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Bioscience Biotechnology Research Communications Special Issue Volume 14 Number (9) 2021

# Special Issue Volume 14 Number (9) 2021

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# **Editorial Communication**

# **Current Research on Management, Sciences and Technology**

The objective of the Special issue of Bioscience Biotechnology Research Communications Vol 14 No (9) 2021 on "Current Research on Management, Sciences and Technology" is to provide a platform to researchers to publish original research work in different avid areas related to Management, Commerce, Social Science, Applied Sciences and Technology.

We are happy to share that quality research work addressing important issues in the field of data science Machine learning techniques, Consumer behaviour, Security network, Deep learning, Health monitoring system, Employee engagement, Engineering Properties, Biology and Medical Science related topic, Topic related to Women Empowerment, artificial intelligence, software applications, energy management and COVID-19 etc. are published in this special issue. This special issue aims to foster the growth of a new research community, acting as an international forum for researchers and practitioners in academia and industry to present research that will definitely play a very important role in changing the landscape of our near future.

The published research articles have been aimed to motivate the next generation researchers working in various emerging research areas. The articles published in this issue will be helpful for the researchers working in these new emerging areas. We express our heartfelt gratitude to all the contributors from different colleges and universities of India and Abroad for giving us an opportunity to publish their research work in this Special Issue on Current Research on Management, Sciences and Technology.

# **Guest Editors**

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# Acclimatization of Angora Rabbits in Warm Climate and its Impact on National Economy

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# ABSTRACT

Today, wool production from Angora rabbits is taking a position on a commercial scale, because it produces 1-1.4 of Kg fine wool, free of any plant contamination and grease, called the Angora wool. This can be attributed to the fact that these animals are highly demanded as pets and companion animals due to the unique qualities of their exquisite beauty and elegant appearance. This study was about the adaptive measures for acclimatization of Angora rabbits in a warm climate in Southern regions of Pakistan. This study provides a brief background of Angora rabbits and their behavior in a warm climate. To keep the Angora rabbits in a warm climate, it may be ensured that their bedding is changed regularly. Rabbits would not like sleeping below a pile of loose blankets, and this may expose them to serious illness. Therefore, their bedding might be changed at least once a week or less. The study was done from 2018 to 2021 on Angora rabbits at Pakistan Agriculture Research Council (PARC), Arid Zone Research Centre (AZRC),Dera Ismail Khan, Pakistan. It included the adaptive measures that might be taken for acclimatization of Angora rabbits in a warm climate, in a warm climate, their living place in warm conditions, their food, fur cutting, and overall management.

KEY WORDS: ANGORA RABBITS; ACCLIMATIZATION; WARM CLIMATE; ADAPTIVE MEASURES.

# INTRODUCTION

The Angolans arrived in Eastern Europe between the 500 and 600 AD era. This was the best instance of its discovery, and it was most likely transported there by the Romans. Angola flocks were raised by tribes living in the



frigid Carpathian Mountains of Transylvania (between Romania and Hungary), for warm wool. These rabbits had been called Angora rabbits for over a thousand years, and in certain regions until the nineteenth century. Rabbit fur is referred to as "Angora" by Romanian tribes. This indicates "no scuffs." The first Angolans landed in southern France around 1723 (Bordeaux). Rabbits were delivered by British seamen, and the prices for each rabbit were exorbitant. According to their account, these rabbits were brought from Angora, a province in Asia Minor (Turkey), now known as Ankara. Because of the extension of Rome's influence, Turkey may also be the birthplace of Angolans. It's also plausible that, because the British have



owned Angola for over 200 years, the new generation of British sailors were unaware that they were bringing descendants of British silk rabbits to France that had been shipped to Turkey for the previous 200 years. The sailors simply named the rabbit after the Turkish capital of Angora when they arrived in France. Rabbits are a notorious component of livestock, being micro and monogastric category animal, usually reared for meat, wool/fur purpose, as a pet, exhibition, and laboratory animal. Rabbits are highly prolific and economical animals, with very low nutritional and managemental costs, and suitable for meat and wool production at low investment plan, feasible to smallholder farmers too (Ume et al. 2018).

Amongst rabbits, the Angora rabbits are known for their beautiful wool that is in shades of white. These are prized for being the most desirable for making fine knitwear items. Angora fiber has a low density of 1.15 to 1.18 g/cm<sup>3</sup>, compared to the density of 1.33 g/ cm<sup>3</sup> and 1.50 g/cm<sup>3</sup>, for wool and cotton, respectively. Angora rabbits are known to produce 1-1.4 Kg of fine Angora wool per annum, with the characteristics of fine quality, contamination, and grease-free. The wool counts for 30% of the live body weight of Angora rabbits, with high content of keratin as compared to other wool-producing animals like sheep, goats, camels, etc. While the production longevity of the Angora rabbits is reportedly 3-4 years (Lebas et al. 2010).

Raising Angora Rabbits for fleece can not only raise the knitting and spinning projects for knitters, but it also can be quite lucrative. Angora rabbits were introduced into other Caribbean regions by American and European fur traders. These animals were initially bred to produce fleece for clothing and winter stuffing but thereafter, the breeders started raising these for their wool purpose. Wool production is an important process, and many people don't have the necessary knowledge to achieve the best results. It is important to find the right rabbit breeders, who have been processing Angora wool products successfully for years and can provide the necessary high-quality, consistent grade wool needed. Angora wool is soft, fine, light, clean, with good insulating features, and is used in the production of excellent quality yarns for hosiery and knitting wear (Herrmann et al. 1996).

Careful selection and pairing of compatible pairs of Angora rabbits will generate a high-quality wool product that can give a premium price. During the selection of potential pairs of rabbits for farming, the signs of quality in the ears, teeth, and feet of the breeding pair are of immense importance, i.e. pink and small ears with little or no swelling, properly spaced teeth having a yellowish appearance in young and white appearance in mature life. In the warm climate of most parts of the world, the Angora rabbits might be fed with table food such as corn or wheat or pellets of lamb, beef, or goat. A rabbit might never be fed with carrots, apple leaves, or grapes, as these are high in carbohydrate contents and cause obesity. Rabbit diet deficient in fibers and vegetables are prone to constipation.

Pakistan's government initiated the cultivation of Angora rabbits in the North West areas of Pakistan, in addition to the existing arrangements with Chinese farmers to raise Angora rabbits throughout the country. Angora Rabbits are highly prolific and a good female can produce 25 to 30 kits (young ones) per year and one bunny is sold on PKR 5000-10000 PKR while breeder price is 20000-50000 PKR in the local market. While wool is sold to leather industries at price between PKR 3000 to PKR 5000 per Kg. Keeping in view the advantages of Angora rabbit production (wool and its products), it is envisioned that the Angora rabbit industry could provide a huge source of foreign revenue by the sale of wool and its products in the established markets in the approach of Pakistan. It can play a vital role in the poverty alleviation of resource-poor farmers. Also, the Chinese Pakistan Economic Corridor (CPEC) will provide open access to the China market for the export of its valuable products.

Angora rabbits improving livelihoods in Pakistan: The rabbit industry has the potential to raise the livelihood and socio-economic status of a developing nation by providing low-cost animal proteins. Because rabbits are highly prolific and a female rapid can produce 80 Kg of meat per year through her progenies. In India, rabbit meat production is 5000-19000 tonnes per annum while, Angora wool production is reported as 25-30 tonnes per vear (Risam et al. 2005). Angora rabbit fiber is particularly popular for making Pajamas, hospital blankets, and thermal underwear. Fashionable attire is also popular (such as shawls). A pilot program was launched in Pakistan's mountains with the help of the International Center for Integrated Mountain Development (ICIMOD) and the Pakistan Agricultural Research Council to use Angora rabbits as a source of high-value livelihoods for marginalized communities, particularly women and the trial begin in 2010, by importing 25 white Angora rabbits from Kathmandu, Nepal, PARC built the first Angora rabbit breeding model at the National Agricultural Research Center (NARC). Now NARC has 200 Angora rabbits under its care, including three different color breeds: German Angola, French Angola, and Himalaya Angola, in jet black, brown, and grey, respectively. PARC has successfully studied Angora rabbit breeding in Pakistan under a variety of environmental conditions and created an Angora rabbit promotion package for Pakistani mountainous communities.

To date, PARC has donated dozens of Angora rabbits to female farmers in Azad Jammu and Kashmir (AJK), Punjab's Muree Mountain, and Hazara division, Khyber Pakhtunkhwa (KPK), comprising 4 females and 2 males per unit. The KPK government developed another Angora rabbit farm at the Livestock Research and Development Station (LR&DS) in Jaba, district Mansehra, with technical assistance from PARC. PARC recently announced the supply of Angolan rabbit units to support the ICIMOD project area in Gilgit's Upper India-Upper Gojal Basin, as well as the Ministry of Forests, Wildlife and Environment, Skardu, and the Ministry of Environment (FWD), Baltistan's local livelihoods. PARC has achieved strides in the development of the Angolan wool value chain, launching a variety of market products such as Angolan yarn, yarn, shawls, and socks.

Study of Angora rabbits maintained at PARC Arid Zone Research Centre, Dera Ismail Khan: The study was done at PARC Arid Zone Research Centre, Dera Ismail Khan, over three years of 2018-2021. For this purpose, 30 Angora rabbits (5 months old, 50% female) were housed individually in well-ventilated wire cages and open sheds (in warm temperature) in the rabbit farm of PARC Arid Zone Research Centre, Dera Ismail Khan. Diet of the rabbit comprised a pellet feed containing 14.38% crude fiber, 16.92% crude protein, 2.42% crude fat, 0.85% lysine, 0.21% cysteine, 1.06% calcium, and 0.55% phosphorus, and has net energy of 9.91 MJ/Kg. Rabbits were also offered green fodder and free access to food and fresh water. Each cage's food consumption was tracked daily and the temperature and relative humidity of the shed were measured twice a day at 8:00 A.M. and 2:00 P.M. The length of fibers on different areas of the body (back, buttocks, neck, and sides of the body) was measured with a scale. The wool was cut using scissors when the Angora fiber length reached 55.0 mm and weighed individually. The shorn rabbits were individually weighed after cutting the wool. The study lasted for three years, which is the average lifespan of Angora rabbits.

Adapted measures for acclimatization of Angora Rabbits in Warm Climate: The three most important factors affected by the weather and climatic conditions are temperature, humidity, and wind. It is, therefore, necessary to provide them with shelter and warmth in times of cold and harsh weather, because the rabbits suffer from stress in unusual heat and humidity in the environment. In such conditions, they are prone to illness and even get hit by severe temperatures. Therefore, different adaptive measures for the acclimatization of Angora rabbits in warm weather are considered. Angora rabbits can't regulate their body temperature since their sweat glands aren't working.

The PARC is a key national agency that collaborates with federal and provincial authorities to deliver sciencebased solutions to agriculture-related problems in rural areas. Angora rabbits were procured from Japan about eight years ago as part of the Agriculture Linkage Projects (ALP) "Raising Angora rabbits as a high-value livelihood for Pakistani women." The major purpose was to investigate Angora rabbit performance in the Pakistani environment and to promote Angora rabbits as a high-value breeding medium and a significant source of income, especially for Pakistani women. Following are the adaptive measures for acclimatization of the Angora rabbits in a warm climate at PARC Arid Zone Research Centre, DIKhan.

**Their living place and Ventilation management:** Provide them with a nice plastic or metal big house with multiple compartments, as a welcoming house in the warm climate to enable them to curl up inside and stay cool during the summers. Ventilation is of most importance for all animals. All rabbits were reared in open shed and air blown through fan with alternate hour functioning due to loading shedding schedule.

**Food and water:** Water is essential for keeping cool in high temperature. Speaking of water, change their water out a couple times a day to keep them fresh and cool. Adding of few ice cubes in water also gave positive impact on animals. Angora rabbits were fed with a mixture of cereals (wheat, barley, and oat), lucerne hay, and fresh forages or fodder beet, for a long time, and were kept for meat purposes only. After the 1960s, the rabbits' diet was shifted to pelleted concentrates, with 3-5mm pellet diameter, and the Angora rabbits were preferably reared for wool production (Lebas et al., 2010).

While in our study, the Angora rabbits were provided with additional things like freshwater cans, food scraps, and dried pellets. These materials were placed in a shallow dish so that the rabbits can easily drink. The shredded paper and hay were placed in the water cans to keep them happy and comfortable even if they were indoors, in a warm climate. They were provided with 330 ml of fresh water per rabbit per day.

**Fresh straw or wood chips:** Give the rabbits, extra space in a shady area inside their house, if it is too hot during the daytime. This will enable them to cope with the sudden temperature change. During the nighttime, provide the rabbits with fresh straw or wood chips for rest and sleep upon these. Rabbits are known impulsive to hide from the heat.

**Use of Pitchers soil moistening:** In rural areas of our country & even in some urban areas too; the pitchers which are the round earthen containers are used for water storage which range in capacity from 10 to 20 liters. Excavated a pit as deep as the pitcher and placed the pitcher inside, surrounded the pitcher with finely powdered soil, pressed against the outer wall of the pitcher. Pitchers were buried around the living area of Angora rabbits (1 pitcher/4 sq ft), which were fully filled with fresh water. After a day or two when the moisture in the pitcher had spread into the surrounding soil it was observed that rabbits preferred to seat near the pictures because of natural seepage causing cooling effects. Pitchers were refilled when <sup>3</sup>/<sub>4</sub> th of its water was leached down.

**Wet Sand bedding:** Angora rabbits were provided with sand bedding and water was showered on this sand twice daily to cool the habitat. The practice eased down the harsh environment for angora rabbits as the rabbit stretched full body on wet sand which had cooling affect.

**Fur cutting:** Fur of all angora rabbits were cut when it attained the length of 8–12 cm to minimize the fur's heating affect. Generally, fur of rabbit is cut to keep them cool, control ticks and for vigorous growth of fur.

Our target was only to eliminate or minimize the effect of heat due to lengthy fur so that Angora rabbit can survive efficiently.

**Deep underground tunnels:** Angora Rabbits were provided with such environment so that they can go for deep tunneling for adaptation under hot weather. It was observed that all rabbits made two- to three-meter-deep tunnels in grounds and gave birth to bunnies in these tunnels even in the hot months of July and August.

**Plantation shade:** Plants' shade plays an important role because of their cooling effects and help in developing comparatively cooler micro-climate. In addition to other practices Angora rabbit sheds were established under the trees which remained very helpful for controlling temperature.

**Type of feed and Night feeding:** Keep the Angora rabbit out of direct sunlight as much as possible, especially during the hottest part of the day as sunlight is main cause of heat stroke in animals, So, allowing rabbits to graze or exercise at night or early morning time gave a very positive impact on their survival, growth and wool production. Moreover, to avoid heat production due to digestion process; grains' feeding was avoided during summer. Green available fodder and plants leaves like neem, moringa etc are the best feeds. Moreover, provided fresh greens washed with cold water to help rabbits get extra water and make them more appealing.

**Shock, disease, or flea infestation:** The rabbits may not be acclimatized simultaneously to treatment for shock, disease, or flea infestation. In past, rabbits were rarely acclimatized to the cold and the process of acclimatization took several weeks. During that phase, the rabbit's temperature remained low, usually below the freezing point, and the rabbits were not allowed outdoors, because rabbits are insatiable creatures and try to seek shelter in any place available to them. Moreover, the diseased rabbits were treated immediately and the antiparasitic medicines were used to prevent flea infestations.

A short analysis of angora rabbits and warm climate: The so-called "warm temperature effect" is one of the most misleading concepts in rabbit care. It has been an occurrence for many decades that some breeders bred their rabbits, during excessively hot and excessively cold. To better understand this concept, it is good to have a basic understanding of the physiology of rabbits. There are three main thermostat elements in rabbits and they are located in the forehead, underbelly, and rump. The cause of this "warm temperature effect" is the fact that the rabbits spend much of their time in their buns or a resting phase. When they get too hot, they extract energy from their buns through their paws and legs, resulting in excessive sweating. On the other hand, when they get too cold, they chill their bodies by unzipping their coats and this causes their insides to become cool and their hairs to fall out. At the same time, the buns do not provide any insulation because of their thick fur which prevents heat from penetrating.

It has been reported that the wool production of the Angora rabbits fluctuates with seasons in temperate climates and the wool production is lowest during the hot summers, in both German and French varieties of the Angora rabbits. Moreover, the wool weight is based on the fiber length, diameter and number of fibers and the growth and number of these fibers is significantly affected by the climate and photoperiod and the ratio of inactive fibers is significantly increased in the summers, compared to spring, thus reducing the net growth of wool in a hot climate (Lanszki et al. 2001). Rabbit is vulnerable to variations in the ambient temperature and the immunity of the rabbits' drop in draught and humid conditions (Ajasin et al. 2003). While, winters, the buns become very tight and uncomfortable around the eyes, legs, and belly. As a result, rabbits accustomed to living in these conditions, tend to develop arthritis. Such a condition may trigger severe pain and inflammation, and it could eventually lead to the breakdown of the bunny's cartilage.

But does warm temperature affect Angora rabbits cause such pain? There is no direct evidence that such a condition is caused by temperature change. It might be due to an increased sensitivity to thermal signals among the Aussie rabbits, or the animals feel the temperature change to find out whether they are safe or not. If the temperature goes up, the animals feel uncomfortable, while if it drops, they feel safe. However, some breeders insist that increasing the temperature at which pellets are stored has a devastating effect on the buns. These breeders say that it causes the buns to shrink together, causing them to look unhealthy and it was claimed that thousands of buns died in a month. It is also believed that buns are affected by temperature because it makes them more active and playful. When the temperature of the rabbit's environment goes up, it triggers their activity. They start moving around more and eating more. It is therefore said that the raised temperature induces them to eat more.

Briefly, the coping strategies may be devised and adopted for cushioning effects of the climate change like sunshade provision, position hutches, use of fans or desert coolers, using resistant breeds of rabbits, frozen water plastic bottles for cooling effect, destocking, shearing, improving the nutrition of rabbits, etc (Okorie, 2011).

Some keys of a good nutritious diet for angora rabbits in winter days: The effect of warm temperature on the Angora rabbits is more desirable because the winter months are the worst time for this type of breed. It is during these winter months; they are prone to illness and injuries. It might be ensured that they have the right amount of food and water to stay healthy. The following are the five keys to good rabbit nutrition;

1. The rabbits need fresh water regularly. They can only digest fresh foods. In addition to providing clean water, a litter pan may also be provided to them to relieve themselves. The litter pan will help protect the fur and also prevent the accumulation of urine and feces. When cleaning the litter pan, it is important not to scrub the bottom of the box as this can cause sores and infection.

- 2. Do not feed your rabbits starch, such as; corn, wheat, or oats. These types of grains can create acidic conditions in their stomach that can be harmful. If the rabbits are hunching over or are licking their stomachs after eating, then they might have been fed too much starch.
- 3. Do not leave your rabbits outside for long periods. The warmth and humidity can make their system feel uncomfortable and their fur may be matted. Sunburn on the fur is very dangerous to the rabbits and can cause raw and blistered skin.
- 4. Avoid giving processed food to rabbits. Although this type of food has been processed to be more digestible, it can still harbor parasites and bacteria especially in the case of poorly washed pellets. Feeding processed food to rabbits may lead to an unbalanced weight, which can cause abnormal activity and overeating.
- 5. Make sure to provide fresh drinking water regularly. Angora rabbits require fresh drinking water at all times. It is advised to keep a supply of fresh drinking water available at all times. A fresh supply of water is essential to maintain a healthy digestion system in rabbits. Because improper digestion of food can result in obesity, bloating, and diarrhea.

# CONCLUSION

It can be concluded that Angora rabbits can also survive under hot temperature even up to 40-50 °C but integrated management measures for its acclimatization under high temperature area should be adapted, which include above mentioned practices. It has been also concluded from the study that the Angora rabbits may be successfully maintained in the cage system as well as in open shed on a commercial pelleted diet, green grass and ad libitum freshwater supply at warm areas. But regular cleaning of their houses and replacing their bedding hay is essential to maintain the quality of Angora wool and prevent any contamination of their wool. Farmers' can fetch more from this self-generated industry; playing thereby role in poverty alleviation. However, it is worth mentioning that while providing cool habitat to angora rabbits; we are also providing best surviving places to other harmful insects like scorpion, which should be checked with proper protection measures. Only breeders should be allowed to go in tunnels for breeding purpose otherwise fur quality is negatively affected. Bunnies do not cope well with hot temperature, so keep a close eye on them and by providing place of ice packs amongst their bedding, wipe their ears with a damp tissue to cool them down and fill plastic bottles with freeze water should be provided because bunnies love laying against these to keep cool and in this way mortality of bunnies can be control in high temperature.

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# On the Healthy and Nutritional Diet During COVID-19 PANDEMIC

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# **ABSTRACT**

The entire world faces COVID-19 outbreak in the year 2019 and 2020. Corona viruses are a large family of viruses that exist in many different species of animals including camels, bovine animals, and bats. The new strain of corona virus identified as the cause of outbreaks of respiratory disease in people first detected in Wuhan, China, was COVID-19. WHO has published a new guide on how to eat healthily during the COVID-19 COVID pandemic and self-quarantine. The guideline contains valuable information about nutrition to help keep the immune system strong. It also has tips for a diet that supports good health while many of us are advised to stay at home and may have less opportunity to consume fresh foods and be physically active The FDA continues important research to protect public health during the COVID-19 pandemic along with other federal, state, and local agencies and public health officials around the country.

KEY WORDS: COVID-19, CDC, FDA, MERS-COV, SARS-COV AND UNICEF.

# **INTRODUCTION**

Coronavirus is an ailing infection. Coronavirus disease (COVID-19) is a newly discovered coronavirus-caused infectious disease. Most people infected with the COVID-19 virus will experience mild to moderate respiratory disease and recover without any special treatment being required. Older people and those with underlying medical conditions such as cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious diseases1.

# Spread of corona disease:

- The coronavirus is thought to primarily spread from person to person. This can happen between people in close contact with each other. Via droplets formed when an infected person coughs or sneezes may land in the mouths or nose of people nearby, or may be inhaled into their lungs.
- A person infected with coronavirus even one with no symptoms – may emit aerosols when they talk or breathe. Aerosols are infectious viral particles that

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can float or drift around in the air for up to three hours. Another person can breathe in these aerosols and become infected with the coronavirus. This is why everyone should cover their nose and mouth when they go out in public.

• Coronavirus can also spread from contact with infected surfaces or objects. For example, a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes.

**Clinical features:** Reported diseases for confirmed coronavirus disease 2019 (COVID-19) cases ranged from mild symptoms to severe illness and death. Such symptoms will show up 2-14 days after exposure (based on MERS-CoV virus incubation period).

- Fever (fever above 37.8 ° C or skin that feels hot to touch).
- Fresh, recurrent cough.
- Breathlessness and trouble breathing.
- Tired.
- Chiefs/Headache.

**Hospitalization:** If anybody develops emergency warning signs for COVID-19 they get immediate medical attention (Błaszczyk et al., 2020).

### The included emergency warning signs are:

- Respiratory trouble
- Lasting chest pain or pressure



# Moon & Mahakarkar

- New confusion or disarray
- Bluish eyes or lips



Figure 2: Ways of prevention from COVID-19 (Coronavirus)



**Treatment:** There are currently no therapies or vaccines approved by Food and Drug Administration for COVID-19 infection. Treatment provide as per Symptoms and severity of disease condition.

- Trouble breathing
- Pain or pressure in chest
- Confusion or severe drowsiness
- A blue tint to lips or face

Table 1. Food types with food Items		
Sr. No	Food Types	Food Items
1.	Fruits	Seasonal
2.	Vegetables, legumes	Boobs, lentils
3.	Total grain and nuts	Maize, millet, oats, wheat,
		brown rice or starchy
		tuber or roots such as
		cabbage, yams,
		taro or cassava
4.	Flesh originates from	Meat, fish,
	animal sources	eggs and milk

# Treatment during Hospitalization:

• Check the levels of oxygen in blood with a clip-on finger monitor

- Check lungs function
- Give a COVID-19 test. This involves putting a 6-inch cotton swab up both sides of the nose for about 15 seconds.
- Perform chest X-ray or CT scan

### **Medications:**

# Painkillers: To relieve pain and fever eg. Paracetamol. Antibiotics:

- Bamlanivimab- monoclonal antibody therapy
- Casirivimab and Imdevimab

Prevention: It also recommends routine preventive measures to help prevent the spread of this and other respiratory viruses, including:

- Wash your hands regularly with soap and water for at least 20 seconds, particularly after going to the bathroom; before eating; and after blowing your nose, coughing or sneezing.
- If soap and water are not readily available, use an alcohol-based hand sanitizer with at least 60 percent alcohol. Where hands are clearly dirty, always wash hands with soap and water.
- Stop to rub your eyes, nose, and mouth unwashed with your hands.
- Avoid direct contact with people who are sick.
- Stay home when you're sick and keep children when they're away from school.
- Using cough or sneeze to cover the tissue, and then dump the tissue in the garbage.
- Clean and disinfect products often treated.

The COVID-19 outbreak- Nutrition advice for adults: Everyone needs good nutrition and hydration and the two are vital. Those who eat a well-balanced diet tend to be safer with better immune systems and less chance of developing chronic diseases and infectious diseases. Start eating unprocessed and nutritious food every day Need to eat (Bogoch et al., 2020).

# Nutrition and health tips during self-quarantine: General Tips:

- Make a plan take only need based food items
- Be strategic about the use of ingredients prioritize fresh products
- Prepare home-cooked meals
- Take advantage of food delivery options
- Be aware of portion sizes
- Follow safe food handling practices: Food safety is a prerequisite for healthy diets and food security. Good food hygiene guidelines include:

# Tips for Food hygiene during outbreak of corona virus disease (COVID-19):

# The tips for General food hygiene are:

Before cooking any meal, we need to thoroughly wash our hands with soap and water for at least 20 seconds before eating and make sure that children do the same.

- When preparing uncooked meat and fish, separate chopping boards must be used
- For cooking food recommended temperature need to be use.

- Maintain food at safe temperatures below 5  $^\circ$  C or over 60  $^\circ$  C
- Use clean water and raw materials.
- Keep the products cooled or frozen and pay attention to the expiry dates of the product, where possible, and keep the freezer clean.
- Recycle or dispose properly of food waste and

packaging in an adequate and sanitary manner, avoiding the build-up of pest-attracting refuse.

- Always keep clean the kitchen, utensils, dishes and hands.
- Separate raw and cooked food, especially fresh and raw meat
- Meat thoroughly cook (De Faria et al., 2021).

Sr. No	Food Types/Items	Quantity		
1.	Veggies	2.5 (5 portions)		
2.	Outfits(Fruits)	2 cups (4 servings)		
3.	Grains	180 gm		
4.	Meat and beans: • Red meat • Poultry	<ul><li>1 to 2 days a week</li><li>Twice a week</li></ul>		
5.	Snacks:			
6.	Fresh fruit	2-3 cups		
7.	Raw vegetables, instead of food	Evite High sugar, fat, or salt. 2 Pockets		
8.	If eat canned or dried vegetables and fruits	Pick varieties that do not have salt or sugar added. 2 Pockets		

Note: Don't overcook fruits and vegetables because of the loss of important vitamins.

Sr. No.	Nutrition advice	Plan
1.	Enough water for drinking every day	<ul> <li>Water brings nutrients and compounds into the blood</li> <li>Water is vital to life and is very important.</li> <li>Drink 8–10 cups of water every day.</li> <li>It regulates a person's body temperature, reduces waste, lubricates and cushions the joints</li> </ul>
2.	Fat and oil -eat moderate amounts.	<ul> <li>White meat and fish (e.g., poultry),</li> <li>Usually low in red meat and not fat.</li> <li>Evite trans processed meat and meat produced industrially.</li> <li>Consume low-fat or low-fat forms of milk and dairy products.</li> <li>Eat unsaturated fats and not saturated fats</li> </ul>
3.	Eat low sugar and salt	<ul> <li>Limit the salt and high-sodium condiments in cooking and food preparation.</li> <li>Restrict daily salt consumption to less than 5 g (about 1 teaspoon), and use iodized salt Pick fresh fruit instead of sweet treats such as cookies, cakes and chocolate.</li> <li>Avoid products rich in salt and sugar</li> <li>The consumption of soft drinks or sodas and other high in sugar beverages should be limited</li> </ul>
4.	Eat Homemade foods	Avoid eating outside; eat only homemade foods to avoid COVID-19 exposure.
5.	Psychosocial assistance and therapy	<ul> <li>Magic bullets are healthy nutrition and hydration for wellbeing and immune system changes.</li> <li>To keep the population in good health.</li> <li>Get specialist advice and psychosocial assistance.</li> </ul>

- Limit salt intake: The WHO recommends eating less than 5 g of salt a day. To do so, priority should be given to foods with reduced or no added salt.
- Limit sugar intake : WHO recommends that ideally less than 5% of total energy intake for adults should come from free sugars (about 6 teaspoons). Limit the amount of sugar or honey added to foods and avoid sweetening our beverages.
- Limit fat intake: Limiting the total intake of fat to less than 30 percent of the total intake of oil, which no more than 10% should come from saturated fat. To achieve this, opt for cooking methods that require less or no fat, such as steaming, grilling or sautéing instead of frying foods.
- Consume enough fibre: Fiber contributes to a healthy digestive system and provides a prolonged sense of

fullness which helps prevent excessive eating. To ensure an sufficient intake of fibre, all meals will contain vegetables, fruit, pulses and wholegrain foods. Wholegrain products include peas, brown pasta and rice, bread and wraps of quinoa and whole wheat rather than refined grain foods, such as white pasta and rice, and white bread (Elfagi et al., 2020).

- Stay hydrated
- Avoid alcohol or at least reduce alcohol consumption
- Enjoy family meals
- According to UNICEF guideline: The healthy eating tips are;

### Moon & Mahakarkar



- 1. Take fruit and vegetable
- 2. When fresh produce is not available swap in healthy dried or canned alternatives
- 3. Keep stock of healthy snacks
- 4. Reduce intake of highly processed foods
- 5. Make cooking and eating a fun with family

**Breastfeeding Advice for Children:** Between 6-24 months breast milk remains a great food for children. Women with COVID-19 are permitted to continue breastfeeding if they wish to (Naja 2020; Omar 2020). If mother with COVID-19 separates mother and newborn baby and starts feeding artificially or if human milk bank is available also give that milk or use the options available. Breast milk provides babies with the best source of nutrition and protects them from disease. Breastfeeding disruption can lead to a drop in milk supply, the infant's refusal to take the breast and a decrease in protective immune factors in breast milk.

## According To Unicef Guideline:

**I.** Continue breastfeeding while keeping hygiene in mind: The virus was not found in breast milk and all mothers recommended that breastfeeding continue while practicing good hygiene while feeding. The 3Ws include in breastfeeding:

- Wear a mask while being fed,
- Wash hands with soap before and after baby has touched,
- Wipe the surfaces and disinfect them regularly.

The main risk to a baby is to catch the virus from close contact with the mother or other family member who is infected. If someone in the household is sick, take extra care in practicing the 3 Ws to protect the baby. Many mothers may opt to wear a mask as a routine during feeding to ensure their child is covered to the full. If a mom suspects she may have contracted coronavirus, she may wish to use a clean cup or cup and spoon to express her breastmilk and feed the baby (Prasad 2020; Scully 2009).

**II. Take more hygiene steps and continue to breastfeed if mother is sick:** Prior to delivery, mothers who are infected with coronavirus and begin breastfeeding and those mothers who are infected during breasfeeding will produce immune factors (antibodies) in their milk to protect their baby and improve the baby's own immune responses. Which means the only way to fight the infection and protect the unborn baby is to start breastfeeding. If a mother is sick with signs of fever , cough, or breathing problems, Mother will seek medical treatment as early as possible and obey a health care provider 's instructions (Mansoorian 2021; Mumena 2021). Those mothers who are good enough to breastfeed their baby should continue to do so by taking additional hygienic care by practicing the 3 Ws whenever the mother goes to near her baby including wearing a mask (Gleeson 2013).

**III. When the mother is too ill and is unable to breastfeed, using a cup and a spoon of concentrated breast milk to feed infants:** Sick lactating mother should seek immediate medical advice. If mom can still express breast milk and ask a non-infected family member to feed the newborn using cup or cup & spoon. Please remember to keep track of the 3Ws all the time and keep the baby safe, clean and healthy (Gleeson 2004; Hobbs 2005).

**IV. Special care While formula feeding:** Breastfeeding is just the right food for healthy baby growth and development. But when the mother lactates she can't breastfeed or decides not to breastfeed her advice on formula feeding. In this condition we must feed the babies as per the packaging instructions. Every time, the 3 Ws followed (Wypych et al., 2017).

# **CONCLUSION**

COVID-19 coronavirus outbreaks are a community health emergency. This time period is very stressful for everyone affected. Remember it's important to stay informed and to be kind and supportive to each other. Peoples maintain our health by taking healthy nutritious diet and also follow the available, updated guideline's provided or published by the government and not to believe on fake news.

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# Effectiveness of Planned Teaching Programme on Knowledge Regarding the Effects of Anemia on Mother and Fetus Among Pregnant Women in Selected Rural Hospitals

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# ABSTRACT

Anemia is the world's most common nutritional deficiency, and it is a major contributor to pregnancy complications and outcomes. According to the WHO, anemia is a condition in which the number of circulating red blood cells. Objectives of study: 1. To assess the knowledge regarding the effects of anemia on mother and fetus among pregnant women. 2.To evaluate the efficacy of planned education on the effects of anemia on the mother and fetus in pregnant women. 3.To find the association between selected demographic variables with knowledge score regarding effects of anemia on mother and fetus among pregnant women. Material and Methods: Purposive sampling was used to collect 50 samples from antenatal wards in various hospitals. A one-group pre- and post-test design with no control group was used for the research. The findings revealed that in the pretest, 10% of antenatal mothers had average knowledge, the mean percentage of knowledge score was 19.76%, and in the posttest, 18% of antenatal mothers had good knowledge. knowledge score was 39.76%. Education was found to be associated with knowledge of antenatal mothers and none of the other variables were found significantly related to the knowledge of mothers. Conclusion: The main objective of the research study was to assess the efficacy of the planned teaching on awareness of the effects of anemia on the mothers and fetus in selected hospitals.

KEY WORDS: ANEMIA, PREGNANT MOTHERS, FETUS, NUTRITIONAL DEFICIENCY, OXYGEN, RED BLOOD CELLS.

# **INTRODUCTION**

Anemia is the world's most common nutritional deficiency, and it plays a significant role in pregnancy complications and outcomes. Anemia is a condition in which the amount of circulating red blood cells reduces, lowering the ability of the mother's and foetus' vital organs to carry oxygen. Anemia is a condition that can affect both the mother and the fetus during pregnancy. Anemia during the antenatal period causes poor weight gain, PIH, placenta previa, eclamsia, abruption placenta, and premature rupture of membranes. During the intranatal period, for example, preterm labour is a maternal risk complication, intranatal hemorrhage, shock



and anesthesia related heart failure to name a few. The postnatal period can be complicated by postnatal sepsis, sub-involution, and embolism, prematurity, low birth weight, low APGAR score, fetal distress and neonatal distress requiring prolonged resuscitation are all examples of anemia related complications (Ezzati et al., 2002).

### **Objectives Of The Study**

- To assess the knowledge regarding the effects of anemia on mother and fetus among pregnant women
- To evaluate the efficacy of planned education on the effects of anemia on the mother and fetus in pregnant women.
- To find the association between selected demographic variables with knowledge score regarding effects of anemia and fetus among pregnant women.

**Distribution of Pregnant Women With Regards To Demographic Variables:** 22% of the pregnant women were in the age group of 18-20 years, 30% were in the age group of 21-22 years and 24% of them were in the age group of 23-25 years and more than 25 years



respectively. 50% of the pregnant women were Hindus, 36% of them were Christian, 10% were Muslim and 4% of them belonged to other religions respectively. 44% of the pregnant women were educated up to primary standard and 56% up to secondary standard only. 4% of the pregnant women were government servants, 30% were doing private service and 66% of them were doing other professions (Gautam et al., 2002).

The present study was conducted in a rural hospital in Maharashtra and the subject was selected through purposive sampling technique. The tool for data collection was a structural knowledge questionnaire. The pre-test was conducted on the first day, followed by a planned teaching programme and the post test was conducted on the seventh day. One of the studies was conducted in 16 Indian districts to determine the prevalence of anemia among pregnant women and teenage girls. The 30 clusters were chosen using a twostage random sampling process. 94.9 percent of pregnant women had anaemia with Hb11g/dl, and 13.1 percent had extreme anaemia with Hb7g/dl, according to the findings. The overall prevalence of anaemia among adolescent girls was 90.1 percent, with mild, moderate, and extreme anaemia being the most common. The study findings showed that the planned teaching was highly effective in improving knowledge of mothers. There was a significant association between the level of knowledge with education and other demographic variables not found significant (Garn 1981).

# **Nursing Implication**

**Nursing practice:** The staff and student nurses can use the planned teaching to impart the knowledge of anemia to mother and fetus among pregnant women in the hospital and community. The tool prepared for this study can be used to assess the knowledge of mothers, Primigravida, multigravida working women. Staff nurses and student nurses and female health workers regarding the effects of anemia on mother and fetus among pregnant women. The staff nurses in obstetrics and gynaecology wards can use this tool for the same (Marahatta 2007).

Level of knowledge	Destruction	Level of Pretest knowledge score		
score	Percentage score	Frequency	Percentage	
Poor	0-25%	40	80	
Average	26-50%	10	20	
Good	51-75%	0	0	
Excellent	76-100%	0	0	
Mear	n±SD	4.92	± 2.04	
Mea	n %	$19.76 \pm 8.17$		
Rat	nge	1 to 10		

Nursing Administration: Administrators of hospitals, primary health care centers, and sub-centres can develop a policy to educate community members about anemia during pregnancy in order to improve the health of mothers and prevent complications from anemia of the mother and fetus.Nurse administrators are the key people to plan. Organize and conduct service education programmes. Nurse administrator's support should be necessary to conduct and evaluate health education programme. They can help to improve the knowledge of the staff nurses working in the Obstetrics and Gynaecology department by providing various teaching programmes with the help of various AV aids. They are in a key position to organize, implement and evaluate educative programmes which will in turn help to improve knowledge as well as to meet the future needs and accelerate the standards of health services.

**Nursing Research:** The main goal of nursing research is to improve the knowledge of staff nurses through the implementation of evidence-based practice. The study provides baseline data for conducting other research studies on a large scale. The study will be a reference for research scholars. Further research work can be conducted with every medical condition to identify the most effective knowledge imparting strategies.

The above table shows the frequency and percentage wise distribution of pregnant mothers from selected rural hospitals according to pre-test level of knowledge regarding the effects of anemia on mother and fetus. The levels of knowledge were seen into 4 categories, poor, average, good and excellent. 80% of pregnant mothers had a poor level of knowledge score, and 10% of them had an average level of knowledge score. The mean pretest knowledge score of the pregnant mothers was  $4.92 \pm 2.04$  (Rajole 2019).

The above table shows the frequency and percentage wise distribution of pregnant mothers from selected rural hospitals according to post-test level of knowledge regarding the effects of anemia on mother and fetus. The levels of knowledge were seen into 4four categories, poor, average, good and excellent 10% of pregnant mothers had a poor level of knowledge score, 72% had an average and 18% of them had a good level of knowledge score. The mean Post-test knowledge score of the pregnant mothers was  $9.94\pm 2.62$ .



Table depicts the overall mean pre-test and post-test knowledge scores of pregnant mothers from selected rural hospitals which reveals that post-test mean knowledge score was higher 9.94 with SD of  $\pm 2.62$  when compared with mean pre-test knowledge score which was 4.92 with SD of  $\pm 2.04$ .

Table 2. Distribution of post-test knowledge scores for
pregnant women regarding effects of anemia on mother
and fetus

Level of knowledge	Percentage score	Level of Post test knowledge Score		
score		Frequency	percentage	
poor	0-25%	5	10	
Average	26-50%	36	72	
Good	51-75%	9	18	
Excellent	76-100%	0	0	
Mean±SD		9.94 ± 2.62		
Mean %		39.76 ± 10.51		
Range		3 to 14		



Hence it is statistically interpreted that planned teaching programme on knowledge regarding effects of anemia on mother and fetus among pregnant mothers was effective. Thus H1 is accepted and H0 is rejected.

Association of knowledge score regarding effects of anemia on mother and fetus in relation to education: The association of knowledge score with educational level of pregnant mothers. The tabulated F values was 2.79 (df = 3.46) which is much less than the calculated 'F' i.e. 12.20 at 5% level of significance also the calculated 'p'=0.0001 which was much less than the acceptable level of significance .i.e. p=0.05 hence it is interpreted that educational level of pregnant mothers is statistically

Table 3. Significance of difference between knowledgescores in pre and post-test of pregnant women regardingeffects of anemia on mother and fetus

unerence	
Pretest 4.92 2.04 5.02±1.72 20.63 0.00	001,S

\*S- Significant

Figure 3: Overall mean pretest and post-test knowledge scores of pregnant mothers



associated with their post-test knowledge score.

### Recommendations

- A similar study can be replicated on a large scale to generalize the findings.
- A similar study can be conducted by using video assisted teaching.
- A similar study can be conducted to find out the difference in the knowledge level of the staff nurses on the basis of various institutional settings such as government and private settings.
- A similar study can be conducted to find the knowledge level of the nursing students
- A similar study can be conducted in community areas.

# CONCLUSION

The teaching programme was effective as the post-test knowledge score improved than the pre-test knowledge score, so the planned teaching programme has proved to improve the knowledge of pregnant mothers to prevent anemia during pregnancy and also fetal complications.

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# **Comparative Activity of Nitric Oxide (II) System: The Process of Developing An Immune Response in Guinea Pigs After the Injection of An Anti-Brucellosis Vaccine**

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# ABSTRACT

Despite the success achieved in the study of brucellosis, the problem of combating this infection remain relevant. There are a number of issues requiring a more profound research. Research work has been under way to find new and improve existing diagnostic methods, means of specific prophylaxis and methods of improving the farms with unfavorable brucellosis situation. The aim of our research was to perform a comparative study of immunogenesis in guinea pigs 15, 30 and 60 days after their immunization with different cultures of strains: B. abortus 82-Rr, B. abortus 19, B. abortus R-1096 and their experimental infection with the vaccine strain B. abortus 82, and to determine the activity of the nitric oxide (II) system in guinea pigs bodies after vaccination. It was found that throughout the periods of research, guinea pigs vaccinated with cultures of B. abortus 82-Rr and R-1096 strains reacted negatively in serological reactions with a single brucellosis antigen, and positively in CBT (complement binding test) with R-antigen. In animals vaccinated with a strain 19 culture, positive indications of AR (agglutination reaction) and CBT with a single brucellosis antigen remained in high titers throughout the study periods, and were negative with R-antigen. A 100% resistance to contamination with a culture of strain 82 was revealed in animals vaccinated with B. abortus 82-Rr and R-1096 strains, while in guinea pigs vaccinated with a vaccine made of strain 19, a immunity breakthrough occurred and the immunogenicity was 60%.

KEY WORDS: BRUCELLOSIS, VACCINES, NITRIC OXIDE (NO), IMMUNOGENESIS, ANTIGENIC PROPERTIES.

# INTRODUCTION

Brucellosis is one of the most important zoonotic diseases in the world and is of particular importance in developing countries (Wang et al., 2021). This disease causes serious economic losses due to late abortions, stillborn and weak offspring. (Jing et al., 2020).

The Brucella family includes several independent species causing disease in various animal species, including



humans. This family includes the following biological species: B. melitensis, B. abortus, B. suis, B. neotomae, B. ovis, B. canis, B. ceti, B. pinnipedialis and B. Microti. Detection of *B. abortus* in the cattle-breeding farm, or B. melitensis in the sheep-breeding farm and goat farms, B. suis at pig farm is the basis to regard the farm as unfavorable in terms brucellosis. (Ponomarenko et al., 2020). The source of the disease causative agent is animals sick with brucellosis. Infection of animals occurs by alimentary, sexual and aerogenic ways (Saeed et al., 2019). Clinical course of brucellosis in animals is characterized by polymorphism. The main symptom is abortion accompanied by massive and prolonged shedding of brucella with an aborted fetus, amniotic fluid, placenta, discharge from the genital and labor organs. Brucella is shedded by sick animals with urine and milk.



The animals skin, stalls, litter, left-over food, care items, premises, as well as pastures and watering places are infected. Apart from abortions, brucellosis in animals can be accompanied by orchitis, bursitis, endometritis, mastitis. It can be in a latent form and be detected only by means of special tests. (Roberto et al., 2020). For the prevention of brucellosis in animals, vaccination is the only possible alternative to combat this infection. (Lalsiamthara and Lee, 2017). In spite of the fact there is still no perfect vaccine, vaccination with available vaccine strains remains the most successful method of preventing and controlling bovine brucellosis, and is an essential component of the majority of the brucellosis control and eradication programs worldwide (Onunkwo et al., 2018). The perfect vaccine should be both safe and immunogenic. General use of immunogenic vaccines will help reduce the incidence of brucellosis (Lai et al, 2017). Within the framework of a number of scientific studies there have been conducted experiments, noteworthy studies on the development of a bovine anti-brucellosis vaccine, the vaccination of which would provide for a sufficiently strong immunity without seropositivity (El-Sayed et al., 2018).

B. abortus 19 strain is a live attenuated vaccine and the first B. abortus vaccine widely used to combat brucellosis in cattle (Mohammadi and Golchin, 2018). The effectiveness of *B. abortus* S19 has been proven by experimental tests on cattle (Mascarenhas et al, 2020) and under field conditions (Mohamud et al., 2020). Its main characteristics are stable low pathogenicity, relatively high immunogenicity and moderate antigenicity. (Maruf et al., 2019). According to researchers, early serological studies 3-5 months after immunization with strain 82 vaccine contribute to a faster recovery of animals. (Yi et al., 2020). The B. abortus82-Rr vaccine strain has a highgrade immunogenic activity, is mildly agglutinogenic, non-contagious, it meets the requirements for Brucella vaccine strains. 82-Rr strain differs from the original 82 strain by the ability to grow on growth media containing rifampicin in an amount of 50 µg/ml and the absence of abortogenic properties. Strain B. Abortus R-1096 is stable, non-contagious, non-agglutinogenic, has a fairly high-grade immunogenic activity, having no abortogenic properties (Saeed et al., 2019).

Nitric oxide (NO) is one of the main mediators of the immune system, as well as a participant of cell-to-cell cooperation. NO can have a damaging or protective effect on the cell functioning, depending on its concentration. Inducible NO synthase (i-NOS) hyperactivity produces damaging effect (Alhaji et al., 2016). Studies by Priscila Carneiro (2019) showed that the control of *B. abortus* replication in macrophages does not depend on the host cell NO, given the fact that infection of macrophages in the presence of NG-monomethyl-l-arginine, nitric oxide synthase does not affect the growth of intracellular bacteria. More important is the fact that the studies showed that *B.abortus* produces NO as a mechanism for regulating IL-1 $\beta$  secretion in macrophages, possibly through inflammation of NLRP3, as it was previously shown that the synthesis of this inflammasome is disrupted by the action of NO produced by *B.abortus*, which can be used by bacteria to modulate the secretion of IL-1 $\beta$  in infected mouse macrophages. Inflammasome NLRP3 is a protein complex being of crucial importance for the activation of caspase-1 and maturation of neutrophil-activating factor IL-1 $\beta$  and IL-18 (Campos et al., 2019). The purpose of our research is to conduct a comparative study of the immunobiological properties of the most commonly used vaccines made of various *B. abortus* strains and to determine the activity of the nitric oxide (II) system in the body of guinea pigs after vaccination and contamination.

# **MATERIAL AND METHODS**

The work was conducted in the laboratory of bacterial zooanthroponosis on guinea pigs with live weight of 400–450 g. They were divided into four groups. The first group was immunized subcutaneously with the B. abortus 82-Rr vaccine in the left groin area with a dose of 1.5 billion m.c. by ITS (optical industry turbidity standard) in phosphate buffered saline in a volume of 1 ml. The second group was vaccinated with *B. abortus* 19 strain subcutaneously into the groin area with a dose of 1 bln m.c. in a volume of 1 ml. The third group was vaccinated with the *B. abortus* R-1096 strain subcutaneously in the groin area with a dose of 1 ml. The fourth group was left intact.

15 days, 1 and 2 months after vaccination, blood was taken from the ear vein of 3 animals from each group for serological tests. BPAT (buffered plate antigen test was conducted with brucellosis rose bengal antigen), AR, CBT, and CBT with R-antigen to the limiting antibody titers. 2 months after vaccination, guinea pigs were contaminated with the *B. abortus* 82 vaccine strain culture with a dose of 1 mln m.c. subcutaneously into the right groin, opposite to the vaccine injection area, in a volume of 1 ml. The strain culture was used as an infectious agent instead of the culture of the virulent Brucella strain. At that, bacteriological control of the infection dose was performed by means of inoculation of a suspension of brucella on Petri dishes with tryptosis agar.

Guinea pigs were euthanized a month after contamination, followed by serological and bacteriological tests. Bacteriological inoculations were conducted from 10 lymph nodes and organs. The inoculations were cultivated in a thermostat at  $(37.0 \pm 0.5)$  °C for 15 days, viewing them 3 times after 5, 10 and 15 days. At the end of the cultivation of the inoculations, the infection index (II) of the guinea pigs bodies was determined by the culture of the vaccine strain using conventional bacteriological methods. Inoculated brucella cultures were typed in AR on glass with brucellosis S- and R-antisera.

The intensity of NO formation in the body was judged by the content in the blood serum of its conversion products – nitrite and nitrate anions, which were determined by reducing nitrates to nitrites with a single sample of zinc dust treated with an ammonia complex of copper sulfate with subsequent photometric determination of nitrites using the Griss reagent with a wavelength of 520.0 nm at CPK - 3 - 01. All results were statistically processed using Student's test.

# **RESULTS AND DISCUSSION**

Serological studies of guinea pigs immunized with a B. abortus 82-Rr strain culture showed that not a single animal produced a positive result in any reaction with the S-antigen (BPAT, AR, CBT). Whereas CBT with R-antigen is a sign of a strong immune response. Thus, on the 15th day after vaccination, the antibody titer in guinea pigs was  $1.3 \pm 0.0$  lg, on the 30th day they reached the highest titer, which was  $1.7 \pm 0.12$  lg, and on the 60th day it decreased to  $1.3 \pm 0.0$  lg. Table shows

that guinea pigs vaccinated with a culture of strain 19, 15 days after immunization, reacted positively in BPAT, AR and CBT with S-antigen, CBT with R antigen was negative. On the 30th day, the titers of antibodies in AR and CBT with S-antigen, were  $1.4 \pm 0.12$  lg respectively. The maximum titer of antibodies in CBT with S-antigen was  $1.6 \pm 0.0$  lg on day 60, and in AR  $-1.3 \pm 0.0$  lg, BPAT was also positive, while CBT with R-antigen – negative. The data of the third group indicate that not a single animal, in any reaction with the S-antigen, produced a positive result. While in CBT with R-antigen reaction was with  $1.8\pm0.0$  lg titre. One month after vaccination, the indicators of serological reactions with S-antigens, similar to the results after 15 days, were negative in all animals of this group.

Table 1. Indicators of antibody formation in guinea pigs vaccinated with various vaccines after 15, 30 and 60 days

Strain culture	Study Numbe period anima	Number of animals	f BPAT	AR (lg)	CB	T (lg)
				Single brucel	losis antigen	R-antigen
					(M±m)	
B. abortus 82-Rr	15 days	3	neg.	neg.	neg.	1.3±0.0
B. abortus 19		3	pos.	1.7±0.24	1.1±0.12	neg.
B. abortus R-1096		3	neg.	neg.	neg.	1.8±0.0
B. abortus 82-Rr	30 days	3	neg.	neg.	neg.	1.7±0.12
B. abortus 19		3	pos.	1.4±0.12	1.4±0.12	neg.
B. abortus R-1096		3	neg.	neg.	neg.	1.9±0.21
B. abortus 82-Rr	60 days	3	neg.	neg.	neg.	1.3.0±0.0
B. abortus 19		3	pos.	1.3±0.0	1.6±0.0	neg.
B. abortus R-1096		3	neg.	neg.	neg.	1.7±0.12

In CBT with R-antigen, antibody titers increased – 93.3 ± 35.9. And 2 months after vaccination, before infection, they decreased. The results of studies after contamination with the 82 strain culture are shown in table 2. As it can be seen form the table, the antibody titers in AR with a single brucellosis antigen in two guinea pigs from the B. abortus 19 strain group, the lg index was  $1.38 \pm$ 0.25, while in the rest AR and BPAT was negative. The highest titers in CBT with S-antigen were in guinea pigs vaccinated with B. abortus 19 strain culture - 1.84 ± 0.13 lg, the lowest – in the control group was  $1.6 \pm 0.0$ lg. In CBT with R-antigen, the highest titers were in the *B. abortus* 19 strain -  $1.78 \pm 0.16$  lg, and the lowest in *B. abortus* R-1096,  $1.7 \pm 0.12$  lg. In the group of animals vaccinated with the B. abortus 82-Rr strain, the antibody titers were  $1.54 \pm 0.13$  lg, and in the control group - 1.9  $\pm$  0.0 lg, respectively.

The bacteriological study revealed that all animals of the control group had a high degree of inoculation of organs and lymph nodes with the contaminant culture, with II of 20.0  $\pm$  4.1, with a spleen weight index of 2.0  $\pm$  0.47. Guinea pigs vaccinated with B. abortusR-1096 and B. abortus 82-Rr, the immune was 100%. All animals resisted contamination with strain 82 culture. And in the group of animals vaccinated with the B. abortus 19 vaccine II was 16.0  $\pm$  13.6, with SWI 1.68  $\pm$  0.14 immunity was observed in 60% of the animals. Figure 1. The level of nitrate- and nitrite-anions in the blood serum of guinea pigs vaccinated with B. abortus 82-Rr strain  $\mu$ mol/l (n = 5)

Note: \*\* - conclusively compared to the control group (p<0.001).



In vaccinated guinea pigs, the formation of nitric oxide (II) is more intense in comparison with the control group. Thus, in the blood of guinea pigs of the control group, the level of NO metabolites was 28.18 µmo /l, while in the group of animals vaccinated with the B. abortus 82-Rr vaccine on day 15, the level of NO metabolites was 41.81  $\pm$  1.9 µmol/L, and on day 60 - 62.42  $\pm$  3.71 µmol/l (P<0,0001). Comparing the average NOx values of the guinea pigs vaccinated on day 15 and on day 60, we can conclude: on day 60 the NO activity is 1.49 times higher

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than on day 15 after vaccination (Fig. 1). The highest NOS activity after vaccination with the B. abortus 19 strain is reached on day 60 being 37.87  $\pm$  3.04 µmol/l (p<0.035), which is 9.5% lower than on day 15 (Fig. 2).

Figure 2: The level of nitrate- and nitrite-anions in the blood serum of guinea pigs vaccinated with B. abortus 19 strain  $\mu$ mol/l (n = 5)

Note: \* - conclusively compared to the control group (p<0.01).



Figure 3: The level of nitrate- and nitrite-anions in the blood serum of guinea pigs vaccinated with R-109 strain  $\mu$ mol/l (n = 5)



The level of stable nitric oxide metabolites of nitrite and nitrate anions on the 15th day after vaccination with the R-1096 culture strain is  $46.66 \pm 16.09 \mu mol/l$ , and on the 60th day –  $41.51 \pm 2.43 \mu mol/l$  (p<0.005). The highest content of active metabolites is on the 15th day after vaccination in comparison with the control group is is 65.57% higher, and in comparison with the group of vaccinated animals after 60 days – by 11.03% (Fig. 3).

The highest content of nitrite-initrate anions in blood serum in the group of animals vaccinated with the B. abortus 82-Rr vaccine on day 60 after vaccination was  $62.42 \pm 3.71 \mu mol/l$  (p<0.0001).

# CONCLUSION

The work performed on guinea pigs to study the

immunogenesis of various vaccine strains showed that during all research periods, cultures of B. abortus 82-Rr and R-1096 strains reacted negatively in all serological reactions with a single brucellosis antigen, and positively in CBT with R-antigen with high titers of antibodies. In animals vaccinated with a strain 19 vaccine, positive indications of AR and CBT with a single brucellosis antigen remained in high titers throughout the study periods, and were negative with R-antigen and only with an immunity breakthrough. A 100% resistance to contamination with a culture of strain 82 was revealed in animals vaccinated with B. abortus 82-Rr and R-1096 strains, while in guinea pigs vaccinated with a vaccine made of strain 19, a immunity breakthrough occurred and was 60%.

We believe that the immune properties of anti-brucellosis vaccines can be checked using a culture of vaccine strain 82 as an infectious agent with a dose of 1 mln m.c., but to make final conclusion, further research is needed to compare this method with the conventional one, when a culture of virulent strain B. abortus 54-M VGNKI (All-Russian State Center for Quality and Standardization of Medicines for Animals and Feed) is used for infection. The highest content of active metabolites is on the 60th day after vaccination of guinea pigs with the B. abortus 82-Rr vaccine, and the lowest content of nitrite-nitrate anions is in the blood serum of the control group of animals. In vaccinated guinea pigs, the formation of nitric oxide (II) occurs more rapidly and the amount of antibody titer increases significantly. In view of the above, we can conclude that nitric oxide (II) is actively involved in the development of the immune response.

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# **Menstruation: Social Construction and Experience**

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## **ABSTRACT**

Menstruation is a basic natural physiological process that all young girls go through to a certain period but in our society, it is considered an important milestone covered with many social beliefs and practices. This particular paper is completely based on an empirical field study conducted during research work while keeping in the front objective of how society has reconstructed this menstruation process. Women have been seen as central characters for this paper and their own experience and from narrative have been kept on the front while arriving at an understanding whole social construction on "menstruation". I analyzed the data by using some thematic decomposition, such as "Comparison with Blooming Flower: A Mark of Fertility", "A Social Taboo", "Curse: Socio-Cultural Perception towards Menstruation", "Status of pollution" and try to portray social reality.

**KEY WORDS:** MENSTRUATION, SOCIETY, SOCIAL CONSTRUCTION, WOMEN.

# **INTRODUCTION**

In a western developed society, the main concern regarding menstruation was "hygiene and sanitation", wherein eastern society depicts the opposite picture and associated with social taboo, impurity, dirt, etc. There are many cultural repetitions of blood, ranging from family and kinship to violence and war, menstrual blood is almost always positioned negatively (Bramwell, 2001) Menstruation is a transformation period for a girl from childhood period to adulthood period. Leela Dube in her work, clearly states that the first step of change that occurs in a girl's life is marked by puberty which is also considered as her first move towards the construction of femininity and her feminine quality. now the question emerges "what means to be a girl or a women? "Lies in our whole socialization process, which informs her about changing body and persona. In one account one of the participants said,

"God created females with this natural process of menstruation. so, as a female and we are bounded to have menstruation on monthly basis for a certain period. This is nature's rules therefore we should live by these rules



along with existing taboo" In India menstruation being seen as a social and cultural entity and our Society has created existing taboo and social practices restricting women to do their normal work and bound them for suffering. If we looked at it from a scientific lens this socio-cultural taboos and practices nothing but all are man-made and socially culturally constructed. Due to a lack of knowledge and awareness young girls and women have started accepting things as they are being told by society. All-female is born and brought up to accept it wholeheartedly and pass it on to next generation to maintain social and cultural belief system. The attitude of our society hasn't changed since a long time ago though the generation has changed. Rather it has been passed to the next generation where girls cannot talk about menstruation with other family members because it a considered a topic of taboo. The culture and religious beliefs regarding menstruation play an oppressive role in a female's life. It's like society has built a tradition to which every female has to follow their whole life without even thinking of the actual relevance or reason behind those beliefs (Spanier), 1978).

**Objective:** The main aim of the present article is to address social construction on menstruation, how a menstruating woman is treated and viewed by society, and to know how socially this normal physiological process is being shaped by our society in various form of social taboos, rigid practices, belief, how menstruation is being categorized as a mark for womanhood, and how on one side menstruation is considered as "status of pollution" and on the other hand Goddess Ma Kamakhya is being



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worshipped all around in India during her menstrual days.

# **METHODOLOGY**

This article is a part of my research work. Participants were young girls and women between the age group of thirteen and sixty years old. Interviews and focus group discussions were conducted during the time of fieldwork with two different ethnic background communities i.e Nepali and Assamese people reside in komolsapori area with the help of an open-ended interview schedule. Purposively I have chosen this field while keeping in front my objective of research work (Baldy 2016).

Comparison With Blooming Flower: A Mark Of Fertility: People of komolsapori area strongly believe that menstruation is directly linked with the fertility of women. According to them, the process of menstruation creates waste or polluted blood and also prepares a women's body for conceiving a child it is a sign of fertility that is unique to a woman. It is a sign of the capability of women to reproduce a new life. Considering the fact of the fertility of womanhood, Menstruation is being compared with blooming flowers. During the fieldwork, Aroti saikia (a women) housewife described menstruation by comparing menstruation with a flower said, "Once a girl starts her puberty, there is flower get implant naturally, and this kind of flower blossoms during the whole month and at the end when the flower dies naturally and came out in a form of blood from the vagina, which we knew as menstruation. Menstrual blood is considered as bad blood, which should be flowing out every month in other to have healthy fertility life. And ironically when a woman gets pregnant, this flower blossoms to bear fruits. Here in this context fruit symbolize a child (Das 2008)."

It is very ironic to note that, if we see the whole narratives from a scientific lens this is nothing but a simple physiological process of menstruation. The typical traditional belief of associating the whole process from monthly drying up of the flower inside the body on monthly basis and leading to the flow of menstrual blood can be directly related to the physiological process of menstruation. From the scientific perspective, during the time of menstruation is the discharge blood, a portion of tissue and blood are shed and replaced by new growth on a cyclic basis. Thus, it can be said that some cultural beliefs are very deeply rooted in our society, that simple physiological process is being reconstructed by our own social belief. The comparison made between the flower and menstruation in which the flower states that the young girl has just bloomed and menstruation symbolizes her fertility and sexuality. The fact comparing to the blooming of the flower states the period of monthly menstruation It symbolizes woman as a creator, power who can create life (Hawkey 2016).

Nongbri observed a similar explanation where he mentioned about mother earth is compared to blossoming or ripening of flowers for bearing fruit. "The reproductive ideology and the gender role in Hindu tradition start with the metaphor of "seed" and "earth", which implies the subordination of women. The man is considered as the provider of the seed and the woman as the receiver, symbolically implying the womb as the earth for the nurture of the seed. Both the child and the field i.e., woman's womb is owned by man thus stating that the women have no control of her body" (Nongbri: 1988).

A Social Taboo: From the laymen's perspective, the term taboo denotes something which is forbidden. Sociocultural taboos are sanctioned by our social system, culture, and religion and of course we as a common people. The term "taboo" was introduced into the English language from the Polynesian word 'tabu" by Captain James Cook. Taboo, i. e anything is forbidden was widely used by Sigmund Freud in his Totem and Taboo (1950) to define debarments such as "incest taboo". (Das, 2008).

When it comes to the menstrual taboo, there is a legend related to its origin in the Hindu Religion. The Vedic texts of India are full of mythological explanations on how women came to acquire the position of being impure and inferior to men in society, According to Hindu Religious myths, Indra, who is considered as one of the most eminent deities among all the Vedic God, who governs the whole universe especially the natural phenomena such as rains and season. The story narrative reveals that the king of heaven was accused of his sins, that is killing a brahmin (a high caste Hindu) and having illicit sexual acts with women during his quest. Therefore, to turn away from sin, all women were said to be punished through menstruation along with taboos. (Prakash, 2017). In the Vedic text Tarttiriyasamhita it was mentioned that when Indra killed Visvarupa, the son of Tvastr, he transferred one-third of the stain of murdering a Brahmin to women, the text relates that this took the form of women's menstrual period and concludes, therefore one should not converse with stained garments, nor should one with her or eat her food when she has emitted the colour of "Brahmahatya" (Leslie, 1991).

Menstrual taboos have been prevalent in our society since Vedic age, even though we are living in the twenty-first century it still exists and to a certain extent, it defines the existence of woman in some society. The whole "culture of menstruation" is ascribed through the sociocultural process of traditional rituals and belief systems, societal norms, gender-based roles, etc. Social taboos are deeply culturally rooted in komolsapori area, and they play a crucial role especially in women's way of life. Komolsapori area, like another village of Assam, has also its definite judgment about "menstrual culture". The status of menstruating women is considered as "impure" because people reside in this area irrespective of their cast, they strongly believe that "dirty" blood came out of the vagina (Hoskins 2002).

Keeping Infront the purity, she is being secluded for the three days on a mandatory basis. Menstruating women are allowed to take rest for these mandatory days and don't come in contact with anyone to maintain the purity of their respective households. But the state of pollutant being stays with her for a weeklong of seven days. An Assamese woman (47) narrated her own experience, how social taboos and rules and restriction were laid down upon her whenever she had menstruation and how she is being treated by society, "I was kept secluded for mandatory three days in a separate closed room where no one is allowed to visit except a few elder female's family members. Only after a ritual bath after three days I am allowed to step out from my confined room n do normal activities. Entering the prayer house is strictly prohibited for seven days. I am not allowed to touch any tangible or intangible items in the household as it is considered impure (Kumari 2017)."

### A Curse: Socio-Cultural Perception Towards Menstruation:

Though women are being placed in a subordinate position in a male-dominated society, women are the only creator of life in the human race. In a country like India, where the menstruation of Mother Kamakhya is worshipped while at the same time, menstruating women are completely forced to seclusion during this time to counter their polluted state. It is indeed ironic to see, how on the one hand the menstrual cloth of kamakhya and fluid is being distributed as Prasad among the bhaktas on the other hand, in social scenario women with menstruation are considered as a threat to sacredness. On one hand, this natural process of menstruation that is a part of a woman's life is a symbol of blessing and on the other hand, it is considered impure. Menstruation as a blessing brings in the fact of woman as a power to produce a new life. While as a curse, a menstruating woman is considered impure and is forbidden during her periodical cycle (Rege 2003).

Therefore, a question arises that how can menstruation be both a blessing and a curse at the same time? "Ma kamakhya is worshipped for her power to provide fertility, during the time of menstruation this power is believed to be heightened, hence more sensitive, thus resulting in her seclusion from any profane distraction. In the context of Assam, the power of the menstruating Goddess Kamakhya is considered as something that is immensely potent. Menstrual taboo imposed on the woman primarily rests on the idea of her profanes, whereas the menstrual taboo of Goddess Kamakhya essentially represents her sacredness, involving restriction not on the Goddess but n her believers. The fluidities and contradictions of social constructions around menstrual taboo become evident here. (Patar, 2019). Women of komolsapori area have big faith in Ma Kamakhya Sapna Das (57), who is a very staunch believer of Ma Kamakhya shared her story, she narrated,

"Every year during Jun July mother kamakhya Menstruates, we call it as "xaat loga", "suwa" in local terminology. Every work-related to mother nature or earth is strictly prohibited. I try to remain in bed as long as possible. Only boil food is being cooked in the kitchen and it is strongly believed nothing from the womb of nature should be used and people who reside in rural should not use any firewood for making food as firewood is a necessary part of nature. Any activity which is directly or indirectly related to nature should be avoided' In a country like India, where the first menstruation of a girl(menarche), is not a private affair at all rather it is being celebrated publicly (Mangar 2019).

Most of my participants positioned menstrual celebration as a public recognition of their entry into womanhood which should be socially recognized and accepted. Apart from that, from my observation, most of the women had less knowledge about the physiological process of menstruation rather they are being told to kept silent during the time of the month. Basic knowledge was also not provided by elders but rather young girls are being told to maintain "menstrual culture". some participant repeatedly shared their experiences that they are being told to maintain "distance", "avoid touching any tangible and intangible things", "be more careful in every step you make" during the time of menstruation from elderly women (Patar 2019).

Status of Pollution: It is being believed that "bad blood" that contains germ is discharged from the body in a form of menstruation which in social structure symbolizes as "polluting state" of women. The status of pollution linked up with menstruation found in Komolsapori area too. Purity, pollution, and restrictions (taboos) have been written about by different authors for different societies. For example, Eichinger Ferro-Luzzi states that any members of society may be polluted at any given point of time where the pollution may be temporary or permanent, voluntary or involuntary, etc. women are generally polluted during their menstrual period as well as during delivery. These kinds of pollutions are involuntary and temporary wherein women become untouchable and may become unusable by men(1974). The need for practicing such restrictions as mentioned by the author is aptly taken forward by Doughlas(1966( where she suggests that societies give conformity to such rites and practices which are there to minimize the dangers people might encounter by associating pollution to their moral values. (Das, 2008).

"Some personal narratives were shared by a Nepali woman during my field visit where she said: "During the time of this month (period of menstruation) we become as polluted beings because we release polluted blood. Through Menstruation the polluted blood that forms inside a female body is let out from the vagina. we release the pollution from our body during menstruation so we are restricted to touch anything and follow seclusion for a certain period. All pure sacred places that are considered clean and pure such as the kitchen, the place of worship at home are meant to be avoided while menstruating because if consciously or unconsciously we touch any tangible and intangible items of this place it will automatically become impure. The kitchen is believed to be Goddess Lakhi's abode and the prayer house is considered as the house of different deities".

# **CONCLUSION**

The current research demonstrates that the simple biological element in women's bodies has been reconstructed by our society without proper scientific validation. Young girls and women are bound to follow it to fit in the social framework. In komolsapori area, women are still today abiding by the prevalent prescribed rules of society, and they considered their "state of menstruation" as a polluted one. Women considered themselves impure during the time of menstruation as they strongly agree and believed that the blood that came out from the vagina is polluted, which is unclean. If we trace the history of Indra's curse, to repent his sin women are punished in form of menstruation along with taboo, but they do not consider themselves as a cursed being either. The culture of menstruation will remain to exist in komolsapori area whether, in form of traditional beliefs, rituals, taboos, impurity, etc, there is less future possibility to eradicate from society itself.

During the entire fieldwork, women were quite vocal in their thoughts but men have always kept a distance during the discussion on menstruation. This study finding highlights that there is a complete absence of knowledge about the physiological process related to menstruation but rather their mind is fully occupied by socio-cultural dogmas. They have a positive approach and they were likely to consider menstruation as the only way to attain a child. Lastly to conclude this paper the process of socialization of young girls becomes an important concern specially for mothers. Moreover, while stating about the existing culture of menstruation, it depicts the harsh social reality in many forms, there is a need to know up to what extent this menstrual culture is being practiced in a different part of the globe.

Does enough literature present the existing menstrual culture? Lastly, "menstruation' is a basic normal physiological process that every girl goes through till menopause occurs but our society has reconstructed and reshaped with its ideologies and able to create and maintain existing social construction around "menstruation'. It's high time for us as a member of civil society to look into our very own perception towards existing social beliefs system, social norms regarding menstruation, practices, etc whether they are justified or not in the twenty-first century for young girls and women. We have the power to change this whole belief system if we change our attitude towards it and spontaneously that will also help our next generation to create an egalitarian society for women.

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# Factor- Based Approach to Develop a Framework for Enhancied Students' Employability

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## ABSTRACT

Higher education plays a major role in growth and development of individual as well as the economy. Good higher education leads good placement. There are various factors related to higher education like academic marks, technical test, technical interviews and personal interviews' marks that lead to the better placement. The main purpose of this research paper is to identify the association between different fields of higher education data. This is done by using association rule mining algorithm which will identify the associations and correlation between different data that student should focus upon to get better placement. It has been noticed during the analysis that marks obtained by the students in combination with the pre placement activities have more association with salary grade or placement package. The current results can be very helpful for academic institutions in planning their course structure and teaching pedagogy as the overall aim of all professional colleges is to make the students employable.

**KEY WORDS:** ASSOCIATION RULE MINING, FREQUENCY PLOT, GRAPH PLOT, HIGHER EDUCATION RELATED FACTORS.

# INTRODUCTION

Education field is developing tremendously during past few years. The face of education is getting change with the growth of professional courses in universities and colleges. There are many colleges in India which are self-financed and not funded by the Government. The competition is to get good number of students in these professional colleges and the main aim of getting them placed after completion of their course. Students also decide and take admission in any course or institute for higher education after seeing its placement record. Today, Institutions are working on towards helping the students in achieving their goal of good placement after completion of their study (Sen et al., 2012).

The social and economic growth of a country is directly linked to the education and success of its youth. This is done by using association rule mining algorithm which will identify the associations and correlation between different data that student should focus upon to get better placement. The projects conducted by the students

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are also evaluated. The analysis shows that the academic performance is not the only factor influencing the placement of students and these considered factors also play an important role (Green 2008).

### 2. Research Strategy and Process

**2.1 Research Process:** The research will use association rule mining algorithm. An association rule has two parts. First is antecedent that can be found in the data. Other is consequent which can be found in combination with the antecedent. The purpose of association rules is to enumerate interesting interactions of variables. The association rule is the full expression of the antecedent and consequent together. There are different measures of associations also which are described below:

**a.Support:** Support shows the frequency of if/then relationship in the dataset. It is defined as the number of times a rule occurs in the data divided by the number of entries in the dataset. Support(X => Y) = P (XUY)

**b. Confidence:** Confidence is the percentage of transactions when the antecedents are true. It tell about the number of times these relationships have been found to be true. Confidence(X => Y) = Support (XUY) / Support(X)

**c.** Lift: Lift is measure of performance of a target model at classifying or prediction the cases. It is a rule which measures how many times more likely the consequent


will occur when antecedent is true compared to how often the consequent occurs on it's own. Lift(X => Y) = Confidence(X => Y) / Support (Y)

**3. Data Analysis and Implementation:** Multivariate mining is used for data analysis and implementation purpose. Multivariate mining is one where there is more than one independent variable for one dependent variable (Sharma 2019).

**3.1 Explanation of dataset:** Academic\_Result\_code = It is the code generated from academic marks obtained in three years of MCA course by students.

**Technical\_Interview=** It is the marks obtained in mock technical interviews conducted in the second semester of MCA students.

**Tehnical\_Test\_code =** Technical tests are the multi choice tests based on programming languages. They are being conducted for MCA students to make them practise for final placements.

**Salary\_Grade=** It is obtained from the actual salary package of the students at the time of their final placement.

#### 3.2 Status of variables:

Independent variable: academic\_result\_code, tech\_test\_ code, tech\_interview\_code, PI\_code Dependent variable: salary\_grade

The data set has various fields which are described in the table below (Aggarwal 2018).

Table 1. Data Set Fields					
Field name	Description				
Student_id	Unique ID of the student				
Academic_result-code	Code given for average marks of three years' academic subjects				
Tech_test_code	Code assigned for technical tests				
Tech_interview_code	Code assigned for technical interviews				
PI_code	Code assigned for personal interviews				
Salary-grade	Grades assigned for salary				

Rule No	Rule	Support	Confidence	Lift
1	{PI_code} => {Tech_test_code}	0.5882353	0.7692308	0.9340659
2	{Tech_interview_code} => {PI_code}	0.4117647	0.8750000	1.1442308
3	{Tech_interview_code} => {Tech_test_code}	0.3529412	0.7500000	0.9107143
4	{Tech_interview_code, Tech_test_code} => {PI_code}	0.2941176	0.8333333	1.0897436
5	{PI_code, Tech_test_code} => {Tech_interview_code}	0.2941176	0.5000000	1.0625000
6	{Salary_grade} => {Tech_test_code}	0.1764706	1.0000000	1.2142857
7	{Academic_result_code} => {Tech interview code}	0.1764706	1.0000000	2.1250000
8	{Academic_result_code} => {Tech_test_code}	0.1764706	1.0000000	1.2142857
9	{Academic_result_code, Tech_interview_code} => {Tech_test_code}	0.1764706	1.0000000	1.2142857
10	{Academic_result_code, Tech_test_code} => {Tech_interview_code}	0.1764706	1.0000000	2.1250000
11	{PI code}=>{Salary grade}	0.1176471	0.6666667	0.8717949
12	{Academic_result_code} => {PI_code}	0.1176471	0.6666667	0.8717949
13	{PI_code, Salary_grade} => {Tech_test_code}	0.1176471	1.0000000	1.2142857
14	{Academic_result_code, PI_code} => {Tech_interview_code}	0.1176471	1.0000000	2.1250000
15	{Academic_result_code, PI_code, Tech_interview_code} => {Tech_test_code}	0.1176471	1.0000000	1.2142857

Table 3					
chiSquared	hyperLift	hyperConfidence	leverage	oddsRatio	Phi
1.12087912	0.8333333	0	-0.041522	-1.48E-15	-0.25678
1.02163462	0.875	0.66470588	0.05190311	3.50E+00	0.2451452
0.56216931	0.75	0.08235294	-0.0346021	3.75E-01	-0.1818482
0.97721088	0.7142857	0.05147059	-0.0449827	2.78E-01	-0.2397561
0.24271562	0.8333333	0.44537815	0.02422145	1.88E+00	0.119488
0.0843254	0.7142857	0.41937474	0.01730104	1.33E+00	0.0704295
0.78061224	1	0.46470588	0.03114187	NA	0.2142857
4.09821429	1	0.91764706	0.09342561	NA	0.4909903
0.78061224	1	0.46470588	0.03114187	NA	0.2142857
4.09821429	1	0.91764706	0.09342561	NA	0.4647059
6.67857143	1	0.97058824	0.11418685	-2.48E+16	0.6267832
0.19459707	0.6666667	0.12058824	-0.017301	5.45E-01	-0.1069901
0.48571429	1	0.33088235	0.02076125	NA	0.1690309
0.19459707	0.6666667	0.12058824	-0.017301	5.45E-01	-0.1069901
0.55	1	0.79411765	0.06228374	NA	0.3872983
0.43531746	0.6666667	0.80882353	0.06574394	7.33E+00	0.3784891





The above data is converted so that we can have the results of academic results, technical test marks, technical interview marks, personal interview marks and salary grade with respect to each student id. Thus the converted dataset will be in the form of {student\_id, salary-grade},{academic\_result\_code, salary-grade},

{tech\_test\_code, salary-grade}, {tech\_interview\_code, salary-grade}, {PI\_code, salary-grade}.

4. Association Mining Rules: The next phase is to create the association mining rules. Based on the dataset, there were many rules which were built. The following table shows few rules with the support, confidence and lift values (Aggarwal 2019).

The association mining algorithm has identified more than 35 rules along with the values of support, confidence and lift. But based on potential values of support and confidence, authors are considering only 15 rules and others are removed. Rule 1  $\{PI\_code\} =>$ {Tech\_test\_code} shows the if a student will perform good in Personal interviews, then he will get good marks in technical tests as well. In addition, rule 11 {PI\_code}=> {Salary\_grade} states if he performs good in interviews he might will get better salary grade. Also, rule 15 shows the impact of academic results, pi\_code and technical interview on technical test marks.

The value of lift is also shown in the above table. If Lift > 1, variables are positively correlated and for Lift < 1, variables are negatively correlated. In the above output, out of 15 rules, 11 rules are having lift value greater than 1 which indicates a strong positive correlation among variables (Wall 1994).

#### 4.1 chi-square statistics

4.2 Frequency plot: A frequency plot is built to show the significance of various independent variables like academic result, personal interviews, technical tests and interviews on the dependent variable placement. It shows the role played of various independent variables in getting the placement in reputed company with a respectable salary grade (Cramer 2016).

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It can be observed from above figure that the variables PI\_code, Tech\_test code and Tech\_interview\_code are most important and in order to get final placement, student must score high marks in these and prepare accordingly (Azevedo 2012; Barbara 1984).

#### a. Graph Plot

It can be identified from the above figure that tech\_ test\_code, PI\_code and academic\_result\_code are closely associated. Similarly, the academic\_result\_code, tech\_test\_code and tech\_interview\_code are also closely associated.

## CONCLUSION

In this paper we have analyzed the various academic activities that a student has to go through during the 3 years of MCA technical course. The student is not only assessed on the basis of marks obtained in the end term examination but a regular assessment is carried out in the form of technical tests, technical interviews and non-technical assessments. Domain of the paper is limited to the record of three batches of MCA students of a college in Delhi, India. This dataset is analyzed for the listed objectives and association of dependent variable is identified with various independent variables. It has been noticed during the analysis that marks obtained by the students in combination with the pre placement activities have more association with salary grade or placement package. The current results can be very helpful for academic institutions in planning their course structure and teaching pedagogy as the overall aim of all professional colleges is to make the students employable. The association depicted in this paper can define how variables are related. We have also predicted the behavior of the dependent variable (Salary Grade) by monitoring and manipulating the behavior of the independent variables (Mean Marks, Technical score, and PI marks). Association mining rules are also created. Frequency plot showed the factors which play important role for getting good placement. A graph plot is also made to show the close association between various factors.

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## **Distress and BSE Realty Sector: Pre & Post COVID-19 Analysis**

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#### ABSTRACT

Purpose: This article interprets the pre-epidemic scenario and analyzing the impact of Coronavirus Outbreak on Indian Realty Sector along with testing the efficiency of Zmikskwi distress prediction model during crisis on the financials of BSE S&P Realty Sector. The study is based on the various reports on real estate sector performance and financial statements of the companies of Realty Index listed on the Bombay Stock Exchange (BSE) during a period of five years since demonetization till the year outbreak bursted, i.e 2016-2020. For forecasting the financial health of the realty sector companies during the scenario, the distress prediction model Zmijewski is used. This provides us the direction whether model can predict the distress in advance so that investors could be alarmed before time. The Universal economic downturn coupled with coronavirus pandemic might have more adverse effect on real estate demand in the country this year. Our empirical findings on the prediction model suggests that Zmijewski model has a remarkable accuracy of prediction even in hard times during from 2016-20, as per interpretation realty companies are coming in distress zone on the basis of the threshold of the model, which can be used as a caution bell to avoid the losses before investing hard earned money in financially unsound companies. To the author's knowledge, it is anticipated that this study will be the most extensive to-date review in this field of literature to analyze the pre-pandemic scenario with the post impact of the COVID-19 pandemic on Real estate sector. Additionally, this study uses distress prediction model to test its efficiency and rings the caution bell for the investor before taking investment decisions during this period.

KEY WORDS: COVID-19, REAL ESTATE, FINANCIAL DISTRESS, ZMIJEWSKI MODEL, DISTRESS PREDICTION.

#### INTRODUCTION

The Coronavirus pandemic has put halt on everyone's societal and gainful life. During this period, countries are facing multiple shocks: majorly economic and health shocks. The first case was observed in Wuhan (China) in the month of December, 2019 and it speedily rolled out throughout the world. In our history so far, this is considered as one of the immense health crisis. In India, it was January 30, 2020 when the very foremost case



and symptoms of this virus was detected. From the beginning to till date, the counting of infected persons are enormously increasing day on day leaving the country helpless with no vaccines till date in the hands with just one way out i.e isolation and distance from other people to block the spread of COVID virus. Due to this, economic activities of the nations are facing major downfalls (Chaoudhary, 2020). It has also sparked fears of an impending economic crisis and recession (S. Mahendra Dev, 2020). Almost all sectors got affected in this crucial period where everybody is counting the notion such as 'survival of the fittest'. Majorly production and the service sector like tours and travels, hotels, healthcare, real estate, IT and banks have faced a massive hit. It leads to giant layoffs, leaving the companies with no options other than bankruptcy as their profitability and liquidity got affected directly (Amankwah-Amoah, 2020).



The real estate sector is considered as one of the prime retaining sectors, just after agriculture in the country. But, this sector is going through extrinsic strain during couple of years due to lack of liquidity, lower demands, downfall in consumptions, price drops and accelerating NPA's frightening their survival and growth during the crisis. This pandemic is considered as a third black swan for realty sector after demonetization and implication of RERA and GST in 2017. After accepting all the tremendous challenges, it started glowing in 2018 but in 2019 global economic downturn with steady GDP growth affected this sector again.

The pandemic has pushed and increased the numbers of recently financially unsound companies. It is determined that around "half a million firms are at risk of collapse" (Cook & Barrett, 2020). Like, India Bulls Real Estate finalized its merger plan with embassy group and the proposed amalgamation will see the company exit from real estate business completely (economictimes. indiatimes.com, August 2020). (Walsh, 2020) concluded that, "large and small companies, are succumbing to the effects of the coronavirus", and 2020 has been projected to "set a record for so-called mega bankruptcies". This results in economic distress leaving its abiding impact on world economies. Policymakers, analysts and authorities have become progressively anxious about the antieffects of COVID-19 on business traits, industry reforms and on the global economy. With the recent news on stocks of BSE realty, Prestige Estates, Sunteck Realty, Brigade Enterprises, and India Bulls real estate etc., top performers are now coming in the list of top losers of the index.

Plenty of firms have closed their activities around the world due to financial anguish during the crisis (Wagas, 2018). The inflated production costs, declining sales activities, financial weakness, managerial defeat, or blend of these reasons are alarming bell for a company for financial illness (Shankar, 2013). Forecasting distress is

one of the challenging tasks for all organizations all over the world in this current situation of pandemic (Awais, Hayat, et al., 2015). There is a huge demand to predict the financial distress at early stage to avoid failures. To prevent the risk of losing investments, investors always intend to predict the financial soundness of the corporations. Present study gives out the perception of the Pre-pandemic realty sector and examines the crash due to COVID-19 on real estate industry. Further it tests the efficiency of the Zmijewski (1984) distress prediction model on the financials of S&P BSE realty sector companies for a period of five years during the hit of demonetization, RERA and health crisis i.e from 2016-2020.

#### Objectives

- 1. To study the performance of Indian realty sector before Covid-19 pandemic.
- 2. To understand the impact of Coronavirus outbreak on Indian Real estate.
- 3. To test the efficiency of Zmijewski distress model during the period.

## MATERIAL AND METHODS

Annual reports were checked to collect the data of this study which is on BSE Realty Sector over the period of five years right from demonetization to pandemic. Other authentic websites of Money control, Bombay Stock Exchange and Stock Screener etc. were also used to get the missing secondary data. Further, reports on real estate sector from various research firms are considered like JLL Research, Anarock, and FICCI etc. during the pandemic. To forecast the financial health of the companies, the distress prediction model Zmijewski is used. The drawn out data was then put into the equation of the stated model. This provides us with a view if model was able to predict the distress during the period. The sampled companies taken under consideration are shown in Table 1.

Table 1. List of S&P BSE Realty Sector						
Delhi Land and Finance (DLF)	Sobha Limited	Brigade Enterprises Ltd				
Godrej Properties Ltd	The Phoenix Mills Ltd					
Prestige Estates Projects Ltd	Sunteck Realty Ltd	Mahindra Life space Developers Ltd				
India bulls Real Estate Ltd		Oberoi Realty Ltd				

# The formula, description and score categorization of Zmijewski model are given underneath:

Zmijewski (1983): Z = -4.3 -4.5X1 + 5.7X2 - 0.004X3 (Zmijewski, M. E. (1984) (1)

ZS = Zmijewski Score X1=ROA (Net Income/ Total Assets) X2= Leverage (Total Liabilities/Total Assets) X3 = Liquidity (Current assets/current liabilities) **Financial Data Analysis And Interpretation:** Zmikskwi model formula applied on 10 real estate companies from the list of BSE S&P Realty sector in Table 3.

When the appropriate coefficient values are multiplied with the various assigned ratios, the final Zmikskwi value is determined after summing the results. From Table 3, it can be inferred that financial performance of these companies during the period of five years is not sound and prominently all the companies are lying in Distress Zone (as per the threshold of the model shown in Table 2) due to the effect of Demonetization, RERA and COVID pandemic. The Zmijewski Value of all these companies are coming >0 in all the years from 2016-2020 which shows that there is more probability for financial embarrassment in near future.

Table 2. Threshold Values of the Model				
Scores	Zone	Results		
ZS<0	Healthy	Protected		
ZS>0	Distress	Not Stable, Likely to face financial distress.		

Table 3. Z value of BSE S&P Realty Sector Companies (2016-2020)

		2020	2019	2018	2017
SR No	Companies	Z value	Zvalue	Zvalue	Zvalue
1	Delhi Land and Finance (DLF)	1.06	1.27	1.33	1.26
2	Godrej Properties Ltd	1.12	1.10	1.15	0.95
3	Prestige Estates Projects Ltd	1.23	1.17	1.22	0.90
4	India bulls Real Estate Ltd	1.45	1.34	1.40	1.38
5	Sobha Limited	0.87	0.78	1.10	1.18
6	The Phoenix Mills Ltd	1.21	1.17	1.18	1.20
7	SunTeck Realty Ltd	1.17	0.97	1.06	0.59
8	Oberoi Realty Ltd	1.16	1.03	1.01	1.03
9	Brigade Enterprises Ltd	1.11	1.13	1.18	1.11
10	Mahindra Lifespace Developers Ltd	2.07	1.24	1.26	1.27

Impact Of Covid Pandemic On Realty Sector: In the Indian context, the impact of this coronavirus pandemic seems damaging. It has affected the realty sector massively which was already going through the clump of challenges after the fortnight demonetization, RERA reforms and policies and then promulgation of GST in 2017. Towards the sectors growth, residential, commercial, and retail are the key major contents which are furnishing immensely. With reference to JLL research report, Real estate was contributing approximately 6% to India's GDP in 2017 and this number was expected to grow to 13% by the year 2025 as per projection growth trends but with the massive hit by the pandemic on the country, the national GDP plunging into negative figures which will result in economic recession. As during financial crisis in 2007-08, GDP faced a massive decline from 7.77% to 3.09% in the year 2008-09. Similarly, after demonetization again the giant decline fall was noticed in year 2016-17 (shown in Figure 1) coupled with the Covid pandemic it largely falls to 5% in FY 2019-20 and expected to go more downstream in FY 2020-21.

With reference to Anarock research report, the market magnitude of the industry was \$120 billion in 2017 and was expected to arise to \$650 Billion by 2025 and \$1000 Billion by 2030 (Shown in Figure 2) which has now become a dream in this current critical situation. Not just this, if we compare the sales of residential units with the previous corresponding quarter the decline of 29% is noticed in Q1 2020 (Shown in Figure 3) which is the highest downfall till now. Additionally, a fall of 40% in new completions was recorded in the first quarter of

2020 (Shown in Figure 4). FDI inflows in the upcoming quarter of the present year may have more diminishing trend in this sector. Realty sector creates vast opportunity for both skilled and unskilled workforce. It successfully managed to give employment to 40 million people in the year 2013, which tremendously rose to 52 million in 2017 and was expected to touch the figure of 67 million by the end of 2022. However, this target seems difficult to accomplish in near future with this ongoing pandemic. It seems to be a giant dip of 30% in Net absorption (Shown in Fig 5). Furthermore, the banks have decided to cut the policy rates to deal with the current situation, RBI cuts the repo rate bringing it down to 4.4% in March, 2020 which will also result in a decline of home loan rates.







Source: Real Estate Intelligence Service(REIS), JLL Research

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#### Suggestions

Adaption of Technology: Real estate as an industry must do a lot of catching up on technology, and this crisis making things develop even more quickly. Physical distancing and the lockdown of physical spaces have magnified the importance of digitization. After this situation is over, these technologies which enable more efficient operation and communication will be as an essential element of a good organization.

**Risk Management Practices:** Practises and policies pertaining to risk management need to be taken seriously by all businesses and not be restricted to the financial sector. It needs to be practised with all earnestness to prepare the preparedness for any future disaster and ability to mitigate situation.

**Focus on Liquidity and cash flow management:** Cash is King- understand your cash and working capital needs. During this crisis, establishing the correct cash flow management mechanism is pivotal for property developers to ensure effective overall planning and adequate liquidity to avoid shortage in capital and a possible debt crisis. Early crisis signals and indicators may help developers to create their own management mechanism.

Business Continuity Planning: The pandemic has created

a serious threat to people, business and economies around the global. Existence and longevity of the business in the current scenario is crucial. Management must focus on how they can protect their people, serve to their customers and steady their business continuity. All the pre framed policies and regulation needs a quick change to adopt the changes in environment and brace them in the light of the prevailing pandemic situation.

**Focus on Online presence and transactions:** In the current era of social distancing, people familiar with e-commerce will surely wins the game. As the customers are shifting more towards electronic mode for their day to day activities rather than physical presence to cut the community of virus. In this dynamic environment, all the businesses are facing rapid changes with innumerable challenges and real estate is no different. The real estate players must adapt digitalization to survive in the market. They must bring innovative digital ideas and initiatives to engage with their customers and prepare to take them towards e-tour of properties.

**Limitations and Future Scope of the Study:** The study is limited to the footprint of COVID-19 on Real estate sector based on the published reports and financial statements of the company of five years taken from 2016-2020. Further studies can be extended considering other dynamic sectors with larger data sets using alternative modeling techniques, assessing, and comparing the outcomes of different models by taking multiple samples of the sectors at the same time.

## **CONCLUSION**

It might be just the beginning; industries must prepare themselves for much more drastic terrible effect of this pandemic. All the industries including realty sector have to innovate and amend their essential flaws to hit the crisis. Sit and observe strategy, will not going to work for realty sector during this time. It must adapt the rapidly changing environment. This is one of the few studies focused on the impact of Coronavirus outbreak on business arena of Indian realty sector. Further, this study investigated the efficiency of Zmikskwi model during the crisis to examine the financial soundness of the BSE S&P realty companies. It is assumed that with every threat, there is always an opportunity to grow and fly high and believe to shine in near future. Indian retail sector will also flourish and embark the different growth path in the coming years with its strong hands on technology and media with viable business models. Collaterally, this study suggests the most effective and accurate model for playing safe in the future.

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## To Assess the Knowledge Regarding Care of Post Vaccinated Child Among Primi Para Mothers

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#### ABSTRACT

Immunization rate is one of the best public health outcome and service indicators. However, the adverse effect of immunization often occur which can lead to serious complication. Awareness of the background rates of possible adverse events will be a crucial part of assessment of possible vaccine safety concerns and will help to separate legitimate safety concerns from events that are temporally associated with but not caused by vaccination. Because of the side effect of vaccination, many countries have begun mass education programmes regarding vaccination and post care. Specially to post vaccinated child, there occur a lot of side effect. This complication can be treated easily if we have the knowledge regarding post vaccinated care. Knowledge and practices of primi para mothers regarding immunization leads the major factors that contribute to effectiveness of vaccination. They are the one who are newly exposed to the post vaccinated care condition. So, it will be effective Objectives: 1. To assess the knowledge regarding care of post-vaccinated child among the primi para mothers. 2. To associate the knowledge score with selected demographic variables. Material and methods: 100 samples were selected from AVBRH, Wardha by non-probability convenient sampling technique and in this study descriptive research design was used. Tool: A structured knowledge questionnaire was used for collecting data. Data was collected within 3 weeks. Descriptive and inferential statistics were used to analyze data. Result: The level of knowledge was seen in 5 categories: poor, average, good, very good and excellent. 16% of the mothers had poor, 60% had average, 23% had average and 1% had very good knowledge score. Findings reveals that mean percentage of knowledge score was 34.70% regarding care of post vaccinated child. Conclusion: It is concluded that the primi para mothers do not have adequate knowledge regarding care of post vaccinated child and demographic variables were not associated with the knowledge of primi para mothers.

**KEY WORDS:** KNOWLEDGE, CARE, POST VACCINATED CHILD, PRIMI PARA MOTHERS.

## **INTRODUCTION**

Vaccinations greatly reduced the prevalence of diseases and continue to be important for global health today. The low price of vaccines made them especially attractive as a way to improve global health and vaccines reached billions of people around the world. A vaccine is a biological preparation that provides active acquired immunity to



a particular disease. Vaccination is the most effective method of preventing infectious diseases; widespread immunity. Vaccination is largely responsible for the worldwide eradication of smallpox and the restriction of diseases such as polio, measles, and tetanus from much of the world. The terms vaccine and vaccination are derived from Variolaevaccinae(smallpox of the cow), the term devised by Edward Jenner to denote cowpox. In 1881, to honor Jenner, Louis Pasteur proposed that the terms should be extended to cover the new protective inoculations then being developed (Booy et al., 2013)

Vaccination protects children from serious illness and complications of vaccine-preventable diseases which can include amputation of an arm or leg, paralysis of limbs, hearing loss, convulsions, brain damage, and



death. Vaccine-preventable diseases, such as measles, mumps, and whooping cough, are still a threat. Many studies showed that parents' knowledge regarding child immunization and post care varies according to the family physician and other medical staff. Although parents would like to know about the adverse effects, the benefits and other information about vaccines, many physicians include vaccine risk in their discussions with parents without comparing it to the risks involved in infectious disease (Gellin et al., 2000).

Table 1. Demographic characteristics					
Demographic Variables	No. of primi para mothers	Percentage (%)			
Age(years)					
18-22 years	40	40			
23-27 years	36	36			
28-32 years	18	18			
≥ 33 years	6	6			
Type of family					
Nuclear	26	26			
Joint	10	10			
Extended	63	63			
Single Mother	1	1			
Education					
Illiterate	9	9			
Primary	8	8			
Secondary	29	29			
Higher Secondary	46	46			
Graduate and above	8	8			
Religion					
Hindu	61	61			
Christian	3	3			
Muslim	15	15			
Buddhist	16	16			
Others	5	5			
Occupation					
Housewife	73	73			
Government Service	6	6			
Private Service	11	11			
Self Employed	10	10			
Area of Residence					
Rural	50	50			
Urban	50	50			

## MATERIAL AND METHODS

A descriptive research design is used in the present study. Samples are primi para mothers. Inclusion criteria include primi para mothers who are willing to participate in the study, who are able to read Marathi/English and who are available at the time of the study. Exclusion criteria includes primi para mothers who have attended programme on the same topic, who are health personnel and who are having some complication.100 samples were selected from AVBRH, Wardha by non-probability convenient sampling technique. A structured knowledge questionnaire was used for collecting data. Data was collected within 3 weeks. Descriptive and inferential statistics were used (Melief et al., 2015).

## **RESULTS AND DISCUSSION**

Table 1 show that majority of the primi para mothers were in the age group of 18-22(40%) years and most of them belongs to extended family (63%). Maximum primi para mothers studied up to higher secondary (46%) and were belong to Hindu family. Most of them were housewives (73%) and 50% were from rural and another 50% were from urban. Table 2 shows that 16% of the primi para mothers had poor level of knowledge score, 60% had average, 23% had good and only 1% of the primi para mothers had very good level of knowledge score. The minimum score was 2 and maximum score was 13, the mean knowledge score was  $6.94\pm 2.33$  and mean percentage score was  $34.70\pm 11.69$ .

This table shows the association of knowledge scores with age in years of primi para mothers. The tabulated 'F' values were 2.68(df=3,96) which is much higher than the calculated 'F' i.e. 1.24 at 5% level of significance. Also, the calculated 'p'=0.29 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that age in years of primi para mothers is not associated with their knowledge score. This table shows the association of knowledge scores with educational level of primi para mothers. The tabulated 'F' values were 2.45(df=4,95) which is much higher than the calculated 'F' i.e. 2.08 at 5% level of significance. Also the calculated 'p'=0.089 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that educational level of primi para mothers is statistically not associated with their knowledge score (Moro et al., 2015).

 Table 2. Assessment of knowledge regarding care of post

 vaccinated child among primi para mothers

Level of	Percentage	Knowledge Score		
score	score	Frequency	Percentage (%)	
Poor	1-4(0-20%)	16	16	
Average	5-8(21-40%)	60	60	
Good	9-12(41-60%)	23	23	
Very Good	13-16(61-80%)	1	1	
Excellent	17-20(>80%)	0	0	
Minim	um score		2	
Maximum score		13		
Mean score		6.94±2.33		
M	ean %	34.70±11.69		

This table shows the association of knowledge scores with religion of primi para mothers. The tabulated 'F' values were 2.45(df=4,95) which is much higher than the calculated 'F' i.e. 1.10 at 5% level of significance. Also the calculated 'p'=0.35 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that religion of primi para mothers is statistically not associated with their knowledge score. This table shows the association of knowledge scores with area of residence of primi para mothers. The tabulated't' values were 1.98(df=98) which is much higher than the

calculated't' i.e. 1.20 at 5% level of significance. Also the calculated 'p'=0.23 which was much higher than the acceptable level of significance i.e. 'p'=0.05.Hence it is interpreted that area of residence of primi para mothers is statistically not associated with their knowledge score.

Assessment of Knowledge on Immunization among primi para mothers: The mean value of knowledge on post vaccinated child among primi para mothers was 34.7 which falls in the level of inadequate knowledge. This finding contradicts with the findings of the study conducted by Angelillo, Ricciardi on assessment of knowledge, attitude and behavior of vaccination among mothers from Italy which stated that the mothers had inadequate knowledge but favorable attitude. Sangamesh Nidagunni conducted a study to assess the knowledge and practice of mothers of primi gravid mothers regarding universal immunization programme. The results showed that overall mean knowledge score among respondents was found to be 42.72 % which coincides with the findings of the present study. Based on the present study findings revealed that 16% of the primi para mothers had poor knowledge on immunization, 60% have average knowledge,23% have good knowledge ,1% have very good knowledge. No one score the excellent rate in the study.

Table 3. Association of knowledge score of primi para mothers with age.						
Age (years)	No. of Primi para mothers	Mean knowledge score	F-value	p-value		
18-22	40	7.30±1.98	1.24	0.29		
23-27	36	6.50 <u>+</u> 2.64		NS,p>0.05		
28-32	18	6.66±2.27				
≥ 33	6	8±2.60				

Table 4. Association of knowledge score of primi para mothers with education.

Educational Level	No. of Primi para mothers	Mean knowledge score	F-value	p-value
Illiterate	9	6.55±2.06	2.08	0.089 NS,p>0.05
Primary	8	6.62±2.50		
Secondary	29	6.34±1.91		
Higher Secondary	46	7.10±2.44		
Graduate and above	8	8.87 <u>+</u> 2.64		

Table 5. Association of knowledge score of primi para mothers with religion.

Religion	No. of Primi para mothers	Mean knowledge score	F-value	p-value
IHindu	61	7.31±2.43		
Christian	3	6.33 <u>+</u> 2.08		
Others	5	5.80±1.92	1.10	0.35
Muslim	15	6.60±1.99		NS,p>0.05
Buddhist	16	6.31±2.33		

## Nursing Implications

## Nursing Education:

- The nursing student develops an insight about post vaccinated care and implement this knowledge in daily practices and also educate the primi para mothers regarding the care.
- Findings of this study will help the nursing students to understand about the necessity of care regarding

post vaccinated child since there are a lot of complication after vaccinated a child.

#### **Nursing Practice:**

- The study findings will help nursing personnel to know the care of post vaccinated child and how to assess the knowledge level of primi para mothers.
- The study findings will help nursing personnel to

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raise their insight regarding care of post vaccinated child.

**Recommendations:** On the basic of the findings of the study, it is recommended that the following studies can be conducted:

of primi para mothers.

- The study can be repeated by assessing the effectiveness of planned teaching.
- A similar study should be done by using control group.
- A comparative study to assess the knowledge of urban and rural primi para women can be done.
- The study can be repeated by taking more samples

Table 6. Association of knowledge score of primi para mothers witharea of residence.						
Area of residence	No. of Primi para mothers	Mean knowledge score	t-value	p-value		
Rural	50	6.66±2.07	1.20	0.23 NS,p>0.05		
Urban	50	7.22±2.56				

## CONCLUSION

After the detailed analysis, the study leads to the following conclusion that there was a lack of knowledge among primi para mothers regarding care of post vaccinated child.

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#### BBBRC Bioscience Biotechnology Research Communications

## **Effectiveness of a Demonstration Skill on the Use of Nebulization Therapy Among the Parents of Hospitalized Children**

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## ABSTRACT

For several years, Nebulization therapy has been an effective method in the treatment of respiratory problems. Objectives: 1. To assess the existing demonstration skill on use of Nebulization therapy among the parents of hospitalized children. 2. To assess the effectiveness of demonstration skill on use nebulization therapy among the parents of hospitalized children. 3. To associate the post-test demonstration skill score on use Nebulization therapy among the parents of hospitalized children with selected demographic variables. An interventional research approach with one group pre-test post-test research design was used in this study. 60 samples were selected by Non- probability conveniently Sampling Technique. A demographic variables and self-Structured Observational Checklist on Nebulization therapy were used to collect the data. Pre-test and demonstration skill was carried on day 1 and post-test conducted with same checklist on 7<sup>th</sup> day. This study revealed that, Mean value of pre-test demonstrations skill is  $\pm 1.48$  and post-test demonstrations skill is  $\pm 1.48$ . The calculated t-value is 15.995 is 'calculated t value' & 0.00 is 'p value'. Hence it was statistically interpreted that demonstration skill on use of Nebulization therapy among the parents of hospitalized children was effective. Thus, the H<sub>1</sub> was accepted and H0 was rejected in this study. There was no any association with demographic variables. It is concluded that demonstration skill on use of Nebulization therapy among the parents of hospitalized children was effective.

**KEY WORDS:** Effectiveness, Demonstration Skill, Nebulization Therapy, Parents, Hospitalized, Children.

## **INTRODUCTION**

Every child is precious to their parents and family. Today's young children are the future of the nation. If the child is ill, then this results inapprehension, anxiety, helplessness and disturbed lifestyle for the entire family. One among those is respiratory diseases which account for high, mortality among under-five children. The lung is one of the pair of conical organ of the respiratory system, consisting air tubes (bronchi and bronchioles) terminating in air spaces (alveoli). It is unique organ constantly exposure to microorganism and pollutant. It is kept sterile by several defence mechanisms including mucociliary escalator mechanism that plays a noteworthy role to



keep the airway sterile. When its function gets affected, it causes respiratory diseases. The respiratory disorder is pathological conditions of respiratory system which involves lungs and other parts of respiratory system.

Acute and chronic childhood respiratory illnesses are one of the first factors for paediatric consultation and can result in substantial health and financial burdens. The upper and lower respiratory tract diseases frequently and simultaneously appears in same patient associate with their pathogenic condition. The upper and lower respiratory tract co-morbidity is also called as United Airway Diseases. Airway conditions can vary from Mild to auto-limiting conditions like Viral Rhinitis to lifeendangering conditions such as Bacterial Pneumonia, Pulmonary Embolism & Cancer of Lungs. ARI is a respiratory tract infection caused by bacteria and viruses. Out of the two, viruses constitute the greater proportion for the cause of infection. ARIs are more common in young children with seasonal events and also linked to particular respiratory syndromes by certain agents. It may affect the individual's normal breathing and also



communicable in nature. More than 12 million children under five years of age admit to hospital every year with ARIs. Worldwide, more than 2 to 6 million deaths caused by lower respiratory tract infections, making them fifth major cause of morality in children under 5 years of age (Alhaddad et al., 2016).

The Upper Respiratory Tract Infections like Viral Rhinitis, Pharyngitis & Otitis Media are more prevalent in children under 5 years of age & boys under 3 years of age are more commonly and seriously affected. Aerosol therapy is a technique of administration of medication directly into lungs. The efficacy of the medication is determined by its form, physical and chemical characteristics of the aerosols, aerosol device, breathing pattern of the patient, lung anatomy and physiology. Such local therapies enable smaller doses and minimize systemic adverse effects. The devices that supply aerosols with therapeutic agents use one of different devices: Nebulizers, a Pressurized Meter Dose Inhaler and a Dry-Powder Inhaler. Nebulizer is instrument which converted liquid into aerosol that can be inhaled into the lower respiratory tract. Nebulizer is device that used for aerosol medication administration. It produces a polydisperse aerosol where the drug particles of size range from 1-5 µm in diameter (Barry & Callaghan 1997).

Most nebulisers use compressor for atomisation i.e. separate something into fine particles but some use ultrasonic energy. Nebulizers are widely used for Cystic Fibrosis, Asthma, Chronic Obstructive Pulmonary Disease et other Respiratory problems. Nebulization drug therapy has a very significant part in Paediatric clinical nursing practice. Nurses are primary health care providers that give Nebulization to children by using the nebulizers in a hospital setting. Aerosolized drugs are the clinical cornerstone of several paediatric respiratory paediatric pulmonary disease conditions.Nebulization therapy machine has been used clinically from many years.The use of these equipment is key to an efficient treatment.

Nebulisers prove difficult to use, as they require device assemblies, dosage, dilatants often combined, inhaled for a few minutes and then disassembled, cleaned, sanitized and dried. A nebulizer is used in medicine as a medical device to oversee pharmaceutical products in the form of the inhaled mist in the lungs. Nebulization therapy is commonly used to administer bronchodilators and corticosteroids among the elderly and children. The medicine could be either an antibiotic or medicine for child's lung. As child breaths, the medicine gets inhaled inside to his lungs. When a nebulizer is used, it is referred as breathing treatment or nebulizer treatment.

Several problems may come in assessing Nebulization in children which include age, compliance, problems in drug delivery and drug supplies, anatomical and physiological differences, and trouble able to comprehend when the drug is received by the patient. The medication doses empirically evolved used and new methods of delivery from adult experience have been introduced. Nominal medicine for the infant is also equivalent to that used in older children and adults. The Guidelines of the European Respiratory Society on the use of nebulizers consider the impact of all nebulizer components that may have an effect on the overall performance of the nebulizer including air compressor flow or pressure qualities, attachment tubes, patient interface such as mouthpieces or face masks etc. When one aspect is updated, drug delivery performance and efficiency often change and the nebulizer system needs to be redefined.

#### **Objectives:**

- 1. To assess the existing demonstration skill on use of Nebulization therapy among the parents of hospitalized children.
- 2. To assess the effectiveness of demonstration skill on use Nebulization therapy among the parents of hospitalized children.
- 3. To associate the post-test demonstration skill score on use Nebulization therapy among the parents of hospitalized children with selected demographic variables (Beachey 2017).

## **MATERIAL AND METHODS**

An interventional research approach with one group pretest post-test research design was used in this study. 60 samples were selected by Non- probability conveniently Sampling Technique. A demographic variables and self-Structured Observational Checklist on Nebulization therapy were used to collect the data. Pre-test and demonstration skill was carried on day 1 and post-test conducted with same checklist on 7<sup>th</sup> day.

### **RESULTS AND DISCUSSION**

The percentage wise distribution of samples with selected demographic variables (Bustamante et al., 2017).

The above table no. 1 shows percentage-wise distribution of sample with regards to parents age (in years), relationship with child, residential area, educational status, occupation, monthly income of family, no. of children and age of the child (years/months) regarding effectiveness of demonstration skill on use of Nebulization therapy among the parents of hospitalized children.

- Distribution of samples with regards to Parents (Age in Years) shows that 9 (15%) belong to 21-24 years of age, 25 (41.66%) belongs to 25-29 years of age, 23 (38.34%) belong to the age of 35-39 years and remaining 3 (5%) belong to the age of 30-34 years respectively.
- Distribution of samples with regards to their relationship with child shows that 38 (63.3%) were mother and 22 (36.7%) were father.
- Distribution of sample with regards to their residential area 20 (33.3%) were Urban and 40 (66.7%) were Rural.
- Distribution of samples with regards to their educational status shows 12 (20%) have primary education, 5 (8.3%) have secondary education, 22 (36.7%) have higher secondary and 21 (35%) are

graduate.

- Distribution of sample regards to their occupation 6 (10%) were famer and 15 (25%) were private employee, 7 (11.7%) were self- employee and 30 (50%) were home maker.
- Distribution of sample regards to their monthly income of family 12 (20%) having Rs. 5000- 10,000, 25 (41.7%) having income is Rs. 10001-15,000, 14 (23.3%) having income is Rs. 15,000-20,000 and 9 (15%) having income is more than Rs. 20001.

Demographic Variables	Frequency	Percentage
20-24 years	09	15%
25-29 years	25	41.66%
30-34 years	23	38 34%
35-39 years	03	50/
Relationship with child	05	5%
Mother	38	63.30%
Father	22	36.7%
Pesidential area		50.7%
Urban	20	22.20%
Dinal '	20	55.5% 66.7%
Kuldi Educational status	40	00.7%
Educational status	0	00/
IIIIterate Drimony oducation	12	0%
Primary education	12	20%
Secondary education	05	8.3%
Higher Secondary	22	36.7%
Graduate	21	35%
Post graduate and above	0	0%
Occupation		
Laborer	0	0%
Farmer	6	10%
Private employee	15	25%
Government employee	7	11.7%
Self-employed	2	3.3%
Home maker	30	50%
Monthly Income of family	:	
Rs. 5000-10,000.	12	20%
Rs. 10001- 15000.	25	41.7%
Rs.15001-20000.	14	23.3%
above Rs. 20001	09	15%
No. of children		
1	21	35%
2	36	60%
3	03	5%
More than 3	0	0%
Age of the child		
(years/months):		
0-1 year	25	41.7%
1-2 year	15	25%
2-3 year	5	8.3%
3-4 year	5	8.3%
4-5 year	10	16.7%

e 1. Percentage wise distribution of samples with

- Distribution of sample regards to their number of children 21 (35%) parents had single child, 36(60%) parents had 2 children and 3(5%) parents had 3 children
- Distribution of sample regards to their age of child in years/months 25 (41.7%) belong to 0-1 years of age, 15(25%) belong to 1-2 years of age, 5(8.3%) belong to 2-3 years of age, 5(8.3%) belong to 3-4 years of age and 10(16.7%) belong to 4-5 years of age. Assessment of existing demonstration skill score on use of Nebulization therapy among the parents of hospitalized children.

Table 2. Assessment of existing demonstration skill score on use of Nebulization therapy among the parents of

Level of demonstration skill	Score range	Dercentage score	Pre Test		
		reitentage store	Frequency	Percentage	
Very Poor	0-4	0-20%	0	0%	
Poor	5-8	21-40%	45	75%	
Good	9-12	41-60%	15	25%	
Very good	13-16	61-80 %	0	0%	
Excellent	17-20	81-100%	0	0%	
Minimum score		0	S		
Maximum score		1	2		
Mean demonstration skill score	7.4167± 1.74				
Mean % demonstration skill score	37.05±8.7				

Figure 1: Existing of level demonstration skill on use of Nebulization therapy among the parents of hospitalized children.



The above table No.2 and Graph No. 1 shows that very poor level of demonstration skill score is 0 (0%), poor level of demonstration skill score is 45 (75%), good level of demonstration skill score is 15 (25%), very good level of demonstration skill score is 0 (0%), excellent level of demonstration skill score is 0 (0%). The minimum score was 05 and the maximum score was 12, the mean demonstration skill score was 7.4167 $\pm$  1.74 with a mean percentage demonstration skill score of 37.05 $\pm$ 8.7 Assessment of post-test demonstration skill score on use of Nebulization therapy among the parents of hospitalized children (Catherine & Dash 2018; Celli 2008).

The above table no.3 and fig no.2 shows that of sample were had very poor level of demonstration skill score is 0 (0%), poor level of demonstration skill score is 0 (0%), good level of demonstration skill score is 01 (1.66%), very good level of demonstration skill score is 19 (31.67%), excellent level of demonstration skill score is 40 (66.67%).The minimum score was 15 and the maximum

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score was 18, the mean score was  $16.76\pm 1.48$  with a mean percentage score of  $83.8\pm7.4$ . The effectiveness of demonstration skill score on use of Nebulization therapy among the parents of hospitalized children.

Table 3. Assessment of post-test demonstration skill score on use of Nebulization therapy among the parents of hospitalized children. n = 60

Level of demonstration skill	Score	Percentage	Post Test		
Ecver of demonstration skin	range score		Frequency	Percentage	
Very poor	0-4	0-20%	0	0 %	
Poor	5-8	21-40%	0	0 %	
Good	9-12	41-60%	01	1.66%	
Very good	13-16	61-80 %	19	31.67%	
Excellent	17-20	81-100%	40	66.67%	
Minimum score			12		
Maximum score	19				
Mean score skill score	$16.76 \pm 1.48$				
Mean % demonstration skill score		8.	3.8±7.4		

Figure 2: Post-test demonstration skill on use of Nebulization therapy among the parents of hospitalized children.



The table No.4 and fig no.3 shows that there is a significant difference between pre-test and post-test demonstration skill scores interpreting effectiveness of demonstration skill on use of Nebulization therapy among the parents of hospitalized children. Mean value of existing demonstrations skill is 7.41 and post-test demonstrations skill is 16.76 and a standard deviation value of existing demonstrations skill is  $\pm 1.48$  and post-test demonstrations skill is  $\pm 1.48$  and post-test demonstrations skill is  $\pm 1.48$ . The calculated t-value is 15.995 and p-value is 0.00. Hence it is statistically interpreted that demonstration skill on use of Nebulization therapy among the parents of hospitalized children was effective. Thus the H1 is accepted and H0 is rejected in this study (Fromer & Cooper 2008).

The association of post-test demonstration skill score on use Nebulization therapy among the parents children with selected demographic variables. There is no significance association between demonstration skill score with associated with parents (age in years), relationship with child, residential area, educational status, occupation, monthly income of family, no. of children, age of the child (years/months) (Prajapati 2019). Analysis of data showed that there was significant difference between existing and post demonstration skill scores. Hence it is concluded that the demonstration skill significantly brought improvement in the demonstration skill on use of Nebulization therapy among the parents of hospitalized children (Katiyar 2020; Savitha 2018; Sengupta 2016)).

The researcher found that the Mean value of existing demonstrations skill is 7.41 and post-test demonstrations skill is 16.76 and a standard deviation value of pre-test demonstrations skill is  $\pm 1.48$  and post-test demonstrations

parents of hospitalized children. $n=60$					
Tests	Mean score	SD	't'-value	p-value	Significant
Pre Test Demonstration Skill Score	7.41	±1.48	31.529	0.00	S, p<0.05
Post Test Demonstration Skill Score	16.76	+1.48			

Figure 3: Effectiveness of demonstration skill score on use of Nebulization therapy among the parents of hospitalized children.



skill is  $\pm 1.48$ . The calculated t-value is 15.995 and p-value is 0.00. Hence it is statistically interpreted that demonstration skill on use of Nebulization therapy among the parents of hospitalized children was effective.

This study is supporting to my study. The study was conducted in hospital at Mangalore on 40 postnatal mothers to assess effectiveness of demonstration on breastfeeding technique. In this study, an interventional approach with a One Group Pre-test Post-test Design' was used. The Purposive Sampling Technique was used to collect samples. This study revealed that after administration of intervention i.e. demonstration on breastfeeding technique the mean post-test practice score was 17.25 $\pm$ 1.444 which was higher than pre-test practice score 11.3 $\pm$ 2.666 (Posa et al., 2017; Simoes 2006). The calculated t value was 17.59. This finding

showed that the postnatal mothers had poor practice on breastfeeding technique & after the appropriate intervention [demonstration] the practice on breastfeeding technique had increased. A research concluded that the demonstration program was an effective measure to improve the breastfeeding technique among postnatal mother (Roy 2015; Nair 2013; Park 2015).

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## Musculoskeletal Discomforts Experienced by the Cashiers of Selected Retails Stores Vadodara City

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#### ABSTRACT

Retail sector in India is the second largest employer after agriculture. A team of several workers are involved in these retail stores such as cashier, sales associate, store manager, cleaning and maintenance worker, security guard, team leader and floor manager. The present study focuses on the cashiers of the retail stores who perform several roles such as scanning and billing the products purchased by the customers and bagging the products purchased. All these tasks are carried out by them in standing position for 8 to 9 hours a day. They further have to perform repetitive movements of hands and legs while standing. Therefore, the retail store cashier's work has been associated with high rates of musculoskeletal discomforts. The present study was descriptive in nature. Through purposive sampling technique 61 cashiers are selected from nine different retail stores of Vadodara city who were working as a cashier for minimum 12 months. Interview schedule was developed to collect the background information of the cashiers. The standardized questionnaire namely "Nordic Questionnaire" was used to study the discomforts experienced by the cashiers while performing their tasks during last 12 months, last 7 days in different body parts. It also focused on finding out the discomforts that prevented the cashiers in carrying out daily activities during last 12 months. The findings revealed that majority of the respondents experienced discomfort in their lower back, upper back, knees, ankles and feet during last 12 months. It was also found that since last 7 days majority of the respondents experienced discomfort in their upper back (cervical), shoulders and lower back. Further, the respondents reported pain in upper back, lower back, knees, feet and ankles prevented them from carrying out their normal activities during last 12 months. Focusing on these problems some recommendations were suggested to the cashiers to reduce their discomforts.

**KEY WORDS:** MUSCULOSKELETAL DISCOMFORTS, CASHIERS, RETAIL STORES.

## **INTRODUCTION**

Retailing in India is one of the pillars of Indian economy (McKinsey, 2007). India is the world's fifth-largest global destination in the retail space. It accounts for over 10 per cent of the country's Gross Domestic Product (GDP) and around 8 per cent of the employment (IBEF, 2019). A team of several workers are involved in these retail stores such as cashier, sales associate, store manager, cleaning



and maintenance worker, security guard, team leader and floor manager (Comentale et.al. 2018). These workers play a very important role in the retail stores, without these workers the retail stores are can't be alive. Moreover, they play a very important role in buyer-seller interactions. To make buyer-seller interactions successful it is important to take care of their work-related discomforts which may reduce their productivity. It was found through preliminary survey that cashiers at checkout counters were working in standing position throughout their shift (Capodaglio 2017.

They were also subjected to repetitive tasks and awkward postures. Therefore, the retail store cashier's work has been associated with high rates of musculoskeletal discomforts. Due to repetitive tasks and awkward postures they may develop neck-shoulder pain, carpal tunnel



syndrome and back pain (Maligava et al. 2011) which as a result absenteeism and low productivity increases. Work-related musculoskeletal discomforts bring about a lot of harmful effects. Moreover, people who experience these discomforts suffer mentally and physically and are faced with the possibility of permanent, partial or total disability (Maligava et al. 2011). Therefore, it becomes imperative to reduce such problems for a productive and safe work environment. The present study highlights the discomforts experienced by the cashiers of retail stores. The results of the study will help the designers of checkout counters of retail stores to consider the discomforts experienced by cashiers while designing them. The outcome of the research will also wrench the attention of the retails store authorities to contemplate the discomforts of their employees considering which can reduce absenteeism and increase productivity.

**Statement of Problem:** The present study aims to assess the musculoskeletal discomforts experienced by the cashiers of selected retail stores.

**Objectives of the study:** To assess the musculoskeletal discomforts experienced by the cashiers of selected retail stores.

#### Hypothesis of the study

 $H_1$ : There exists a relationship between discomforts experienced by the cashiers during last 12 months with age of the respondents.

 $H_2$ : There exists a relationship between the discomforts experienced by the cashiers during last 12 months and discomforts that prevented them from carrying out their normal activities during last 12 months.

Review Of Literature: A study was conducted by Forcier et al. (2008) on "Supermarket Workers: Their work and their health, particularly their self-reported musculoskeletal problems and compensable injuries". The musculoskeletal health of supermarket employees other than cashiers was examined for one company. Two sources of data were used compensation statistics (from the company's 57 corporate supermarkets) and self-reported questionnaires (administered in 4 selected stores). The data about the musculoskeletal health of these workers were collected by means of a self-administered questionnaire known as Nordic Questionnaire. The findings of the study revealed that 83% of workers (excluding cashiers) reported at least one musculoskeletal disorder over a 12- month period, and 32% had problems severe enough to impede regular activities. An experimental study was conducted by Lehman et.al (2010) on "Effect of sitting versus standing and scanner type on cashiers" (Forcier et al., 2008).

This study was conducted to understand the effects of working position (sitting versus standing) and scanner type (bi-optic versus single window) on muscle activity, upper limb and spinal posture, and subjective preference of cashiers. Ten cashiers from Dutch retailer participated in the study. The findings of the study showed that cashiers exhibited lower muscle activity in the neck and shoulders when standing and using a bi-optic scanner. Shoulder abduction was also less for standing conditions. In addition, all cashiers preferred using the bi- optic scanner with mixed preferences for sitting (n=6) and standing (n=4). A study was conducted by Kihlstedt and Hagg (2011) on "Checkout cashier work and counter design- Video movement analysis, musculoskeletal disorders and customer interaction" in Sweden in order to analyze checkout cashiers' movements at a checkout counter during interaction with customers and the prevalence of work-related stress and musculoskeletal disorders in checkout cashiers. The research was conducted among 50 cashiers from 7 shops. Cashier activities and movements, customer interaction and counter design issues were analyzed from the video data (Comentale et al., 2018).

Prevalence of work - related stress and musculoskeletal disorders was obtained from the questionnaire. The findings of the study showed that the prevalence of Musculoskeletal Disorders among the cashiers was quite high despite their low average age and the large number of male cashiers. The highest prevalence of MSD was in the neck (68%), shoulders (66%), lower (58%) and upper back (50%). The results showed that many cashiers experienced stress. The behavior of the customers was the major cause of stress. Other sources of stress arose from bad design or function of the computer system or other technical equipment. Maligaya et al. (2011) conducted a study on "Ergonomic assessment of the working conditions of checkout counter cashiers in a Grocery store" in Phillippines. This study aimed to investigate the working conditions of the cashiers in one of the grocery store in the country. The focused grocery store has five cashiers who were female with age ranging from 21 to 33 years old. The perceived pain of each worker was determined using Cornell Musculoskeletal Discomfort Questionnaire (CMDQ). Rapid Entire Body Assessment (REBA) was conducted to evaluate their postures and identify the level of risk of developing musculoskeletal disorders (MSD). The results of the CMDQ showed that the neck, thighs, and feet are the body regions that ranked the highest in terms of prevalence of musculoskeletal discomfort (five out of five workers).

These were followed by the shoulders, upper and lower back, upper arms, lower legs and hips/buttocks with four workers out five experiencing discomfort. Three workers experienced discomfort in the knees and two in the wrists and forearms. The tasks barcode scanning, reaching and bagging produce higher REBA scores compared to the other tasks such as getting a bag and operating the cash register. This puts them more at risk due to the longer duration of time spent doing the tasks. Capodaglio (2017) conducted a study on "Occupational risk and prolonged standing work in apparel sales assistants". The aim of this study was to assess the postural risk of sales assistants working in a prolonged standing posture, focusing on critical issues for the lower limbs. The study was conducted in 70 sales assistants employed among 9 apparel stores in northern Italy. An

observational approach was adopted together with the application of standard ergonomic tools (RULA, REBA, Strain Index, OCRA) to assess the postural risk (Kihlstedt et al., 2011).

The findings of the study indicated that the work of sales assistants in the apparel retail sector was characterized by the prolonged standing posture which accounts for more than 80% of the work shift duration, alternation with walking phases occur according to assigned tasks and work organization. The musculoskeletal discomfort of the lower limbs reaches a medium- high intensity in 75% of the workers at the end of the work shift. Comentale et al. (2018) conducted a study on "Comfort and ergonomics evaluation of a checkout workstation" in Italy. This study analyzed how cashiers move themselves into their workspace, with their own tools and devices and do their jobs. Photo and video acquisition has been done to acquire postures and movements by DARTFISH software and DELMIA software was used to model humans postures, workstation and interactions. The results were processed by CaMAN software. The results of the study showed a good correlation among subjective evaluations and calculated comfort indexes. In particular, high correlations have been found for neck, shoulders and hand (Lehman et al., 2010).

## MATERIAL AND METHODS

Descriptive design was thought to be most appropriate method to carry out the present research. The locale of the study was Vadodara city. The sample for the present study was collected from nine different retail stores of Vadodara city. The data were collected from 61 respondents who were working as a cashier for minimum 12 months in the selected retail stores of Vadodara city. Therefore, purposive sampling technique was used for the selection of respondents from the retail stores. Interview schedule was developed to collect the background information of the cashiers. The standardized questionnaire namely "Nordic Questionnaire" was used to study the discomforts experienced by the cashiers while performing their tasks during last 12 months, last 7 days in different body parts viz. neck, shoulder, upper back, upper arm, lower back, forearm, wrist, hip, thigh, knee, ankles and feet. It also focused on finding out the discomforts that prevented the cashiers in carrying out daily activities during last 12 months in different body parts viz. neck, shoulder, upper back, upper arm, lower back, forearm, wrist, hip, thigh, knee, ankles and feet (Maligaya et al., 2011).

## **RESULTS AND DISCUSSION**

**Major Findings:** The findings of the study obtained through the analysis of the data supported discussion and interpretations are presented here.

**Section 1 Background information:** This section contained questions regarding the personal information of the respondents covering details on their age (in years), Gender, height (in cms), weight (in kg), marital status, years of service as cashiers, number of days at work in

a week, total working hours per day, number of break in a day, duration of each breaks in a day. It was found that all the respondents of selected retail stores had 6 working days in a week and their working hours were 9 hours per day. The data in Fig.2 depicted that majority (81.96%) of the respondents had 1 to 2 breaks in a day and 18.03 per cent of the respondents had 3 to 4 breaks in a day. The duration of tea/coffee breaks in a day was 15 minutes and lunch breaks was 30 to 60 minutes in a day at selected retail stores. Majority (81.96%) of the respondents had one tea/coffee break in a day and 18.03 per cent of the respondents had two tea/coffee breaks in a day. It was also found that less than three - fourth (70.49%) of the respondents had one lunch break of 60 minutes in a day while and more than one - fourth (29.50%) of the respondents had one lunch break of 30 minutes in a day. From Fig. 3, it was found that all of the respondents reported that they did not had any musculoskeletal problems before joining as cashier at the present retail stores (McKinsey 2007).





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Section 2 (Discomfort experienced by the cashiers): In this section, a standardized questionnaire namely "Nordic Questionnaire" was used to study the discomforts experienced by the cashiers while performing their tasks during last 12 months, last 7 days in different body parts viz. neck, shoulder, upper back, upper arm, lower back, forearm, wrist, hip, thigh, knee, ankles and feet. It also focused on finding out the discomforts that prevented the cashiers in carrying out daily activities during last 12 months in different body parts viz. neck, shoulder, upper back, upper arm, lower back, forearm, wrist, hip, thigh, knee, ankles and feet. The data in Fig. 4, revealed that majority (88.52%) of the respondents experienced discomfort in their upper back (cervical) during last 12 months. Less than three-fourth (70.49%) of the respondents had encountered discomfort in their right wrist during last 12 months. It was also found that less than two - third (62.29%) of the respondents had discomfort in both shoulder during last 12 month.



Figure 4: Discomforts experienced in upper body parts during last 12 months







From the Fig. 5, it was found that since last 7 days, majority (88.52%) of the respondents experienced discomfort in their upper back (cervical). Less than

two – third (60.65%) of the respondents experienced discomfort in their both shoulder. Moreover, 13.11 per cent of the respondents experienced discomfort in their right shoulder. More than one – half (59.01%) of the respondents experienced discomfort in their right wrist and 14.75 per cent of the respondents experienced discomfort in their right wrist (98.36%) of the respondents had experienced discomfort in their lower back (lumber) during last 12 months. More than three-fourth (78.68%) of the respondent had discomforts in their both knees during last 12 months. It was also found that less than three – fourth (73.77%) of the respondents experienced discomforts in their ankles and feet during last 12 months.



Figure 8: Discomforts in upper body parts that prevented the cashiers from carrying out their normal activities during last 12 months



The data in Fig. 7 depicted that in lower body parts, majority (95.08%) of the respondents experienced discomfort in their lower back and knees (80.32%) during last 7 days. Less than three fourth (73.77%)

of the respondents experienced discomfort in their ankles and feet during last 7 days. It was revealed that less than two - third (63.93%) of the respondents experienced discomfort in their upper back during last 12 months which prevented them from carrying out their normal activities. More than one – half (52.45%) of the respondents experienced discomforts in their shoulder during 12 months which prevented them from carrying out their normal activities viz. household activities and other jobs (Fig. 8).

Figure 9: Discomforts in lower body parts that prevented the cashiers from carrying out their normal activities during last 12 months Discomforts in lower body parts that prevented the cashiers from carrying out their normal activities during last 12 months (n=61) 57.37% 63 03% 49.18% 44 26% Lower back Hips/buttocks Thighs Knees Ankles Feet (lumber)

Due to discomforts experienced in lower back (lumber) three-fourth (75.4%) of the respondents were prevented from carrying out their normal activities during last 12 months (Plate 10). It was also revealed that less than three – fourth (70.49%) of the respondents experienced discomforts in knees and two – third (63.93%) of the respondents experienced discomfort in their ankles during last 12 months which prevented them from carrying out their normal activities (Fig. 9).

**Testing of Hypotheses:** Several hypotheses were formulated to find out the relationship between selected variables of the present study. In the present investigation, as per the nature of variables t-test, coefficient of correlation and Analysis of the Variance (ANOVA) were computed. For the purpose of statistical analysis, the hypotheses were formulated in null form. The results are presented in this section:

**HO<sub>1</sub>:** There exists no variation in the discomforts experienced by the cashiers during last 12 month and Age (in years) of the respondents: Analysis of Variance (ANOVA) was computed to test the hypothesis.

Table 1. Analysis of Variance showing variation in the discomforts experienced by the cashiers with selected personal variables viz. Age (in years) and Years of service as cashiers (in months)

Sr. No.	Selected Variables	df	Sum of Squares	Mean Squares	F-value	Level of Significance
1.			Age (in years)			
	Between Groups	2	154.533	77.267	5.474	0.01
	Within Groups	58	818.713	14.116		

Table 2. Co-efficient of correlation showing relationship between the discomforts experienced by the cashiers during last 12 months and discomforts that prevented them from carrying out their normal activities during last 12 months

Selected Variables	n	r-value	Level of significance
Discomforts experienced by the cashiers during last 12 months			
Discomforts that prevented them from carrying out their normal activities during last 12 months	61	0.764	0.01

The computation of F – value showed significant variation in the discomforts experienced by the cashiers with age (in years) of the respondents. The F – value was not found significant for years of service as cashier (in months) (Table 1). Hence, the null hypothesis was partially accepted. Thus, it was inferred that the discomforts experienced by the cashiers varied with their age (in years).

experienced by the cashiers during last 12 months and discomforts that prevented them from carrying out their normal activities during last 12 months: Co-efficient of correlation was computed to find out relationship between the discomforts experienced by the cashiers during last 12 months and discomforts that prevented them from carrying out their normal activities during last 12 months.

Ho<sub>2</sub>: There exists no relationship between the discomforts

The results revealed that their existed significant

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relationship between the discomforts experienced by the cashiers during last 12 months and discomforts that prevented them from carrying out their normal activities during last 12 months. Hence, the null hypothesis was rejected (Table 2). It can be concluded that more is the discomforts experienced by the cashiers during last 12 months more was they were prevented them from carrying out their normal activities during last 12 months.









#### From the present study it was found that the cashiers experienced some musculoskeletal discomforts while working. These discomforts lead them to some musculoskeletal disorders such as back injuries, muscle strain, carpal tunnel syndrome, rotator cuff injuries (a shoulder problem) and many more if continued further. Therefore, there is a need to suggest ergonomic tips for reducing discomforts and the environmental parameters which will help them to increase their productivity and reduces absenteeism. Occupational Safety and Health Administration (OSHA) (2004) provided practical recommendations to help retail store cashiers to reduce the musculoskeletal discomforts in their workplaces. This can be done by recommending correct working postures.

**CONCLUSION** 

1. Recommended Working Postures: According to Occupational Safety and Health Administration (OSHA), recommended Working Postures describe body positions that are neutral and comfortable to use. Using postures other than those recommended will generally waste energy and motion as well as potentially raise the risk of injury. Changing position frequently and stretch between tasks helps in improving circulation and lessens fatigue.

- 2. Best and Preferred Work Zone: Performing work within the best and preferred work zones facilitates productivity and comfort. Work is safest when lifting and reaching is performed in these zones. Working outside these work zones results in non-neutral postures that may increase the risk of injury. It is particularly important to perform heavy lifting tasks within the best work zone (Fig. 10).
- **3.** Checkout and Bagging: Checking out and bagging were the regular tasks of the cashiers. They have to perform these tasks for every customers visited to the retail stores. Thus, they were subjected to awkward postures and repetitive which as a result developed musculoskeletal discomforts among the cashiers. Given below are some ergonomic tips given by Occupational Safety and Health Administration (2004) to cope with these problems.
- A powered in-feed conveyor should be used to help cashiers bring the items to their best work zone, rather than leaning and reaching to get items further up the conveyor (Fig. 11).
- In-feed and take-away conveyor belts should be placed as close as possible to the cashier to minimize reaching.
- Work should be performed within the preferred work zone (Fig. 12).
- Keyboards should be considered to enter the quantity of identical products rather than scanning each individual item (Fig. 13).
- Keyboards should be used to enter code if item fails to scan after second attempt.
- Keyboards should be placed on supports that adjust in height, horizontal distance and tilt to keep work within the preferred work zone.
- Cash register displays should be placed at or slightly below eye level.
- Scan cards or scan guns should be used for large or bulky items to eliminate the need to handle them.
- Scanners and conveyors should be set at the same height so that cashiers can slide items across rather than lift them (Fig. 14).

Cashiers should wear suitable and supportive shoes. The shoes shall be able to maintain the shape of the foot and provide support for the arch of the foot; have adequate space to allow movement of toes; have shock-absorbing insoles, and have low heels (not higher that 5 cm or 2 inches). Suitable shoes can reduce the health risks of standing. Standing on anti-fatigue mats, as compared to bare floors, provides a noticeable improvement in comfort. It reduces back pain and stress when standing for long period of time, prevents from injury and fatigue and also reduces foot pressure. When cashiers works by standing for longer period of time, certain body parts are going to become stiff such joints, especially knees are the most at risk of experiencing this minor annoyance which can lead to major. The anti-fatigue mat prevents from such stiffness. It also promotes good postures. The rubbery and cushioned surface will keep the cashier balanced and relaxed even when they are not moving. This way, the blood flow of the body is not disrupted, promoting good posture in the process. Anti-fatigue mat also eliminate fatigue while working for long hours. This leads to a substantial reduction of stress. (CCOHS, 2015). The cashiers should encourage to perform appropriate stretching exercises to relax their legs during work breaks.

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## Screening and Risk Factors Associated with Vulvovaginal Candidiasis Among Pregnant Women

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#### ABSTRACT

Background: Vulvovaginal candidiasis is nothing but refers to vulval symptoms caused by the yeast which is most common as candida albicans and it's also consisted of, Vaginal burning and itchy rashes around vulval region, trichomonas vaginalis which leads to fishy smell with greyish discharge. Objective: 1. To assess vulvovaginal candidiasis among pregnant women. 2. To identify risk of developing vulvovaginal candidiasis among pregnant women. 3. To associate risk factors score of vulvoyaginal candidiasis among pregnant women with their demographic variables. The purpose of this study was to assess vulvovaginal candidiasis and to identify risk factors among pregnant women in selected hospital. Material and method: The quantitative research approach and descriptive research design were used. Setting of the study: The study was conducted in Gynae OPD from selected hospital of Wardha District and 43 Pregnant women were selected with non-probability convenient sampling technique. High vaginal swabs were collected from each and processed by Gram Staining, culture on Sabroud's dextrose agar & CHROM agar. Result: The findings of this study shows that out of 43 pregnant women 4 were positive for vulvovaginal candidiasis, and 11.93% of total pregnant women were at the risk and 88.37% of all total pregnant women were at no risk for vulvovaginal candidiasis. Significant association found between age and trimester in pregnancy. Whereas occupation, monthly income, gravida and education didn't show any significant association with risk factors score. Conclusion: Reproductive age group women and third trimester of pregnant women have more risk of developing vulvovaginal candidiasis. Hence it is necessary to screen for high vaginal swab to reduce the risk of developing vulvovaginal candidiasis among pregnant women.

**KEY WORDS:** VULVOVAGINAL CANDIDIASIS, REPRODUCTIVE AGE, TRIMESTER, PREGNANT WOMEN, SCREENING, RISK FACTORS.

### **INTRODUCTION**

Vulvovaginal candidiasis is a type of mucosal infection of a female genital tract of women which is most commonly caused by candida albicans. It is characterized by itching in vagina, burning sensation, soreness near vaginal area, atypical vaginal discharge, dyspareunia, vaginal erythema and oedema. Which are related with vulvovaginal candidiasis results in changes or imbalance in sexual hormone, and its result to usage of contraceptive pills, pregnancy or therapy for hormone replacement as well as using antibiotic in the case of diabetes mellitus. Many incidents of vulvovaginal candidiasis re-join to remedy

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which is recently available antifungal during acute vulvovaginal candidiasis is mostly curable with recent chemotherapeutic and stay in their place for subset of the population among females those who are diagnosed with vulvovaginal candidiasis. Primary infection is arising and it is not connected with any make susceptible factors to find out with acute vulvovaginal candidiasis.

Hormonal replacement therapy and diabetes mellitus are secondary predisposing factors been noted. Females those who are diagnosed with recurrent vulvovaginal candidiasis specifically responds to antifungal treatment because of little aversion to the disease. Vulvovaginal is one of the common infections that nurses deal with daily. Yeast infection are not always be prevented so however, that are associated with specific risk. Factors that nurses can counsel women to alert or avoid. There are three main cause of infection those are bacterial vaginosis, vaginal yeast infection, and trichomoniasis. Despite of these there are many other causes which includes allergies related to any substance from soap or spermicides, and it leads to



decrease in oestrogen level at the time of breastfeeding and menopause and these causes are changes as the age varies (Alli et al., 2011).

These complications may lead to regular discomfort such as daily discomfort, infection of skin and many more, because of rashes scraping, and other causative conditions includes candida infections and Neisseria gonorrhoea. The diagnosis of these disease is done according to patients' condition, microscopic examination and culture is done to examine the growth of the yeast by discharge. Many advices which are given the following are keeping the genital area clean and dry, its more necessary to keep it clean and rising with only plain water only. Yes, it is necessary to clean vagina after sexual contact and menstruations but using douching may be harmful in many conditions. Using of condoms are suggested to avoid any kind of sexually transmitted diseases. Antibiotic therapies are recommended to prevent the yeast infections (Fidel 2007).

### MATERIAL AND METHODS

The researcher has adopted descriptive research design to assess the risk factors of vulvovaginal candidiasis among pregnant women, it provides the best framework for the study. The present study aims are to assess vulvovaginal candidiasis and associated risk factors among pregnant women in selected hospital. The researcher has adopted quantitative research approach. The research from the tool after updating theoretical risk factors associated vulvovaginal candidiasis, where it will help to rule out the incidence of vulvovaginal candidiasis among reproductive female. At the beginning, patients form outpatient department that are pregnant women had been be tested those who have come for regular antenatal check-ups. Females with symptoms and without symptoms are selected for this study. Structured questioner on demographic variables and observe by using risk factors assessment scale for vulvovaginal candidiasis (Foxman 1990).

High vaginal swab was taken from every patient, each sample required 15 mins of time to finish this procedure, and the sample were sent to microbiology department for further investigations. The Sample collections process started from the researchers visited to Rural hospital AVBRH Sawangi (M) Wardha city and had taken necessary permissions from authorities. Before the procedure of data collection permission were taken from involved committees, Prior permission was taken from HOD of Dept of OBGY to conduct this study. The researches selected the ANC mothers from OPD those visited for their regular check-up with the following inclusion and exclusion criteria, the researcher explain the patients regarding vaginal candidiasis and its complication to foetus in future, and also explain them awareness regarding this condition and preventive measures (Gipson 2012).

Written consent is taken from every participant before starting the procedure. High vaginal swab was taken from every participant's swab were preserved and send to microbiology department for further process, later questions were asking regarding demographic variables and risk factors assessment scale were given for detection risk of developing vulvovaginal candidiasis among them. The pregnant women will be surveyed to assess the risk factor of vaginal candidiasis by using risk assessment scale. Risk status was classified with "no risk" means NO with the score "zero", "with risk" means YES with the score of "one". And it is distributed accordingly, No risk (0) With Risk (1-20) and it was based on total number of responses given by pregnant women. The Datta Meghe Institute of Medical Sciences' Ethics Committee (DU); the report was accepted by the Institutional Ethics Committee (Christian 2012).

Table 1 Distribution of pregnant women according to their

demographic variables n=43						
Demographic Variables	Frequency (f)	Percentage (%)				
Age(yrs.)						
18-22 yrs.	8	18.6				
23-28 yrs.	20	46.5				
29-34 yrs.	15	34.9				
35-40 yrs.	0	0				
Education						
Illiterate	0	0				
Primary	3	7.0				
Secondary	11	25.6				
Higher Secondary	19	44.2				
Graduate	10	23.3				
Occupation						
Govt. Sector	2	4.7				
Private Sector	5	11.6				
Homemaker	32	74.4				
Unemployed	4	9.3				
Monthly family income (Rs)						
<5000 Rs	3	7.0				
5001-10000 Rs	31	72.1				
10001-20000 Rs	5	11.6				
>20000 Rs	4	9.3				
Gravida						
Primigravida	19	44.2				
Multigravida	24	55.8				
Trimester						
First	1	2.3				
Second	14	32.6				
Third	28	65.1				

**Statistical Analysis:** All findings were summarized by concentrations and percentages, categorically. The program used in the study was SPSS 24.0 and the edition of Graph Pad Prism 7.0, and p<0.05 is regarded as a degree of significance. Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they

form the basis of virtually every quantitative analysis of data (Ilkit 2011).

#### **RESULTS AND DISCUSSION**

The analysis and interpretation of the data collected from 43 samples who were pregnant women. The analysis was done with the help of inferential and descriptive statistics. The Section deals with demographic variables such as age, education, occupation, monthly income, gravida and trimester (Kamath et al., 2013).

Table 2. Assessment of vulvovaginal candidiasis among
pregnant women n=43

Vulvovaginal candidiasis (Candida albicans)	Frequency	Percentage (%)
Present	4	9.30%
Absent	39	90.70%
Total	43	100

Table 3. Frequency and percentage distribution of findings for vulvovaginal candidiasis n=43

Sr.	0		Positive		gative
No	Organism Found	F	%	F	%
1	Candida Albicans (vulvovaginal candidiasis)	4	9.30	39	90.70
2	Escherichia Coli	3	6.98	40	93.02
3	Klebsiella Pneumoniae	2	4.65	41	95.35
4	Normal flora grown	6	13.95	37	86.05
5	Not even normal flora grown	28	65.12	15	34.88

Figure 1: Frequency and percentage distribution of findings for vulvovaginal candidiasis



This table states the distribution of pregnant women according to their demographic variables in this table it is distributed as age in years pregnant women were found 18-22yrs the total frequency was 8(18.6%), 23-28yrs frequency was 20(46.5%), the age group of 29-34yrs was 15(34.9%), whereas the last age group that is of 35-40yrs no women was present. This shows the percentage wise distribution of educational status which includes, illiterate women were 0, primary education was 3(7.0%) women, secondary education was 11(25.6%) women were found, whereas higher secondary education was 19(44.2%) women and Graduate were 10(23.3%) women were observed. The distribution was according to occupation status it includes government sectors

2(4.7%), Private sector was 5(11.6%), whereas homemaker was 32(74.4%) and unemployed was 4(9.3%) (Kamath et al., 2013).

The table shows distribution of monthly income of family were women with < 5000Rs was 3(7.0%), women with family income between 5001-10000Rs was 31(72.1%), and Women who had family income from 10001-20000Rs was 5(11.6%) and women with > 20000Rs were 4 (9.3%) are following distribution of income. The distribution of gravida of women are primigravida and multigravida. The distribution shows 19(44.2%) of women are primigravida and 24(55.8%) of women are multigravida. The table shows distribution of trimester of pregnant women it indicates that 1(2.3%) is of first trimester, 14(32.6%) of women are from second trimester and 28(65.1%) of pregnant women were from third trimester.

Findings of vulvovaginal candidiasis among pregnant women in selected hospitals of Wardha district. The total women were selected for the study was 43, and among that it shows that 4(9.30%) of pregnant women had vulvovaginal candidiasis, however 39(90.70%) of pregnant women didn't have vulvovaginal candidiasis. According to above table it indicates the distribution of vulvovaginal candidiasis and other organisms, In the present study among 43 pregnant women, 4(9.30%) of pregnant women were positive for vulvovaginal candidiasis it indicates the presence of candida albicans which is a type of yeast (Kamath et al., 2013). Escherichia coli 3(6.98%) was present among pregnant women, 2(4.65%) of pregnant women were positive for Klebsiella Pneumoniae, in 6(13.95%) pregnant women normal flora grown was present, and 28(65.12%) where not even normal flora growth has been observed among pregnant women. Assessment of risk factor associated with vulvovaginal candidiasis among pregnant women from selected hospital. Percentage and frequency wise distribution of risk factors of vulvovaginal candidiasis

According to the table there are distribution of the risk factors which shows the pregnant women with risk and no risk. Severe vaginal discharge 29(67.44%) are with risk and 14(32.56%) are with no risk were present in pregnant women, vulval itching 18(41.86%) pregnant women are with risk and 25(58.14%) women are with no risk. 2(4.65%) of women were with the previous history of vulvovaginal candidiasis they are with risk and 41(95.35%) of women are with no risk, 17(39.53%) of pregnant women were using oral contraceptive users are were at risk and 26(60.47%) of pregnant women are with no risk. The recent antibiotics user was not present in the study 43 (100.00%) of women are with no risk. 4(9.30%) of pregnant are of diabetes are with risk and 39(90.70%) of pregnant women did have the risk, 43(100.00%) of pregnant women are with no risk for steroids users, not a single woman is found with risk in it. 24(53.48%) of women were with risk in multipara and 19(44.18%) of women were with no risk. Taking anti-allergic drugs for allergy in pregnant women were 1(2.33%) of them were with risk and 42 (97.67%) of pregnant women are with no risk. 11 (25.58%) of pregnant women were suffering

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from anaemia and are with risk and 32 (74.42%) of them are with no risk. 4 (9.30%) of pregnant women were Suffering from Hypothyroidism with the risk and 39(90.70%) of pregnant women are with no risk found.

Not a single woman is found with risk for worm infestation problem which means 43(100.00%) of all pregnant women are with no risk for worm infestation problem. 43(100.00%) of pregnant women are with no risk for multiple sexual partners, 1 (2.33%) of pregnant women are with risk for wearing tight undergarments and 42 (97.67%) of them are at no risk. 1(2.33%) of pregnant women think it is not necessary to change wet undergarments are with risk and 42(97.67%) of them are with no risk. 2(4.65%) of pregnant women goes to swimming pool are at risk and remaining 41(95.35%) are with no risk. 2(4.65%) of pregnant women are using scented laundry soap are with risk and 41(95.35%) of women are with no risk. 25(58.14%) of pregnant women wearing synthetic undergarments are with the risk and remaining 18 (41.86%) of women are with no risk. 4 (9.30%) of pregnant women are sensitive to any perfume or talcum powder and 39(90.70%) of women are with no risk for using and of the perfume or talcum powder. 29 (67.44%) of pregnant women have a habit of washing from back to front after using toilets are with the risk and 14(32.56%) of remaining pregnant women are with no risk in the present study, whereas 11.93% of pregnant women are at no risk.

Table 4. Ide n=43	ntify risk of developing vulvovaginal candidias	is amor	ıg pregna	ant wo	omen.
Sr. No	Risk for vaginal candidiasis	With Ye	risk s	No ri N	sk o
		F	0/0	F	%
1	Severe vaginal discharge	29	67.44	14	32.56
2	Valvula itching	18	41.86	25	58.14
3	Previous history of vaginal candidiasis	2	4.65	41	95.35
4	Oral contraceptive pills user	17	39.53	26	60.47
5	Recent antibiotics user	0	0.00	43	100.00
6	Diabetic	4	9.30	39	90.70
7	On steroids	0	0.00	43	100.00
8	Multipara	24	53.48	19	44.18
9	Taking anti-allergic drugs for allergy	1	2.33	42	97.67
10	Suffering from Anemia	11	25.58	32	74.42
11	Suffering from Hypothyroidism	4	9.30	39	90.70
12	Worm infestation problem	0	0.00	43	100.00
13	Multiple sexual partner	0	0.00	43	100.00
14	Wearing tight undergarment's	1	2.33	42	97.67
15	Think it is not necessary to	1	2.33	42	97.67
	change wet undergarment's				
16	Going to Swimming pool	2	4.65	41	95.35
17	Wearing synthetic undergarments.	25	58.14	18	41.86
18	Using scented laundry soap	2	4.65	41	95.35
19	Sensitive to any perfume or talcum powder	4	9.30	39	90.70
20	Washing from back to front after using toilets.	29	67.44	14	32.56
			11.93%		88.37%

This table shows the association of risk factor score with age in years of pregnant women. A 'F' values were 3.23(df=2,40) it is lesser than evaluated 'F' i.e., 9.27at 5% level of significance. Also, the calculated 'p'=0.0001which was less than the acceptable level of significance i.e., 'p'=0.05. Hence it is interpreted that age in years of pregnant women is statistically associated with their risk factor score. This table shows the association risk factor score with trimester of pregnancy of pregnant women. The tabulated 'F' values were 3.23(df=2,40) which is much less than the calculated 'F' i.e., 17.54 at 5% level of significance. Also, the calculated 'p'=0.0001 which was much less than the acceptable level of significance i.e., 'p'=0.05. Hence it is interpreted that trimester of

pregnancy of pregnant women is statistically associated with their risk factor score (Rajeswari et al., 2019).

The study findings were discussed with the references to the objectives stated in chapter 1 and with the findings of other studies in this section. The research study was an undertaken that is "Screening and risk factors associated with vulvovaginal candidiasis among pregnant women." In the present study among, 43(100%) out of 4 (9.31%) of pregnant women were positive for vulvovaginal candidiasis and all participants include pregnant women from Gynae OPD from selected hospitals of wardha district. In the present study researcher found an association in the demographic variable and risk factors score in age and trimester. Women with the age group 18-34years (Reproductive age) have high risk of vulvovaginal candidiasis and also found that women with third trimester of pregnancy have more risk of developing vulvovaginal candidiasis.

Level of screening and	C D	Level of screening an	d risk factor score	
risk factor score	Score Kange	Frequency (f)	Percentage	
No risk	0	38	88.37 %	
With Risk	1-20	5	11. 93 %	
Minimum	score	0		
Maximum	score	- 7		
Mean score		$4.04 \pm 1.92$		
Mean % Score		$20.32 \pm 9.63$		



Table 6. Association of risk factor score in relation to age. n=43

Age (yrs.)	Frequency (f)	Mean score + SD	F- value	p- value
		_		
18-22 yrs.	8	2.12±1.80	9.27	0.0001
				Sp<0.05
23-28 yrs.	20	3.45 <u>+</u> 1.76		
29-34 yrs.	15	4.86±0.74		
35-40 yrs.	0	0±0		

Table 7. Association of risk factor score in relation to their trimester of pregnancy. n = 43

Trimester of pregnancy	Frequency (f)	Mean score <u>+</u> SD	F- value	p- value
First	1	0±0		
Second	14	2.28±1.85	17.54	0.0001
Third	28	4.53±0.96		Sp<0.05

Similar study was conducted in Mangalore, Karnataka India were 118 pregnant women were analyses and its shows that 50% of pregnant women were positive for candidiasis and giving the prevalence of 42.37% which shows that majority of vulvovaginal candidiasis if found in reproductive age that is from 26-30yrs of age, and they conclude that incorporation of a screening protocol in routine antenatal check-up for early diagnosis of candidiasis and its treatment by cost effective drugs should be recommended.9 And another study was conducted in port Hardcourt, River states which aimed was to determine the prevalence of candida albicans among the women, the study shows that 36% of women had positive for candida albicans and 64% of women were negative. It concludes that prevalence is higher in pregnant women with a significant relationship with age.

The similar study was conducted in Ghana which aim was to assess the prevalence of vulvovaginal candidiasis among pregnant women. Were the highest frequency of vulvovaginal candidiasis was recorded in pregnant women in their third trimester (57.4%).11 Further they had concluded with the reason that is the reason is just because pregnancy mostly in the third trimester, levels of oestrogen is specifically high and its result in higher glycogen deposits in the vagina, and this provides a good source of carbon, which supports the proliferation of Candida species. Moreover, oestrogen increases the affinity of Candida to the yeast cytosol receptor in vaginal epithelial cells (Redondo et al., 1990).

In the present study it was found that among all total majority of 11.93% of total pregnant women were at the risk and 88.37% of all total pregnant women were at no risk for vulvovaginal candidiasis. The risk factors were detected among them were that 29(67.44%) of the pregnant women have habit of washing from back to front after using toilet, 24(53.48%) of that were multipara and 25(58.14%) of pregnant women among them were using synthetic undergarments and 11(25.58%) of pregnant women were suffering from anaemia. The similar study was conducted in Karnataka, India which aimed was to assess the risk of vaginal candidiasis among pregnant women, the study shows that majority that is (53%) of the pregnant women belongs to no risk category and (47%) of pregnant women belongs the risk of developing vulvovaginal candidiasis. The risk factors were detected among these pregnant women were 52.8% of them had the habit of washing from front to back after using toilet. 39.4% were multipara and 39.4% of the pregnant women had the habit of wearing synthetic undergarments, 35.2% were using scented laundry soap to clean the perineum each time. 33.8% of them were suffering from anaemia (Louis et al., 2020).

## **CONCLUSION**

After the detailed analysis, the present study concludes that reproductive age group women and third trimester of pregnant women have more risk of developing vulvovaginal candidiasis. It also found that age and trimester in pregnancy were significantly associated with the risk factor score. It also shows among all total 11.93% of pregnant women were with the risk of developing vulvovaginal candidiasis and 88.37% of them were at no risk. In conclusion our current study concludes that reproductive age group women have more risk of developing vulvovaginal candidiasis, because of High oestrogen levels cause an increased glycogen load in epithelium, which is a nutritional source for growth of candida & germination. Oestrogen promotes fungal adhesion & germination, fungi are more capable to penetrate vaginal wall, Vulvovaginal candidiasis the most common gynaecologic diagnosis in the primary care setting. Lactobacillus acidophilus (normal vaginal flora) produces hydrogen peroxide, when balance bacteria and veast imbalanced it results to rise in hormone levels and moist environment is also a favourable condition of yeast to grow. Which may harm to mother and child too. Hence it is necessary to screen for high vaginal swab to reduce the risk of developing vulvovaginal candidiasis among pregnant women.

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## Assessment of the Effectiveness of Progressive Muscle Relaxation Therapy on Stress Among Non Teaching Staff

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## ABSTRACT

Background - Stress is the emotional and physical responses of our body to the things happening near to each individual. Stress lives with skills have a broad notion and many intellectual-behavioral aspects. Generally, coping is the individual's ability to adjust with the situation or works to prevent the situation that leads to unfavorable outcomes. Mainly there are two ways to cope with stress. The first way is to concentrate on the issue in a straight way to change or modify the situation or surrounding that can lead to adverse effects. The other way is to control the thinking and actions of individual aroused from the conditions that leads to stress. There are several issue related remedial measures like intellectual and action solving ability. Objectives: 1) To assess the level of stress among non teaching staff. 2) To evaluate the effectiveness of progressive muscle relaxation therapy on stress. 3) To associate the post test level of stress with selected demographic variables. Materials and methods: Pre experimental one group pretest and posttest design was applied. Interventional analytical approach was used in the study. The study was conducted at DMIMS (DU), Sawangi (M), Wardha. 30 non teaching staffs were selected for the study by non probability convenience sampling technique. Job stress scale was used for collecting the data. Result: There was significant difference in the stress level of non-teaching staff before and after intervention. Conclusion: Progressive muscle relaxation therapy was effective in reducing the stress of the non teaching staff and none of the demographic variables were associated with the post test level of stress.

**KEY WORDS:** STRESS, NON TEACHING STAFF, PROGRESSIVE MUSCLES RELAXATION THERAPY.

## **INTRODUCTION**

Stress is a multi factorial thing that is associated with the connection between the person and his/her surroundings. It can also be termed as an annoyance, how the person interacts with the annoyance and the connection between the person and his/her surroundings. It can be said that many victories had achieved from some kind of stress; but if the stress rate is high, then it leads to some unfavorable conditions like psychological disturbances, problems with sleep, pain in head, not able to focus on things, not able to remember things and not able to solve the problems



correctly. There are different varieties of stress which affects the individual negatively by affecting the sources of copying and in the future life; it will have physical and mental consequences. It is also noted that stress have physical and mental consequences, not able to function properly, not able to adjust to the situation. At the end, these all will affect the person's quality of life.

Mainly there are two ways to cope with stress. The first way is to concentrate on the issue in a straight way to change or modify the situation or surrounding that can lead to adverse effects. The other way is to control the thinking and actions of individual aroused from the conditions that leads to stress. All the living organisms experience the stress. The aim of nurse is not removing the whole stress completely, because stress is a part of life. Response to stress can be in an unhealthy way, and the role of non teaching staff at this time is helping to promote the health. Heath promotion includes strategies for reduction and management of the stress, the non



teaching staff also can use nursing process in order to manage the stress (Beddoe & Murphy 2004). id.

Table 1 Percentage wise distribution of non-teaching staff

according to their demographic variables. n=30				
Demographic Variables	No. of non- teaching staff	Percentage (%)		
Age(yrs)				
21-30 yrs	16	53.3		
31-40 yrs	10	33.3		
41-50 yrs	4	13.3		
Gender				
Male	17	56.7		
Female	13	43.3		
Residential Area				
Urban	22	73.3		
Rural	8	26.7		
Education				
Graduate	13	43.3		
Post Graduate	17	56.7		
Marital Status				
Married	22	73.3		
Unmarried	7	23.3		
Divorce	0	0		
Widow	1	3.3		
Occupation				
Permanent	20	66.7		
Contract Basis	10	33.3		
Income				
Below Rs. 10000	1	3.3		
Rs.10001-15000	8	26.7		
Rs.15001-20000	10	33.3		
Rs.20001 & above	11	36.7		
Experience				
Less than 01 year	2	6.7		
01-07 years	13	43.3		
08-14 years	12	40		
15 years & more	3	10		
Type of work				
Clerical	20	66.7		
Social	10	33.3		
Area of work				
Hospital	24	80		
College	6	20		

## MATERIAL AND METHODS

Interventional analytical approach was used for the present study. In the present study, pre experimental one group Pre-test – post-test design was used. The study was conducted at DMIMS (DU). The sample for the present study consisted of 30 non teaching staffs working in DMIMS (DU). Non probability convenience sampling technique was used for the present study. Inclusion

criteria were non teaching staff who work for more than 8 hours in front of computer daily and who are willing to participate in the study. Exclusion criteria were non teaching staff who have some health problems and who have already taken work related management measures. Job stress scale and progressive muscle relaxation technique were used to collect the data.

## **RESULTS AND DISCUSSION**

**Section A:** Distribution of non-teaching staff with regards to demographic variables (Eby & Brown 2009).

**Section B:** Assessment of pre and post test level of stress among non-teaching staff.

Table 2. Assessm	nent with le	evel of pre test stres	s score		
n =30					
Level of pre test stress	Score Range	Level of Pre test stress Score			
		No of non-teaching staff	Percentage		
No Stress	0-12	0	0		
Mild Stress	13-25	0	0		
Moderate Stress	26-38	1	3.33		
Severe Stress	39-51	29	96.67		
Minimum sco	ore	37			
Maximum score		51	51		
Mean stress score		43.50±3.87			

Table 3. Assessment with level of post test stress score n = 30

I and of most tost stress	Score Range	Level of Post test stress Score		
Level of post lest stress		No of non-teaching staff	Percentage	
No Stress	0-12	0	0	
Mild Stress	13-25	12	40	
Moderate Stress	26-38	18	60	
Severe Stress	39-51	0	0	
Minimum sco	ore	25		
Maximum score		31		
Mean stress score		28.60±2.98		

Table 4. Significance of difference between stress score inpre and post test of non-teaching staffn = 30

Overall	Mean	SD	Mean Difference	t- value	p- value
Pre Test	43.50	3.87	14.90 <u>+</u> 4.63	17.61	0.0001 S,p<0.05

**Section C:** Evaluation of effectiveness of progressive muscle relaxation therapy on stress among non-teaching staff (Forozandeh & Delaram 2003).

This table shows the comparison of pretest and post test stress scores of non-teaching staff. Mean, standard deviation and mean difference values are compared and student's paired't' test is applied at 5% level of significance. The tabulated value for n=30-1 i.e. 29 degrees of freedom was 2.05. The calculated 't' value

i.e. 17.61 are much higher than the tabulated value at 5% level of significance for overall stress score of non-teaching staff which is statistically acceptable level of significance. Hence it is statistically interpreted that the progressive relaxation muscle therapy on stress among non-teaching staff was effective. Thus hypothesis H1 is accepted (Gammon & Morgan 2005).

Section D: Association of post test level of stress among non-teaching staff with their demographic variables. None of the demographic variables were associated with the post test level of stress.

Analysis of data showed that there was significant difference in the stress level of non-teaching staff before and after intervention. Hence it is concluded that progressive muscle relaxation therapy significantly brought improvement in the stress level of non-teaching staff. Progressive muscle relaxation therapy was given to the nursing students studying at selected Nursing Colleges in Bangalore for assessing whether it was effective in reducing the stress or not. The mean pre test stress score was 89.56 and the mean post test stress score was 65.74. The mean post test stress score was less than the mean pre test stress score. This indicates that progressive muscle relaxation therapy was effective in reducing the stress of the nursing students.

**Implication:** The findings of the study have implications for nursing practice, nursing education, nursing administration and nursing research.

**Nursing Practice:** Progressive muscle relaxation therapy is an inexpensive intervention in order to reduce stress. The nurses can provide awareness to the people regarding this intervention. Nurses should have skill regarding various therapies other than medicine to help the clients and families to relieve their stress which in turn helps in preventing psychiatric illness and making their life more hopeful even though affected by illness.

**Nursing Education:** The healthcare delivery system at present gives more emphasis on preventive care rather than curative aspect. Progressive muscle relaxation therapy can be used to teach as a stress reduction method to student nurses, patients, and caregivers of clients. Nursing students should be trained to acquire skill in assessing the stress of clients in different settings and to intervene with the appropriate literature so that they can be prevented from taking anti depressive other medicines to relieve their stress.

**Nursing Research:** Many more research studies could be done to assess the efficacy of this highly feasible and less expensive therapy in various other conditions and settings. The researchers can also explore similar therapies which increase the self-confidence and selfworth of sample. Future investigators can use the findings and the methodology as reference material.

**Nursing Administration:** The administrative nursing can also provide training of progressive muscle relaxation therapy for staff nurses, student nurses and other allied profession. The nurse authors should take a keen interest in progressive muscle relaxation therapy for the effective use in various areas like clinical practice, community and home health care.

#### Recommendations

The current study has following recommendations:

- The study can be conducted for larger sample size which will facilitate more reliable result.
- A similar study can be conducted in different settings.
- The experimental study can be conducted to find out the effectiveness of Progressive Muscles Relaxation Therapy on stress among caregivers of mentally ill patient.
- The effectiveness of Progressive Muscles Relaxation Therapy can be done in reducing stress among cancer patients admitted in hospitals.
- A similar study can be conducted to find out the Stress and coping strategies of hospice nursing.
- A comparative study can be conducted to find out the level of stress among staff nurses working in the selected government and private hospitals.
- A similar study can be done with large sample size.
- A similar study can be conducted to find out the level of stress among staff nurses working in the Mental Health Hospitals and General Hospitals.

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## On the Attitude Regarding Need of Two Wheeler Driving Among Parents of the Late Adolescent

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#### ABSTRACT

Background: A major proportion of motor vehicles on the Indian roads, especially in metropolitan cities comprise of motorized two-wheelers (Singh, 2012). Indian statistics reveal that two-wheeler riders are amongst the most vulnerable road users and get into road traffic injuries very often; these mostly involve young drivers (Dandona, & Mishra, 2004; Gururaj, 2005, 2008). Aims- The aim of the study was to assess the attitude regarding need of two wheeler driving among parents of the late adolescent. "Objective of the study:- 1. To assess the attitude regarding need of two - wheeler driving among parents of late adolescent.2. To associate the score with the demographic variables. Methods and Material: Research approach: Survey approach. Research Design: - Descriptive design. Setting of the study: The study was undertaken in selected rural and urban areas of Wardha.Sample size: 100 Sampling technique: Convenient sampling Results: Majority of samples (48) 48% were of 38-48 years of age, (60) 60% were male, educated,(31) 31% were Graduated, availability of two- wheeler (94)94% has two- wheeler, parents' monthly income (55)55% were 10,000-20,000, (68)68% have two children, source of training (69)69% by self. Majority of samples 79(79%) were agree level of attitude score. association of attitude score with the age in year of samples. The 'F' value was calculated 1.146. Also, the calculated 'p' value is 0.334 which was more than acceptable significance level of 'p'<0.05. Therefore, it is interpreted the age in years of attitude regarding the need of two- wheeler driving among the parents is not associated with attitude score.

**KEY WORDS:** ATTITUDE, TWO WHEELER, LATE ADOLESCENT, PARENTS.

## **INTRODUCTION**

More than one third of fatal and nearly half of nonfatal road traffic injuries involve two-wheeler riders in India and the majority of the injured are in the age range of 20–30 years (Gururaj & BRSIPP, 2011). These figures underscore the need to examine various factors implicated in road-safety of two wheeler riding in Indian youth. While behavioural factors such as speeding have been widely recognized as some of the key factors in influencing road traffic accidents (Mehrotra, Sharma &Sudhir, 2008; Dandona 2006), there is a paucity of published research on the same in India, especially with reference to young two-wheeler riders. India has been identified by WHO as the worldwide leader in road deaths.



Although India has-National speed limit law, National drink-driving law, National motorcycle helmet law, National law on mobile phone use while driving, National drug-driving law, the reported road traffic fatalities in 2010 accounted to 137572 (85% Males, 15% Females) as per Transport Research Wing (TRW), Ministry of Road Transport and Highways (Steinberg 2004).

In India WHO estimated road traffic fatalities accounted to 16.6 per 100 000 population. Road accidents cost the economy of the country in many respects like infrastructural cost, spending on health care services, compensation as well as rehabilitation of the victims, loss of household services as the economy loses out on the taxes of the earnings of the deceased victims and there is a loss of income for the survivors of the victim's family. RTA's are the leading cause of death for young people aged 15-29. More than a million people die each year on the world's roads and the cost of dealing with the consequences of these road traffic crashes runs to billions of dollars (Carrillo 1968).



Background Of The Study: Motorized two-wheeler riders are one among the most vulnerable Indian road users. However, there is limited research on psychological factors that are likely to influence riding behaviors of youth. The present paper focuses on exploring and documenting emotional states associated with two-wheeler riding in urban Indian youth. The study sampled 1,650 youth, aged between 17-30 years, from 30 educational institutes in Bangalore and Delhi. A Riding Survey developed during the pilot phase was used for data collection. Positive emotional states were commonly reported to be associated with riding and a sense of freedom was one of the commonest factors that were linked to the same, from the perspectives of the youth. Other than commuting, riding for fun (54%) and riding for relaxation (30%), relief from boredom (22%) and getting away from distress (17%) were endorsed as some of the reasons for taking out the two-wheeler. Seeking a sense of power and control, seeking joy, seeking relief from anger or feeling upset were reported by varying proportions of young riders as some of the reasons for speeding. This exploratory survey highlights an urgent need for addressing the role of emotions in preventive intervention programs that target young two-wheeler riders (Dandona 2004).

Need Of The Study: As per May 2017 report released by Dainik Bhaskar in Rajasthan, every year 10,000 people die due to road accidents. Among them 35% are two wheeler riders. This year till March 2017, 2564 people died in road accidents. Among them highest number of deaths are from Jaipur North, Jaipur South, Hanumangarh, Bundi Bara, Chittorgarh and Pali district. In comparison with 2016 report, there is a rise of 83% in deaths in Hanumangarh and 71% in Jaipur North. This is an alarming sign, because either people do not have awareness regarding two wheeler rules or do not obey the traffic rules.3 The United Nations has rightly proclaimed 2011-20 as the Decade of Action on Road Safety. India is a signatory to Brasilia Declaration and is committed to reduce the number of road accidents and fatalities up to 50 percent by 2020. Simple measures like awareness and practice of two wheeler measures can effectively reduce the impact of RTAs on the lives of people. Hence, the present study aimed to assess the awareness and attitude regarding need of two wheeler driving among the parents of the late adolescent (Guru 2002).

Review Of Literature: Review of literature provides the basis for future investigations, justifies the need for replications, justifies the need for replication, and throws light up. On feasibility of the study and indicates constrains of data collection and help to elate the finding of another.

- Review related to importance of two-wheeler in India.
- Review related to attitude regarding need of twowheeler driving.
- Review related to attitude towards speed limits.
- Review related to attitude towards drink driving.

According to Dodona and Mishra, a major proportion of motor vehicles on the Indian.

roads, especially in metropolitan cities comprise motorized two-wheelers (Singh, 2012).Indian statistics reveal that two-wheeler riders are amongst vulnerable road users and get into road traffic injuries very often, these mostly involved young drivers (Dodona and Mishra, 2004; Gujarat, 2005,2008). More than one third of fatal and nearly half of nonfatal road traffic injuries involve two-wheeler riders in India and the majority of injured are in the age range of 20-30 years (Gururaj & BRSIP, 2011). These figures underscore the 13 need to examine various factors implicated in road-safety of two- wheeler riding in Indian youth (Poonam et al., 2013).

**Conclusion:** knowledge does not necessarily translate into improve traffic behavior as was seen in this study. School and college are the basic institution where we can formulate interventions. Continuous reinforcement and education reminding them of traffic rules can bring about a positive change and motivate them to strictly adhere to the traffic norms and help reduce the morbidity and mortality regarding road traffic accident. According to Liu BC, it seems intuitive that helmets should protect against head injuries but it is seen the many two- wheeler users prefer not to used one. A review 61.

observational studies showed that motor cycle helmets were found to reduce the risk of death and head injury in motor cyclists who crashed. From four higher qualities studies helmet were estimated reduce the risk of death by 42% (or 0.58, 95% CI 0.25-0.38) and from six higher quality studies helmets were estimated to reduce risk of head injury by 69%. A study was conducted by Carrillo in 1968 to determine whether speed variance contributes to accident involvements on the interstate system. This study way is seen as an extension to the s difference was that Solomon's study focuses only two and four lane rural highways while Carrillo investigated the contribution of speed variance to accidents in the Interstate system. Carrillo used date collected by 20 state highway departments. Results of the analysis showed that, as the speed of a vehicle varies from mean speed of traffic, the chances of an accident involving the vehicle increase. The involvement rate variation means speed for interstate highways (Lui 2008).

A study was conducted on epidemiology of traumatic brain injuries (TBI) IN 2002: Indian scenario" road traffic injuries are the leading cause (60%) of TBIs followed by falls (20%- 25%) and violence (10%). Alcohol investment is known to present among 15% to 20% of TBIs at the time of injury. The rehabilitation needs of brain injured persons and significantly high and increasing from year to year. Indian and other developing countries 24 face the major challenges of prevention, pre-hospital care and rehabilitation in their rapidly changing environment to reduce the burden of TBIs (Ramya 2017).

Problem Statement: To assess the attitude regarding

need of two wheeler driving among parents of the late adolescent.

#### Objectives

- To assess the attitude regarding need of two wheeler driving among parents of the late adolescent.
- To associate the score with the demographic variables.

#### **Operational Defination:**

**Attitude:-** attitude defined as feeling or opinion about something or someone, or a way of behaving that is caused.

**Two wheeler:-** A two-wheeler is a vehicle that runs on two wheels.

The two wheels may be arranged in tandem, one behind the other, as with single-track vehicles, or arranged side by side, on the same axle. If on the same axle, the vehicle may be have no other support, as with bicycles, or have additional support, which is often also the source of motive power.

**Late adolescent:-** The period of development in a person's life from ages 18 to 24 wherein that person becomes a young adult.

**Parents :-** A parent is a caregiver of the offspring in their own species. In humans, a parent is the caretaker of a child (where "child" refers to offspring, not necessarily age). A biological parent is a person whose gamete resulted in a child (Trivedi & Rawal 2011).

#### Hypothesis

- **HO:-** There will be negative attitude regarding need of two wheeler driving among parents of the late adolescent.
- **H1 :-** There will be positive attitude regarding need of two wheeler driving among parents of the late adolescent.

### Variables

- Independent variable : Attitude of the parents .
- **Dependent variable :-** Parents of late adolescents

**Assumptions:** Parents may have positive attitude regarding need of two wheeler driving in the late adolescent.

## MATERIAL AND METHODS

Research approach: - Survey approach

Research Design: - Descriptive design

Sample:- Parents of late adolescent

**Sampling Technique:-** Samples will be collected by purposive sampling technique.

Sample size: - The sample size for this study is 100

Setting: - Selected area in Wardha.

#### Inclusion Criteria:-

- Parents in selected area who are willing to participate in the study.
- Parents of late adolescent who are available at the time of data collection.

#### **Exclusion criteria**

• Parents of late adolescent who have already attended similar type of study.

**Tool:** A structured questionnaire will be used for data collection. The questionnaire will be consisting of two sections.

Part 1:- Demographic variable

**Part 2:-** Likert scale to assess the attitude regarding need of two wheeler drives among parents of the late adolescent.

#### Interpretation is done based on the following level.

0-21- Strongly disagree attitude regarding need of two-wheeler

21-42- Disagree attitude regarding need of two-wheeler

43-63- Neutral attitude regarding need of two-wheeler 64-84- Agree attitude regarding need of two-wheeler

85-105- Strongly agree attitude regarding need of two-wheeler

- **Validity:-** the validity of tool will be established in consultation with guide from community health department.
- **Reliability:** reliability assess for the finding of pilot study.
- **Pilot study:** pilot study will be conducted on 10% of the total sample.
- **Plan for data analysis:** the collected data will be analyzed by the descriptive and inferential analysis.

Ethical Aspect: Prior approval for the study will be taken from institutional ethical committee. Due permissions will be taken from concerned authorities of the institute where study is to be conducted. Informed and written consent will be taken from the samples and identity of the samples will be kept confidential.

## **RESULTS AND DISCUSSION**

Distribution of parent's according to the demographic variable: According to age (48) 48% were of 38-48 years, (40)40% were of 49-58 years, (10)10% were of 59-68 years, and (2)2% were of 69-78 years. According to gender (60) 60% were male and (40) 40% were female. According to education (3) 3% were Illiterate, (9)9% were primary educated, (26)26% were of secondary educated,
#### Mendhe et al.,

(22)22% were of higher secondary educated,(31) 31% were graduated, and (9)9% were of above graduation. According to availability of two- wheeler (94)94% has two- wheeler and (6) 6% doesn't have two- wheeler. According to parents' monthly income (55)55% were 10,000-20,000, (20)20% were 20,001-30,000, (12)12% were 30,001-40,000 and (13)13% were 40,000 and above. According to number of children in the family (19)19% have single child, (68)68% have two children,(10) 10% have three children and (3)3% have more than three. According to the source of training (18)18% taken training from family,(9) 9% taken from friends, (4)4% taken from driving school and (69)69% by self.

# Assess Attitude Score Regarding Need of Two - Wheeler

**Driving Among the Parents of Late Adolescent:** 2(2%) of samples were having disagree level of attitude score, 1(1%) were neutral level of attitude score, 79(79%) were agree level of attitude score, 18(18%) were strongly agree level of attitude score. The minimum score for attitude was 21 and the maximum score for attitude was 93, the mean attitude score was attitude was 75±9.26 with a mean percentage of 71.4.

#### Association of attitude score with selected demographic

**variables:** Association of attitude score with the age in year of samples. The 'F' value was calculated 1.146. Also, the calculated 'p' value is 0.334 which was more than acceptable significance level of 'p'<0.05. Therefore, it is interpreted the age in years of attitude regarding the need of two- wheeler driving among the parents is not associated with attitude score.

The current study was conducted to assess the attitude regarding need of two- wheeler driving among parents of late adolescent. A detail review of literature indicates aimed to assess the attitude regarding need of two-wheeler driving among parents of late adolescent. The findings of the present study show that attitude score of parents of late adolescent is 75. In the present study (2) 2% of parents is disagree, (1)1% of parent is neutral, (79)79% of parents is agree, and (18)18% of parents is strongly agreed. There is an association of demographic value with monthly income of parents with the attitude regarding the need of two-wheeler driving.

The results of the present study are consistent with the study of two-wheeler drivers driving towards wearing a helmet, speaking on a cell phone while driving and driving with pillion passengers. Result shows that driving without wearing a helmet on local city road (97)97% is higher than on highways (89) 89%. Receive a telephone while travelling on roads (4.30) 4.30% relative to highways (2.01)2.01%. Overall cell phone speaking behavior while driving is (3, 02)3.02%. Driving on city roads with two or more pillion is higher (5.03)5.03% than on highways. Taking on cell phones after parking on city roads (1.55%) as well as on highways (0.78%) is

a positive overall activity of taking on the cell phones after parking away.

## CONCLUSION

This study leads, after detailed analysis to the following conclusion. The parents of late adolescent were strongly agreed with the attitude regarding need of two-wheeler driving. Attitude of late adolescent parents were categorized into strongly agreed where 2% of parents disagreed, 1% of parents were neutral, 79% of parents agreed and 18% of parents strongly agreed. The demographic variable like age, gender, education, availability of two-wheeler, parents of monthly income, number of children in family and source of driving training. There is an association of demographic value with monthly income of parents with the attitude regarding the need of two-wheeler driving.

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# Assessment of the Effectiveness of Oral Dextrose on Altering the Pain Level During Venipuncture Among Neonates

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#### ABSTRACT

Neonates, who are sick, require a number of painful therapeutic and diagnostic procedures and cry vigorously during these procedures. The medical and paramedical staffs usually ignore pain felt during these procedures. Objectives: 1. To assess the pain level of neonates undergoing venipuncture in the control group 2.To assess the pain level of neonates undergoing venipuncture in experimental group.3. To assess the effectiveness of oral dextrose on altering the pain level during venipuncture among the neonates.4.To associate the pain level of control group and experimental group with selected demographic variables. The research approach used for the study was interventional Evaluatory approach. The study was conducted in Neonatal Intensive Care Unit at Wardha city Maharashtra, India, using post test only control design. A Non-Probability purposive sampling technique was used to selecting 50 neonates undergoing venipuncture admitted in NICU. The data collected, tabulated, and analyzed in terms of objectives of study using descriptive and inferential statistics. According to the results of this study, Administration of oral dextrose is more effective for minimizing the pain during venipuncture in experimental group as compared to control group. Hence oral administration was cost effective, available and highly feasible. Hence the researcher concluded that administration of oral dextrose on altering the pain level during venipuncture among neonate.

**KEY WORDS:** EFFECTIVENESS, ASSESS, ORAL DEXTROSE, ADMINISTRATION, NEONATE, VENIPUNCTURE.

#### **INTRODUCTION**

Development in the medical field and the progression in the specialized nursing care are interrelated for good prognosis and supports in minimizing the mortality in morbidity rate in less gestational age as well as the neonates who categorized under appropriate for gestational age. The sick Newborn Intensive Care Unit is an highly designed structure where the credentialed health care personnel administered the specialized care and meant for low birth weight, less for appropriate gestational age, babies of high risk mothers who are diagnosed in their prenatal period or the other health issues followed after the delivery (Anand & Corr 1989).

Neonates can face upto 400 painful procedures while they are being cared for in the neonatal intensive care units.



Many of them face painful procedures, like heel pricks, cannulation, endotracheal intubations etc daily. Pediatric patients cited pain related to procedures especially with the placement of intravenous cannula as the most common one. One of the widely performed procedures is peripheral intravenous cannulation that is required for the administration of antibiotics, fluids, blood products and other therapies. It is often a necessary procedure and causes a lot of distress to the patients. Nurses play a valuable role in minimizing the physical discomfort and the related complications. Peripheral intravenous cannulation is associated with a number of both physical and physiological complications (Basavanthappa 2005).

Infants are unable to verbalize pain and that is why it might go unnoticed. In the past, It was believed that neonates did not feel pain or that a painful experience would be forgotten as rapidly it has occurred. However recent evidences have come up which suggests that not only do they feel pain but they feel it more intensely than adults do. Venipuncture for babies' in the neonatal intensive care unit (NICU) or special care nursery is a common event that causes pain to the new born. Recent studies have proven that, the babies early pain experience may alter their pain response in later life. Many attempt



have been made to reduce the pain sensation in the neonates undergoing blood collection. One of the most studied methods is the administration of sucrose or dextrose, before the heel prick, which has been shown to effectively reduce pain sensation in the neonates

## MATERIAL AND METHODS

The Interventional Evaluative Approach (Randomized control trial) Was undertaken on the basis of prevalence. 50 neonates were selected and enrolled via non purposively who are admitted in Neonatal Intensive Care Unit undergoing venipuncture and simple random technique was used in the study. Data was collected by structure questionnaire and standardized neonatal pain assessment tool during the month of December 2020. Neonates who are admitted in NICU, Neonates whose mothers are willing to participate in the study, Neonates whose birth weight is 2.5 kg or more, Neonates who have completed 37 weeks of gestation at the time of birth and Neonates who are active and alert were included in the study. While, Neonates who have nil per oral status, Neonates with congenital anomalies, Mother having history of gestational diabetes, Neonates who are on ventilator, Neonates who are seriously ill, Neonates having history of repeated and frequent admission were excluded. The questionnaire was made in most generally spoken Marathi and English language in the area. Participation was on voluntary basis at the report. Participants answered the questionnaire themselves anonymously (Ghai et al., 2009).

The tool was devised through several steps of item generation, reduction, weightage, pilot testing of the tool and validating the tool, the content validity was determined after the opinion of 10 experts in the field of child health nursing. The tool validation included measurement of inter-observer reliability and generation of criteria related, construct and content related validity. The tool was later revised by English language expert and then translated into Marathi language by the English translator experts without altering the tool meaning. The institutional ethical committee of Datta Meghe Institute Of Medical Sciences, Deemed to be university sanctioned approval for conducting the research study was obtained. The findings were summarized by concentrations and percentages, categorically. The programme used in the study was SPSS 24.0 and the edition of graph pad prism 7.0 and P<0.05 is regarded as degree of significance.

The questionnaire consist of parts for acquiring demographic information and relevant questions related to the pain assessment among neonates during venipuncture admitted in Neonatal intensive Care Unit. To accomplish the objective of the study the investigator collected data from 50 neonates who were undergoing venipuncture and admitted in NICU who comes under the inclusion criteria by a standardized and valid pain assessment tool COVERS neonatal pain scale.

**Statistical Analysis:** Analysis of data was done by using descriptive and inferential statistics both. Descriptive

statistics was used to describe the basic feature of the data in a study and inferential statistics was used to make inferences from your data to make more general conditions. The percentage wise distribution of neonates undergoing venipuncture admitted in Neonatal Intensive Care unit about their demographic characteristics was calculated. The statistical tests were used for the analysis were Students unpaired t-test, one-way ANOVA, Pearson' correlation coefficient, and reliability analysis. The suitable sample drawn from the study population of 50 subjects who stayed in Wardha district. The data was collected to classify the sample characteristics including the age of the newborn in days, diagnosis, gender, mode of delivery and time gap between last feed and procedure (Basavanthappa 2005).

Table 1. Percentage wise distribution of neonates accordingto their demographic characteristics.

Demographic Variables	Control Group	Experimental Group
Age(days) of neonates		
0-7 days	18(72%)	14(56%)
8-14 days	5(20%)	6(24%)
15-21 days	2(8%)	5(20%)
22-28 days	0(0%)	0(0%)
Diagnosis		
Abdominal Colic	0(0%)	2(8%)
Conjunctivitis	1(4%)	2(8%)
Feeding intolerance	5(20%)	4(16%)
Napkin Rash	2(8%)	2(8%)
Neonatal Syndrome	0(0%)	2(8%)
Neonatal Hyperbillirubinemia	6(24%)	6(24%)
Respiratory Distress syndrome	11(44%)	7(28%)
Gender		
Male	12(48%)	11(44%)
Female	13(52%)	14(56%)
Time gap between last feed		
and procedure		
With half an hour	5(20%)	5(20%)
30 min-1 hr	7(28%)	3(12%)
1-2 hrs	5(20%)	13(52%)
>2 hrs	8(32%)	4(16%)
Mode of Delivery		
Normal Vaginal Delivery	20(80%)	21(84%)
Caesarean Section	5(20%)	4(16%)
Instrumental Delivery	0(0%)	0(0%)

# **RESULTS AND DISCUSSION**

Distribution of neonates according to age (in days) shows that in the experimental group 14(56%) of neonates were under the age of 0 - 7 days, 6 (24%) of neonates were under the age of in between 8-14 days and 5 (20%) of neonates were the age of in between 15-21 days. whereas in the control group, 18 (72%) of neonates were under the age of 0- 7 days,5(20%) of neonates were under the

age of in between 8-14 days and 2 (8%) of neonates were the age of in between 15-21 days. Distribution of neonates according to the diagnosis shows that, In experimental group 2(8%) of neonates were diagnosed with Subconjuctivital hemorrhage,2 (8%) conjunctivitis and 2 (8%)napkin rash whereas, 6 (24%) of neonates diagnosed with Hyperbillirubinemia, 4(16%) of neonates diagnosed with feeding intolerance and 7(28%) of neonates diagnosed with respiratory distress syndrome. While in control group11 (44%) of neonates diagnosed with respiratory distress syndrome, 6(24%) of neonates diagnosed with neonatal Hyperbillirubinemia, 5(20%) diagnosed with napkin rash and 4% of neonates conjunctivitis (Guha 2006).

Distribution of neonates according to gender,48% of neonates in control group and 44% in experimental group were males and 52% in control group and 56% in experimental group were females. Distribution of neonates according to time gap between last feed and procedure shows that in control group 5 (20%) of neonates took last feed within half an hour where in experimental group 5 (20%) of neonates took last feed within half an hour before the initiation of procedure (venipuncture) whereas in experimental group 3(12%) of neonates took last feed within 30 mins -1hr before beginning of procedure (venipuncture). 5(20%) of neonates in control group took last feed within 1-2 hr while in experimental group 13 (52%) of neonates took last feed within 1-2 hours of initiation of procedure (venipuncture) while 8(32%) of neonates in control took last feed before 2 hours of procedure(venipuncture) whereas in experimental group 4(16%) of neonates took last feed before 2 hours of procedure (Ball et al., 2009).

Table 2. Assessment of pain level of neonates undergoingvenipuncture in the control group

T	C	Level of Level of pain score		
Level of pain score	Score Range No of neonates		Percentage	
No Pain	0	0	0	
Mild	1-4	0	0	
Moderate	5-8	12	48	
Severe	9-12	13	52	
Minimum score		7		
Maximum score		10		
Mean pain score		8.48 ± 0.91		
Mean % pa	in score	70.66 ± 7.65		



The above table shows that 48% of the neonates had moderate level of pain score and 52% had severe level of pain score. Minimum pain score in was 7 and maximum pain score was 10. Mean pain score was  $8.48 \pm 0.91$  and mean percentage of pain score was  $70.66 \pm 7.65$ . The above table shows that 80% of the neonates had mild level of pain score and 20% had moderate level of pain score. Minimum pain score in was 1 and maximum pain score was 6. Mean pain score was  $3.28 \pm 1.51$  and mean percentage of pain score was  $27.33 \pm 12.61$ . This table shows the comparison of pain score of neonates in control and experimental group. Mean, standard deviation and mean difference values are compared and student's unpaired 't' test is applied at 5% level of significance.

Table 3. Assessment with of pain level score in experimentalgroup

T 1 P 1	C	Level of Level of pain score		
Level of pain score	Score Range	No of neonates	Percentage	
No Pain	0	0	0	
Mild	1-4	20	80	
Moderate	5-8	5	20	
Severe	9-12	0	0	
Minimun	1 score	1		
Maximum score		6		
Mean pain score		$3.28 \pm 1.51$		
Mean % pa	in score	27.33 ± 12.61		





Table 4. Assessment of effectiveness of oral dextrose on altering the pain level during venipuncture among the neonates

Group	Mean	SD	Mean Difference	t- value	p- value
Control Group	8.48	0.91	5.20±0.35	14.68	0.0001 S,p<0.05
Experimental Group	3.28	1.51			

The tabulated value for n=50-2 i.e. 48 degrees of freedom was 2.00. The calculated 't' value i.e. 14.68 is higher than the tabulated value at 5% level of significance for overall pain score of neonates which is statistically acceptable level of significance and p=0.0001 which is less than

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0.05. Hence it is statistically interpreted that the oral dextrose on altering the pain level during venipuncture among the neonates was effective.



Distribution of sample after the comparison of pain score of neonates in control and experimental group. Mean, standard deviation and mean difference values are compared and student's unpaired 't' test is applied at 5% level of significance. The tabulated value for n=50-2 i.e. 48 degrees of freedom was 2.00. The calculated 't' value i.e. 14.68 are much higher than the tabulated value at 5% level of significance for overall pain score of neonates which is statistically acceptable level of significance and p=0.0001 which is less than 0.05. Hence it is statistically interpreted that the oral dextrose on altering the pain level during venipuncture among the neonates was effective. The association of pain score with age in days of neonates. The tabulated 'F' values was 3.44(df=2,22) which is much less than the calculated 'F' i.e. 9.09 at 5% level of significance. Also the calculated 'p'=0.001 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that age in days of neonates is statistically associated with their pain score (Owem 1979; Taddio 1997).

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# **Assessment of the Effectiveness of Progressive Muscle Relaxation Technique in Reducing Stress Among Primary Infertile Women Undergoing Intra Uterine Insemination**

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#### ABSTRACT

Rachel's eloquent plea ringing through centuries conveys clearly, the desperate hope of the infertile women and their need. The term infertility refers to opponent inability of a couple to conceive after one year of unprotected intercourse. 60-80 million people experience infertility around the world and most of those people live in developing countries. In India infertility affects 10-15% of couples in reproductive age group. Infertility is called "primary" when there has been no prior conception. Male is responsible for the infertility in about 65%. Female is responsible for the infertility in about 40-50% of the cases. Incidences of infertility in India are 92% primary and 8% secondary. To assess the effectiveness of progressive muscle relaxation therapy in reducing stress before and after intrauterine insemination in both experimental and control group. True - experimental research design, Pre-test - post-test - only design was done from July 2020 -November 2020 in 49 primary infertile women undergoing intra uterine insemination. Primary infertile women were randomly assigned to either the Control group or the intervention group. Women were observed for a total duration of four months and assessed with the perceived stress scale. Analysing the data was done using SPSS software, version 16, and paired t, independent t, chi-square and Mann-Whitney tests. Total 49 women were analysed in two groups i.e. intervention group (n=24) and control group (n=25). There were no significant differences in age, education level, spouse's education level, occupation status, spouse's occupation status, cause of infertility, marriage duration, the length of time one knows about their infertility, and the duration of treatment between two groups. After the intervention (Progressive muscle relaxation therapy) at 9th day, 15th day of menstruation and after intra uterine insemination, the level of stress has shown a statistically significant reduction (p=0.000). This interventions were more effective for reducing the level of stress. The findings showed that Progressive Muscle Relaxation technique can be benefited to reduce the level of stress among primary infertile women who are undergoing Intra Uterine Insemination

KEY WORDS: PROGRESSIVE MUSCLE RELAXATION, PRIMARY INFERTILE WOMEN.

#### **INTRODUCTION**

Infertility represents complex physical, spiritual, emotional crises and affects all areas of the women's health and wellbeing, the co-existence of infertility and psychological distress is supported by sound scientific evidence. However the casual direction may well be



from infertility to psychological stress. The degree of psychological stress can be very high and it is essential that, this to be recognized. Infertility myths still exist today. Infertility is often viewed as a failure of the women and to a lesser extends the man, to fulfill their role in society. Studies suggest that infertile women typically do not seek medical help until after more than a year of trying to conceive unsuccessfully. The process of seeking infertility treatment has increased in recent years because of the development of new techniques for treating infertility. This innovations and advancements pose challenges for the nursing personnel while caring the infertile women. So she must understand the dynamics of infertility, different treatment modalities and help the



infertile women to cope with their psychological distress (Alexander 1996.

Infertility is often equated with pain and stress in our society. In India a women without child is considered as "Barren". It is often experienced as the most stressful event in their lives. In infertility problems have historically been attributed to women. Given the plethora of available infertility treatment and their complexity, infertile women and physicians may become so engaged in physiological concerns that they fail to attend to psychological aspects of the process. They focus their interest on the technology to the exclusion of all other concern. These medicalizations of the crisis of infertility fail to adequately address psychological aspect of the women's experience.

A review of literature shows that, health personnel should assess the level and source of existing stress and determine the appropriate intervention to reduce the psychological stress. In the area of infertility nurses are faced with challenges, to provide comprehensive health care in a cost effective manner. Relaxation is one of the cost effective simple and non-invasive strategies to relieve stress. The relaxation training is also within the scope of nursing practice. It does not need physician's supervision and can be practiced in variety of settings. The need for the study arises from the fact that 40-50 infertile women come for intra uterine insemination at Srusthi Medical foundation as per the 2004 statistics. According to the present practice in this hospital there is no specific intervention for stress reduction in infertile women undergoing treatment7. The Betty Neumann System model 2002 also classified the nurse's role to reduce the stressors reaction through use of primary, secondary or tertiary prevention as interventions to retain, attain and maintain an optimum wellness level. This study proposes to determine whether progressive muscle relaxation technique is effective in reducing the level of stress and if so, whether, it can be incorporated as a regular nursing intervention in the care of primary infertile women undergoing intra uterine insemination (Henry 1998).

**Aim Of The Study:** The aim of the study to assess the effectiveness of progressive muscle relaxation therapy in reducing stress before and after intrauterine insemination in both experimental and control group.

**H1:** There is an individual difference in level of stress experienced by primary infertile women undergoing intra uterine insemination with post test score (Hillary 1998).

#### MATERIAL AND METHODS

Study design, participants and setting: This was True -experimental research design, Pre-test -post-test -only design with prospective participants recruited from Infertility and artificial insemination clinic at selected hospitals in Wardha district being assigned to intervention and control group. Primary infertile women were eligible to participate of the age group of 25 – 35 years, Primary infertile women who can read and write Marathi and Hindi, Women with the diagnosis of primary infertility and undergoing intra uterine insemination with the partner's sperm and combined with ovulation induction, Primary infertility with or without altered semen analysis in the partner. Women were excluded if Women with pre-existing illnesses including hypertension, cardiovascular diseases, diabetic mellitus, thyroid disease and renal disease, Women with secondary infertility (Christopher 1999).

**Randomisation:** All primary infertile women who were undergoing intra uterine insemination allocated randomly into control and experimental group by block randomization. Every ten consecutive patients from a block and randomization was done in such a way that within each ten patients ( block ) five patients were randomly allotted to experimental group and five to the control group. This type of procedure is called block randomization. Among next 10 patients 5 were randomly allocated to experimental and the other 5 to the control (Eller 1998; Ellne 2003).

Intervention and procedures: One of the data collection tools in this study was demographic questionnaire, including personal and family information on age, education, spouse's education, occupation, spouse's occupation, and marriage duration. Another tools for data collection was the Perceived Stress Scale. The Perceived Stress Scale (PSS) is the most widely used psychological instrument for measuring the perception of stress. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives. The scale also includes a number of direct gueries about current levels of experienced stress. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 =1 & 4 = 0 to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. A short 4 item scale can be made from questions 2, 4, 5 and 10 of the PSS 10 item scale. In this study, level of stress was assessed by Perceived stress scale to the both groups, before the first session as a pre-test. Then, it was completed 9th day to 14th day of menstrual cycle as a post-test. In the intervention group, progressive muscle relaxation therapy was introduced in six sessions and in the control group, only routine care was given.

In intervention group, the study participants, were lying on the side with their legs fairly bent (no to put pressure at any of the muscles) and in a relax position with closed eyes. In Jacobson technique, the body muscles were divided into eight parts and during performing the technique, an active muscle contraction for 5 seconds and then release of the same muscles for 30 seconds was implemented. The order of muscle contraction and release were as following: right foot, left food, right hand, left hand, stomach and back, chest and the shoulders, face, head and scalp. The first relaxation technique in the intervention group was performed around the 9th day of menstrual cycle and then every other day until women were undergone Intra uterine insemination (totally 6 sessions) in the presence of the researcher in Infertility and artificial insemination clinic at selected hospitals in Wardha district. After 15 days, post test was conducted with Perceived stress scale (Smith et al., 1988).

**Ethical Consideration:** The approval for the study was taken from the Institutional review board and the Ethical Committee of DMIMS (Deemed to be University). Informed consent was taken from all the patients before they underwent the procedure.

**Statistical Analysis:** The SPSS software (Statistical Package for the Social Sciences, Version 21.0, SPSS were used to analyse the data. To assess the homogeneity of the two groups with respect to the demographic and

confounding variables, Chi-squared test, and independent t-test were used. To compare the stress mean score of the two groups, independent t-test was used. p-value  $\leq 0.05$  was considered as the significant level.

## **RESULTS AND DISCUSSION**

**Section I:** There were total 49 primary infertile women participated in this study in two group At last 49 women were analysed in two groups i.e. intervention group (n=24) and control group (n=25). There were no significant differences in age, education level, spouse's education level, occupation status, spouse's occupation status, cause of infertility, marriage duration, the length of time one knows about their infertility, and the duration of treatment between two groups (table no.1).

Table 1. Distribution of characteristics of the study population						
Demographic variables	Interventional group	Control group	p-value			
Age						
20-30	9(37.4)	11(44)	0.609			
30-40	14(58.3)	13(52)				
40 above	1(4.2)	1(4)				
Level of education						
Primary education	5(20)	2(8)	0.439			
Secondary education	9(38.3)	11(44)				
Graduation	10(41.7)	12(48)				
Spouse's education level						
Primary education	2(8.4)	3(12)	0.751			
Secondary education	7(29.2)	9(36)				
Graduation	15(62.4)	13(52)				
Occupation status						
Housewife	19(79.2)	17(68)	0.427			
Working	5(20.8)	8(32)				
Spouse's occupation status						
Employee	15(62.5)	12(48)	0.371			
Business	6(25)	11(44)				
Farmer	3(12.5)	2(4)				
Causes of infertility						
Male factor	10(41.7)	11(44)	0.263			
Female factor	5(20.8)	2(8)				
Both	6(25)	4(16)				
Unknown	3(12.5)	8(32)				

**Section II:** The result shows that level of stress had no significant difference between two groups before intrauterine insemination (p=0.749). But after the intervention (Progressive muscle relaxation therapy) at 9th day ,15th day of menstruation and after intra uterine insemination, the level of stress has shown a statistically significant reduction (p=0.000). This interventions were more effective for reducing the level of stress. (Table 2)

A study was conducted to determine the efficacy of progressive muscle relaxation on reducing stress of

the infertile women undergoing treatment. Methods: 64 infertile women were taken as sample, in that 32 were taken for experimental, 32 were taken for control. Results: there was a significant reduction in systolic blood pressure was observed, a significant reduction on 3 or 5 State-Trait Anger Expression Inventory Scales. Conclusion: Progressive muscle relaxation technique appears to be an effective method to reduce anger, maintain blood pressure and promote psychological well being. A study done on testing the feasibility and effectiveness of incorporating progressive muscle relaxation technique into routine instruction on infertile women undergoing treatment. Design: A quasi-experimental design Subjects: 33 women were taken for study Results: 40% of women reported that they had a good relaxation during procedure, they were relieved from stress and felt happy. Conclusion: Based on above result, it is understood that progressive muscle relaxation technique reduce the anger and worries and promotes psychological wellbeing.

Table 2. Effectiveness of progressive muscle relaxation therapy in reducing stress before and after						
intrauterine insemination in both experimental and control group.						

Variable		Intervention group	Control group	p-value
Level of stress	Before intra uterine insemination	166.75±13.27	167.92±12.14	0.749
	9th day of menstrual cycle	115.75±13.88	177.12±19.37	0.000
	15th day menstrual cycle	118.08±15.37	179.40±18.34	0.000
	After intra uterine insemination	120.50±16.24	183.76±14.97	0.000

A study was conducted on infertility related to stress in men and women predicts the treatment outcome one year later. Design: Cohort study Subjects: 818 samples were taken. After one year the outcome was poor in women with lot of marital problem. Results: A study result shown that women with more marital distress require more treatment to conceive than women with less marital distress 77% of women with less marital problem showed good results.

A study done on perceived infertility related stress and its relationships to the marital adjustment and depression in infertile couples to explore the relationships between partner and infertility related stress and effect on marital adjustment in infertile men and women. Subject: 50 sample were taken for study, 25 sample were experimental,25 sample were control group. Results: 15 mothers reported that they had a good marital satisfaction among experimental group.Conclusion: They reported that it helped them to relieve from stress and successfully manage the stressful event. Above studies support to the present study.

# CONCLUSION

The findings showed that Progressive Muscle Relaxation technique can be benefited to reduce the level of stress among primary infertile women who are undergoing Intra Uterine Insemination

#### Conflict of Interest: Nil

Source of Funding: Self

**Ethical Clearance:** The study was approved by the Ethics committee of the institute.

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# **Evaluation of the Effectiveness of Planned Teaching on Knowledge Regarding Hypnobirthing Among Primigravida** Women

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#### ABSTRACT

Labor and birth hypnotherapy is focused on the idea that a woman's fear and stress of labor and birth contributes to muscle discomfort and eventually increased pain that contributes to more fear and stress continuing the cycle (Phillips-Moore, 2012) by using hypotherapy to teach a woman how to interact with the natural process of her body. The aim of this study was to assess the effectiveness of planned teaching on hypnobirthing awareness among primigravida women. This research included a total of 100 women with primigravida. It has been adopted pre experimental one group pretest post-test research design. The tool's material validity was carried out by different experts from various fields. Suggestions proposed were incorporated in tool and appropriate change were made. Reliability analysis was done by intra class correlation. Structured teaching program followed data collection within 15 days by group members pre-test data collection. The data were analyzed using different stastic tests including percentage, mean and standard deviation. The student t-test and chi-square test carried out the study. The p<0.05 has been regarded as statistically important. The result shows that 3 percent of primigravida women in pretest had poor knowledge score, average 61 percent in pretest, good 34 percent in pretest, very good 2 percent in pretest, maximum knowledge score was 16 in pretest and 20 in posttest. The mean pretest information score was 9.77(2.44) and 17.66 (2.18) in the post exam. The results suggested the impact of the proposed teaching program on overall awareness of primigravida female hypnobirthing.

**KEY WORDS:** PRE-LABOUR TECHNIQUES, THE RELAXATION EXERCISES.

#### **INTRODUCTION**

Hypnobirth helps you to observe birth in an environment of peace, comfort, free from anxiety and stress that prevents the body's birth muscles from working as they were conceived by nature in 1990 by Mongan. Hypnobirthing is a full system of birth education, which helps to monitor their wives and give them a better understanding of conception. This includes teaching basic and complex methods of self-hypnosis, calming, and breathing. Any single set of values is hypnobirthing.



According to Andrew MI Medical play an important role in preserving lives and comfort they have become increasingly routine in normal childbirth. This may increase the risk of associated complication and a less satisfactory birth experience (Agrawal et al., 2019).

Hypnobirthing is described as a strategy for managing pain and anxiety during childbirth involving various techniques of therapeutic relaxation, such as deep breathing and visualization. The best time to start classes in Hypnobirthing course is between 25 weeks and 29 weeks of pregnancy, but you may benefit from the classes right up to the end of your pregnancy. The calming exercises are best performed with the father or birth partner so that the sound of his or her voice or touch is an instant source for relief as the mother goes into labour Both methods of meditation and visualization are performed in the weeks leading up to birth, alongside essential exercise of relaxation accompanied by scripts, help to



alleviate anxiety. Some of the most critical aspects of a hypnobirthing course is the task of calming anxiety and building trust like everything else, the more expectant mothers practice relaxation, the more effectively and safely the body functions when functioning.

#### Objectives

- 1. To assess the pretest level of knowledge regarding hypnobirthing among women.
- 2. To assess the posttest level of knowledge regarding hypnobirthing among women.
- 3. To identify the association between level of knowledge regarding hypnobirthing among mother and selected demographic variables.

# MATERIAL AND METHODS

The present study was a pre-experimental one group pre-test and post-test design which was conducted at antenatal clinic in AVBR Hospital, Wardha, Maharashtra, India. After approval (DMIMS(DU)/IEC/Sept-2019/8500 dated: 15.10.2019) from the institutional ethical committee and informed written consent of the Primigravida women (Nehanegi 2008).

#### **Inclusion Criteria:**

- Antenatal women who were willing to participate in the study.
- Antenatal women who were read, understand and speak English or Marathi.

• Antenatal women who were available at the time of data collection (Barbara 2020).

#### **Exclusion Criteria**

- Antenatal women who have attended and practicing hypnobirthing classes.: A tool or an instrument is the formal written document used to collect and record information. The tool for the present study was prepared by the investigators after extensive review of literature. A structure questionnaires consists of two sections. It is consisting of demographic characteristics regarding antenatal women's i.e. age, marital status, religion, residential area, education. It is consisting of 25 multiple choice questions to assess the knowledge regarding hypnobirthing among primigravida women. For the present study the validated tool was used structure questionnaire. The tool was in Marathi. Structure questionnaire contained 25 multiple choice questions. Data was collected within 15 days by group members pretest data collection was followed by structured teaching programme. Post test data collection with the same questionnaire was done 7 days after structured teaching programme. In order to obtain content validity, the tool was given to 7 experts from Department of obstetrics and gynaecology. It 0.858 split half method was used to establish internal consistency of the instrument and it was found to be 0.858. Analysis was done in Descriptive statistic with mean, mean percentage and standard deviation and In inferential statistics with paired "t" test (Kutti 2000).

Level of Knowledge	Score Range	Level of Knowledge Score		
		Pre score	Post score	
Poor	1-5	3(3%)	0(0%)	
Average	6-10	61(61%)	3(3%)	
Good	11-15	34(34%)	7(7%)	
Very Good	16-20	2(2%)	90(90%)	
Minimum Score		4	7	
Maximum Score		16	20	
Mean Knowled	lge Score	9.77(2.44)	17.66(2.18)	

Table 1. Distribution of primigravida women with regards to level of knowledge regarding

 Table 2. Evaluation of Planned Teaching on Knowledge Regarding Hypnobirthing Among

Primigravida Women n= 100							
Variable	Obs	Mean	Std. Dev.	95 % Inte	Conf rval	t_Value	P_Value
Pre_Score Post_Score	100 100	9.77 18.29	2.44 0.74	9.28 18.14	10.25 18.43	22.83	0.00

#### **RESULTS AND DISCUSSION**

**Section A-** This section deals with percentage wise distribution of primigravida women. Percentage wise

distribution of primigravida women acoording to their demographic characteristics (Laxmansinghbhati 2009).

• Distribution of primigravida women according to age in year 7% of the primigravida women were in the

age group of 18-20 years, 56% in the age group of 21-25 years, 37% in the age group 26-30 years .

- Distribution of primigravida women according to educational qualification. 8% of the primigravida women were educated upto high school, 78% upto HSC, 14% upto graduation .
- Distribution of primigravida women according to Income. 10% of the primigravida women had income between 18000-20000, 50% of the primigravida women had income between 21000-25000, 23% of the primigravida women had income between 26000-30000, 11% of the primigravida women had income between 31000-35000.
- Distribution of primigravida women according to religion. % of primigravida women were hindu, 1% were muslim, 22% were Buddhist.
- Distribution of primigravida women according to caste. 22% of primigravida women were belonging to SC, 8% of primigravida women were belonging to ST, 3% of primigravida women were belonging to VJ/NT, 56% of primigravida women were belonging to OBC, 2% of primigravida women were belonging to SBC, 9% of primigravida women were belonging to open.
- Distribution of primigravida women according to residence. 76% of the primigravida women were belonging to rural area and 24% in urban areas respectively (Selvanathan 2019).

**Section B:** Assessment Of Knowledge Regarding Hypnobirthing Among Primigravida Women.

**Section C:** Evaluation of Planned Teaching On Knowledge Regarding Hypnobirthing Among Primigravida Women.

This table summarizes the comparison of pretest and post test scores for knowledge of primigravida women regarding hypnobirthing among primigravida women. In other terms, standard deviation and mean difference value Are equivalent and student's paired 't' test applied at a sense point of 5 per cent. The value for n tabled = 100-1. The calculated 't' value i.e. 22.83 are much higher than the tabulated value at 5% level of significance for overall knowledge score of primigravida women Is statistically reasonable significance point. Therefore it is interpreted statistically that the planned teaching programme on overall knowledge regarding hypnobirthing among primigravida women was effective. Thus the H2 is accepted (Widmer 2008).

A research on hypnobirthing antenatal childbirth care was performed at South Australia maternity unit. Antenatal hypnobirthing is associated with a decreased need for pharmacological therapies for childbirth4 Participants in the largest tertiary group 1 provide antenatal one center, guided trial using a 3-arm parallel group configuration hypnobirthing education in childbirth planning taught by a licensed therapist using a training in childbirth preparation provided by a trained therapist Using an audio-compact hypnobirth disk for enforcement; group 2 consists of an antenatal hypnobirth instruction in preparation for childbirth using an audio-compact hypnobirth disk provided by a nurse without training in hypnobirth therapy; group 3 participants begin their normal planning for childbirth with no further involvement. Hypnobirthing If Successful

A hypnobirthing-relaxation study. This has been used as a complement to the pharmacological treatment of 39 women hospitalized for premature contractions during pregnancy. Medication alone was misled by the control group and consisted of 70 people. Treatment started at the time of hospitalization and continued on average for 3 hours. Patients also got hypnobirthing cassettesrelaxation A research on hypnobirthing, hypnobirthing theoretical and practical knowledge among primigravida women. They asked a group of 100 primigravida women to complete a 20-question questionnaire. The results revealed that a significant degree of self-satisfaction among the groups in question primigravida women, most of the (90%) women they give correct answer of score range is 16-20 although only 7% of primigravida women they give correct answer score range is 11-15 and 3% women they give correct answer of score range 6-10 The results to present the analysis are described above. A number of studies in this region were reviewed which have direct or indirect effect on acquirement or progression of hypnosis among primigravida mothers.

#### **Implications To Nursing**

**Nursing Practice:** Nurses are the main tool for delivering health education, nurses will implement novel approaches for newly married couples, pre-pregnant mothers, pregnant women and others by discussing baby delivery wards under hypnosis there.

**Nursing Education:** Adequate monitoring and instruction are required for the advancement of student nurses by experienced teachers and staff nurses. Formal and informal teaching should be made available to nurses, so that patients can receive standardized nursing care.

**Nursing Administration:** Client's education services are an integral part of nursing care. The nursing administrator should see that the aspect of health promotion is included while providing care. Nurse administrators can plan for in- service and continuing nursing education regarding hypnobirthing.

**Nursing Research:** For the advancement of health teaching programs and family teaching programs, nurses researchers may also take the appropriate steps to incorporate the results of this report. Through conducting research, the nurse may contribute to the development of awareness about the efficacy of nursing action in alleviating its difficulties.

#### Recommendation

- 1. Similar study can be conducted by administering a planned teaching among hypnobirthing.
- 2. A similar study can be conducted on large population to generalize the findings.
- 3. A similar study can be conducted on assessment

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of knowledge and attitude and practice regarding hypnobirthing among primigravida women.

4. Similar study can be conducted in a different population.

## CONCLUSION

In the present study a sample of 100 primigravida women were selected. A descriptive research design was adopted for the study with a view to measure the primigravida knowledge regarding hypnobirthing .The data was collected and analyzed statistically based on the objectives of the study.

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# Analysis of Stock Market Prediction Models Using Deep Learning

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#### ABSTRACT

In era of Internet and Big Data where investors are open to share sentiments or opinion about share price for discussion which leads to generate massive amount of unstructured data. This unstructured data further affects the direction of stock price on the basis of investor's emotions and sentiments. In recent years, Deep Learning techniques are extensively explored to predict stock fluctuation using historical data, technical indicators and sentiment analysis. This paper inspects the recent literature in the area of Deep Learning Neural Network, Sentiment Analysis, Data Mining, Fuzzy logic and Machine Learning systems to predict the stock market movement. Due to its nonlinear approach, stock market prediction cannot be relying on traditional methods including fundament analysis and technical analysis. In this paper, we give close eye on summarization enhancements, challenges, future scope and categorized research papers published in this field since 2011. Many recent proposed algorithm's methodologies are studied and presented briefly in this paper. Although discussion was based on predictor techniques, trading strategies and evaluation matrices.

KEY WORDS: STOCK MARKET, SENTIMENT ANALYSIS, DEEP LEARNING, MACHINE LEARNING, DATA MINING.

## **INTRODUCTION**

STOCK prices forecasting is widely studied topic in various research fields including finance, trading, economy and of course computer science. The core study generally focusses on forecast the direction of stock's future prices on basis of stock could be buy or sell in profitable position. To make investment decision, most professional trader's studies fundamental or/and technical analysis of the stock prices movement in future. Fundamental Analysis is a traditional way to determine the intrinsic value of company's stock which all depends upon company's revenues, competitors, balance sheet, cash flow where as Technical Analysis is solely based upon study of stock's historical price pattern and Volume Information. Most technical professionals forecast future price movement of stock with support of analyze price chart of stock to determine price pattern. Moreover, stock market plays a critical role in any country's economic growth. Due



to its volatile, nonlinear and non-parametric approach it is hard to predict right stock prices at right timing to buy or sell. Many researchers used various techniques for technical analysis and were not produced statistical valid result because highly subjective in nature of TA. In era of Artificial Intelligence, Data Mining techniques and Deep Learning techniques are taken into consideration for predict the direction of trends in stock market.

A. Sentiment Analysis: What other people think of me is not my Business" has always been makes us curious while indulge in decision making process. Earlier, many of us asked our personal acquaintances to recommend a broker to decide in which share we should invest our money. With the invent of Internet and world wide web have now let it happen to find out large pool of online users to share recommendation, opinion, views about an event. Although these online users are never our personal acquaintance nor professional critics. An irony of situation is many people are sharing opinions available to completely unknown person via Internet. In the beginning of 21st century, social networking websites taken exponential growth in popularity among online users by providing them a platform for discussion and exchange information. Apart from posting photos and videos for event, now online users are posting their comments, views, opinion about event. With this platform, most researchers are analyzing posts or opinion, performing computational methods to come to conclusion



about popularity of event. This analysis part is becoming more powerful day by day to gauge user's opinion and would play a significant role for someone to make major decision in future (Sharma et al., 2019).

With the rapid development of Information and Communication Technologies (ICT), social networking sites now have potential to transform the whole political arena into computerized world by introducing the whole new concept of generate, regenerate and share information in a wide scale of political context. The social microblogging sites such as Pinterest, Tumblr, Apsense, Scoop and specially Twitter are leading pools of online users and contains massive information that can be useful by extracting knowledge from information and that knowledge become asset for business specialist, political specialist, marketing specialist etc. In order to extract knowledge from information, Sentiment Analysis techniques can be used. Opinions are central to almost all human activities and influencers of our behaviors. Humans belief, perceptions of reality, choices that we make generally depends upon how others are evaluating things. For this reason, we often need to seek others opinions when we are in decision making process. This is fundamental truth for individual and for any organization as well. Sentiment Analysis also consider as Opinion Mining is a field of study that analyze people's emotions in most of the cases and a special field in text mining. It is a study that analyze people's emotions, views, opinion, attitudes towards entities such as product, individual, event, issue and their attribute.

**B. Deep Learning:** As subpart of Artificial Intelligence, Machine Learning presents a system that automatically train from concepts and knowledge with minimum programmed strategy. Generally, Machine Learning starts with collection of data, cleansing the data, feature generation and pattern recognition in the data for producing better prediction results. Deep Learning, a subpart of Machine Learning, principally works on Artificial Neural Network(ANN) where massive amount of data analyze with multivariate vectors. Deep Learning model typically relies on machine learning's algorithms where high level of data abstraction with multiple non-linear transformation taken into consideration for modelling.

In Sentiment Analysis, Deep Learning converts text data into dense numerical vectors before being initialized as the input layer of deep learning. With this, large number hidden layers improve the ability of feature extraction and transformation of deep learning. Many Deep Learning algorithms are explored by many researchers since 2011 from where it has been primarily observed two factors. One is the impact and correlation from a stock's price of company on/with other companies and second is growth rate of a company. Regression Neural Model and Recurrent Neural Network could be use respectively in mentioned factors to predict stock movement.

With the collection of Big Data from Web, Graphical Processing Unit(GPU) ability to parallel processing and presence of Convolutional Neural Network(CNN),

Deep Learning showed a wide presence in area of many computational applications including Object Detection, Image classification and time series predictions. Our primary aim of this paper to explored deep learning methods have been applied in prediction of stock movement in future. Although it would be beyond the scope of this paper to explore all factors require to perform prediction because of multivariate data. However, finding from various researchers presented in this paper could be insightful for other multivariate problems (Tsantekidis et al., 2017).

II. Literature Review: In this, authors give close eve on summarization, enhancements, challenges, future scope and categorized research papers published in this field since 2019. Research papers are categorized upon various parameters such as objective, algorithm, data scope, data set, their performance parameters and future scope. In Table:1 about 25 papers inspected in this literature review organized in seven columns. Carta et. al., proposed to multiple agents in Deep RLL model for prediction of stock movement and stock prices. In this model, every agent was trained with diverse repetitions in intraday trading strategy rather Buy-Hold trading strategy. Agents were strictly trained on to perform exactly one course of action in trading period. Agents were trained either buy a stock and sell it before closing of a market or vice versa or trained not to perform any transaction in a whole day.

Authors created new data sets from original data sets on the basis of first open either week or day, last close of either week or a day and maximum days in either week or day. Further, authors applied multi resolution approach in time series (last 40 hours, last 20 days, last 8 weeks). Experiment performed on two sets of S&P500-S and S&P500-L where S means (Short period: 2 Years) and L Means (long Period: 10 Years). Authors used walk-forward validation technique in order to validate time series data instead of cross validation approach like k-fold technique or leave-one-out from data which was sampled in random format on diverse folds. With this way training, test and validation considered from randomly fragmented folded data (Li & Bastos 2020).

In this paper experimented the performance of ML models (RF and SVR) and DL models (DMLP, LSTM and CNN) in the stocks preselection before portfolio formation. For same, authors used data set of 9 years where 60 days daily returns for each stock as input feature to predict next day's return. The experiment was implemented by sliding window such as first four years for training data followed by one year as validation data followed by four years for testing data. For evaluation, authors used MAE, MSE as state of art parameters and observed that RF model outperformed SVR, DMLP, LSTM and CNN in stock prediction. In second phase of evaluation, authors claimed that RF+MVF and RF+OF performed best among models after deducted transaction fee (Caused by high turnover in real stock investment), based upon six metrics state of art parameters (Yoshihara et al., 2014).

In paper published by Ingle et. al., Authors collected

online news data from Yahoo Finance, Google News and Google Finance and then text mining was performed with common phenomenon of correlation between terms which further aggregated to text corpus. For text analysis, authors transformed raw text data into meaningful information by converting text to lower case, removed numbers and punctuation, removed stop words, stemming and identified synonym. From corpus, authors extracted TF-IDF features to identify companied used for stock prediction and their respective documents (news streams from web sources) were collected to prepare dataset. The models GLM, GBM and DL were used to predict stock movement and were evaluated with state of art parameters (Weng et al., 2017).

In this paper Althelaya et. al. adopted combination of multiresolution analysis such as SWT and EWT and deep learning architecture for data decomposition and data modelling/training respectively. For data decomposition, model adopted multi-scale wavelet analysis of financial time series data and set of deep learning networks were trained for each scale to performs prediction at each level. Further, multiple intermediate networks based upon number of resolutions layers generated from previous stage. For this, authors constructed each network using two layers of LSTM and one dense layer to learn each sub layer. Ahead of this, model consider input feature from forecast produced by the second stage along with construction LSTM layers and dense layer to produce final output using a linear activation function. Further, results of Empirical Multi- resolution wavelet analysis were compared with SWT's results (Patel et al., 2015).

In this paper, lee et. al., researchers collected dataset in order of 4000 daily time steps from three stock exchanges such as S&P 500, KOSPI200 and FTSE100 and dataset ratios were set to 0.7, 0.1 and 0.2 respectively for experiment the training, validation and test. Model was designed in view of understand the sequential pattern of target index and market components. For same, model was developed in two phases. In first phase, common features were extracted by input the data into series of two CNN layers and max-pool layer extracted core feature of company stock by applied max-operation between two companies at the time to sliding window and last four layers of ConvLSTM were learnt the spatiotemporal features of company's market size. In second phase, target index consisted of two stacks of LSTM in order to learn temporal pattern.

In this paper, Gupta et. al. introduced" Convolutional Transform Learning", learns a set of filters operated on observed sample to generate set of features Researchers choose NSE dataset contains information of 150 symbols between 2014 to 2018 and these stocks were chosen after filtering out stocks that had less than 3 years of data. Five raw inputs (Open price, Close price, High, Low, Net Asset Value) were considered in order to either buy stock or sell stocks keeping in mind the expectation of stock price on later day. Five raw inputs processed unsupervised by separate 1-D processing line and then concatenated and fed into Transform Learning Layer for fusion which led to supervised benchmark techniques with an output node (buy/ sell) for classification and real valued for regression. Lastly, authors compare it with state of art time series models such as TimeNet and ConvTimeNet. Paper published by Kumar et. al. proposed an intraday trading framework consisted three computational phases (Chung & Shin 2018).

In first phase of model, researchers prepared dataset and for the same ninety days recent intraday trading data extracted from google finance about eighteen companies from six stock exchange. Later in this phase, researchers transformed whole data set into series of attributes such as open price, close price, trade volume, minimum price, maximum price etc. For this, researchers went one step ahead by adapted ten minutes' time resolution interval data from one-minute interval data for understand the market movement and stock momentum. In second phase, researchers used recursive feature engineering with logistic regression (RFE-LRC) in order to eliminate the noisy features and explore the optimum combination of features to avoid non-linearity correlation among them. And in last phase of framework, researchers explored series of hyper parameters that were put high impact on development of model. These hyper parameters were time- step, unseen layers, unseen neurons, size of batch and epochs. In paper published by Naik et. al., Authors proposed a method to identify a trend in data using a combination of candlestick data and technical indicators. For Technical Indicators, authors took data from National Stock Exchange(NSE) and applied ten indicators and calculate based upon respective formulas. For Candlestick patterns, authors took data from NSE, extracted day low-high- open-close price, apply Japanese candlestick pattern on daily basis in order to generate output candlestick pattern (Althelaya et al., 2021).

Paper published by kim et. al researchers designed a stock chart CNN images by designing four stock images such as candlestick chart, line chart, bar chart and F-line chart using SPY (S&P 500) dataset and then analysis which chart image performed better. It had been noticed that bar chart image considered acceptable graph because it was re-designed using high volume trading data. After selection of bar chart image, author fused fundamental tool of stock such as volume information of a stock and performed experiment. Further, time series data and financial data were used in context to apply DL technology. Earlier, researchers used RNN in order to evaluate the sequential pattern in data but didn't work because the absence of gradient. Later, researchers used optimal LSTM-CNN model by merging of stock chart CNN and stock time LSTM using identical characteristics of stock chart image data and stock time series data. From dataset of 68k training data points, researchers considered 10k validation data points and 19k testing data points. With this, researchers predict the stock price for next five minutes by opening trading window for thirty minutes in roll of one minute. Oncharoen et. al. performed the study using the news headlines and historical price data described in Section

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IV. Data are split into three parts comprising training data, validation data, and test data. Researchers train the models using training data and then select the final models based on maximum accuracy of the validation data. Finally, the performance of each model is evaluated using the test data. Sezer et. al. obtained daily stock prices of Dow 30 stocks and daily Exchange Traded Funds(ETF) dataset from" Yahoo Finance" for training and testing purposes. Further, adapted sliding window with re-trained a model where 5 years were chosen for training followed by 1 year for testing. Extracted data labelled manually by determined the top and bottom points in sliding window. For image creation, technical indicators were considered to generate 15 X 15 image in different time intervals for each stock in a five years of period. In CNN analysis phase, nine layers were used with 3X 3 filter size and then buy-sell decisions are made according to the predicted Buy, Sell, Hold labels.

In this paper Chung et. al. extracted data from" Bloomberg" for Korea Stock Price Index in time duration of 4203 trading days where each sample contained information on informative attributes (High, Low, Volume, Open and Close) out of which 80% data used for training and 20% data for holdout. Feature Selection: Five technical indicators and five historical values were employed as input variables (scaled into range of [0,1]), obtaining multidimensional time series and output of prediction model was the closing price the next day. Authors applied GA to investigate the optimal architectural factors, including the size of the time window to be fed a LSTM network, and derives results through this genetic search. Further, applied input embedding of the last 10 time steps, and optimized the architecture to verify the effectiveness of GA-LSTM model on holdout data. Paper published by Fischer et. al. where researchers performed their study in five stages.

In first stage, researchers collected data from Thomas Reuters about S&P500 stock index from 1989 to 2015 and prepared binary matrix in order to identify whether stock is an index or not. This way whole raw data split into training, test and validation data. In second stage, researchers used LSTM network where authors calculated each stock's one day returns and pile into feature vector and followed Binary classification for target. Further, authors applied LSTM network to recognize information which needs to be removed from previous stage of a cell and decides what information must have added into cell on based upon results of previous two stages. Authors evaluated their model's performance on basis of Mean of returns in a day, Standard Deviation of returns, Sharpe Ratio and precision. On basis of these, authors claimed their model outperformed memory-free classification methods (Gupta et al., 2020).

In this paper Tsantekidis et. al., authors generated input data of 10 orders for each side of LOB which further describe by two values; Volume and Price. Since Price and Volume range is much greater that neural network's activation function so authors normalized data set with z-score (Mean Value and Standard Deviation) before fed into network. In order to predict the direction of stock price, authors generated mean between best bid price and best ask price which predicted stock upward or downward movement and used as target for classification model. In order to forecast mid-price movement of a stock, CNN was used and for training a model authors used batch of 16 samples where each sample consisted a sequence of 100 consecutive depths and further each depth consisted 40 values. To measure the performance of model, authors reported the mean recall, precision and F1 score and compared these with Linear SVM model, MLP model and Leaky Rectifiers (Murphy 1996).

Wenf et. al. prepared four set of data from online resources such as (a)NASDAQ and DJIA Indices (Open, Close, Price, Volume/E ratio, DoJ index) (b) Technical Indicators (Stochastic Oscillator-%k, William-%R, Relative Strength Index) of stock (c) Google News on the stock (Number of visited users on Wikipedia about stock. Further, authors performed Features Generations process where firstly authors integrated generated features with original data followed by generation of target matrix based on the movement of stock market and considered both as input to the system. In continuation to above, authors identified important features via visualization, data mining and Consolidated Features. Authors applied Decision Tree, SVM and ANN to predict stock movement and compared their results using 10-fold cross validation (Naik & Mohan 2019).

In this paper Patel et. al. used two stage fusion approach involves SVR in first and in second stage involves ANN, RF, and SVR resulting into SVR-ANN, SVR-RF and SVR-SVR prediction models. In two stage approach, authors employed SVR in first stage which describe the day along with input parameters (open, close, high, low, volume) and then to prepare outputs which consists ten technical indicators which further served as the inputs to the prediction models in the second stage (Sezer & Ozbayoglu 2018). In prediction models, identify mapping transformation from technical parameters describing (t + n) th day to (t + n) th's day closing price. Authors formed 20% tuning data of whole dataset to decide best combination of parameter values for each SVR in the first stage, which further divided into training data (80%) and testing data (20%) in order to minimize error in statistical parameters in second stage of model.

Paper published by Yoshihara et. al. where authors grouped news articles in routine where each news article is represented by standard bag -of-words model considered to be a word vectors used as input to model. Word Vector (0 or 1) represented uptrend and downtrend respectively, considered to be model's output. For experiment, authors collected dataset of ten prominent Nikkei companies from Nikkei newspaper from where news articles published in eight years considered to be a training data followed by news articles published in follow year as validation data and followed by news articles published in a follow year as test data. In order to transform articles into vectors, authors determined the vocabulary in line with morphological analysis and statistical tests. For computational time, authors fixed number of experiments to 5000 and computed chi-square scores in three possible directions such as upward, downward and neutral. Model was trained on RNN-RBM+DBN and its parameters were tuned on the validation data (Tsang et al., 2007).

#### **DISCUSSION AND ANALYSIS**

Stock market prediction is dynamic research field and due to its volatile nature, it is hard to predict acute results in future. However, many researchers used enormous algorithms to predict high returns stock in intraday trading or buy and hold trading system, we analysed researcher's trends was historical data of stocks. Even some researchers explore new insight from current data of share price and news trends to predict results. Many researchers recommended high volume data in opening hours of market must include for analyze and model must incorporate with same.

Table 2 shows number of publications from prominent WoS categories in this field since 2009. Majority of 76 articles published in computer science theory methods since 2011 followed by computer science artificial intelligence, engineering electrical electronics and so on by researches in recent years.

Learning For Stock Market						
WoS Categories	Number of relevant article	% Total Publications				
Computer Science Artificial Intelligence	76	33.188%				
Engineering Electrical Electronic	54	23.581%				
Computer Science Information Systems	47	20.524				
Computer Science Theory Methods	27	11.790%				
<b>Operations Research Management Science</b>	26	11.354%				
Telecommunications	23	10.044%				
Computer Science Interdisciplinary Applications	21	9.170%				
Economics	21	9.170%				
Mathematics Interdisciplinary Applications	19	8.297%				
Business Finance	15	6.550%				
Engineering Multidisciplinary	13	5.677%				
Multidisciplinary Sciences	12	5.240%				
Computer Science Software Engineering	9	3.930%				
Management	9	3.930%				
Physics Applied	8	3.493 %				
Physics Multidisciplinary	8	3.493 %				
Social Sciences Mathematical Methods	8	3.493 %				

Table 1. Most Widely 369 Research Articles Published From Year 2011 To 2021 Related To Deep

Table 2. Wos Research Publications In Various Journals Since 2011 On Deep Learning With Stock Market

Record Count	% of 369
23	6.23%
21	5.69%
9	2.43%
8	2.16%
8	2.16%
8	2.16%
7	1.89%
7	1.89%
6	1.62%
6	1.62%
	Record Count 23 21 9 8 8 8 8 8 7 7 7 6 6 6

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**Challenges:** In this study, we give close look to the most recent trends in research areas of stock market prediction models and found some challenges that can be research areas in coming days (Oncharoen & Vateekul 2018).



**The Dataset:** Although, every country in a globe has establish their respective exchange indexes with millions of transactions in a day. It is quite difficult to analyze whole dataset because of its wide range of technical indicators and fundamental strategies. Apart from technical indicators, one must take care of fundamental analysis of stocks before build a model as FA may not be a part of dataset. High Computational Power: Deep learning has capacity to solve complex problems due to its high level of abstract and presence of multiple layers. DL algorithms are design to inculcate routine input data of stock exchange and that lead to high-capacity GPU, storage and computational power (Carta et al., 2021).

**Presence of Social media:** Stock market highly volatile not only because of political or geographical change in society but also with some news from social media and news media. Sentiment analysis must play a significant role in prediction of stock movement to classifies the polarity in sentiment of news.

#### CONCLUSION

Stock market is diverse area of investment where one can invest across multiple entities such as intraday trading, buy and hold trading, commodity, power exchange etc., by pooling with number of small investments. As stock market data is in high volume, Deep learning is extremely successful in this area of research and if we follow its trend of success rates in other areas of research, definitely the use of its application genuinely takes us towards the acceptance. Stock market prediction with deep learning offers a platform for the common man where one can predict the results with some knowledge of stocks theory.

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# **Studies on the Applications of Drones in Irrigation and Agriculture**

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#### ABSTRACT

Current agribusiness is driven by constant upgrades in computerized instruments and information just as coordinated efforts among ranchers and analysts across the general population and private areas. During the Green Revolution during the 1960s, India could accomplish independence in food grain creation by utilizing current strategies for farming like better nature of seeds, legitimate water system, compound composts and pesticides. As time passed, more mechanical advances showed up in farming. The farm vehicle was presented, trailed by new culturing and collecting gear, water system and air cultivating innovation, all prompting better returns and improved nature of the food and fibre that was developed. It is feasible for ranchers to use logical information and innovation to improve crop yields and stay up with the latest with state-of-the-art techniques for cultivating. In horticulture, enormous information is frequently seen as a mix of innovation and examination that can gather and arrange novel information and interaction it's anything but a more helpful and ideal approach to help dynamic. Rural robots permit ranchers to acquire admittance to an abundance of information they can use to settle on better administration choices, improve crop yields, and increment generally speaking benefit. Robots can be utilized to gather information identified with crop yields, domesticated animals' wellbeing, soil quality, supplement estimations, climate and precipitation results, and then some. This information would then be able to be utilized to get a more precise guide of any current issues, just as make arrangements dependent on very solid information. Robot examination incorporates properties, for example, soil pH, saltiness, and surface, just as incline, H2O accessibility, and peril can be assessed dependent on the planning results.

**KEY WORDS:** AGRICULTURAL DRONES, IRRIGATION, CROP MONITORING, CROP HEALTH ASSESSMENT.

#### INTRODUCTION

Current homesteads and agrarian tasks work far uniquely in contrast to those years and years prior, fundamentally on account of headways in innovation, including sensors, gadgets, machines, and data innovation. The present horticulture regularly utilizes refined innovations like robots, temperature and dampness sensors, aeronautical pictures, and GPS innovation. These high-level gadgets and accuracy farming and mechanical frameworks permit organizations to be more beneficial, effective, more secure, and all the more harmless to the ecosystem.



**Soil and Field Analysis:** Soil reviewing, or ordering regions that share comparative soil properties, assumes a significant part in cultivating and horticulture. Properties, for example, soil pH, saltiness, and surface, just as incline, H2O accessibility, and disintegration risk can be assessed dependent on the planning results. Robots can be instrumental toward the beginning of the yield cycle. They produce exact 3-D guides for early soil investigation, valuable in arranging seed planting designs. Subsequent to planting, drone-driven soil investigation gives information to water system and nitrogen-level administration. A robot, hook to soil investigation.

**Planting:** These frameworks shoot cases with seeds and plant supplements into the dirt, giving the plant every one of the supplements important to support life. Initial, a robot examines the geography to make a 3D guide. Then, at that point, the most proficient planting design for that space is determined utilizing calculations. A robot stacked with sprouted seeds fires units into the ground at



a pace of one every second, or around 100,000 per day. Scale this up and 60 robot groups could plant 1 billion trees every year (Gerard 2018).

**Crop Spraying:** Distance-estimating hardware–ultrasonic repeating and lasers like those utilized in the light-location and going, or LiDAR, technique–empowers a robot to change height as the geology and topography differ, and in this manner stay away from crashes. Subsequently, robots can check the ground and shower the right measure of fluid, tweaking distance from the beginning splashing progressively for even inclusion. The outcome: expanded effectiveness with a decrease of in the measure of synthetics entering into groundwater. Indeed, specialists gauge that flying splashing can be finished up to multiple times quicker with drones than with customary apparatus (Gerard 2018).

Crop Monitoring: Harvest Monitoring drone was shown in figure 6. Tremendous fields and low proficiency in crop checking together make cultivating's biggest impediment. Checking difficulties are exacerbated by progressively flighty climate conditions, which drive hazard and field upkeep costs. Already, satellite symbolism offered the most exceptional type of observing. Yet, there were disadvantages Images must be requested ahead of time, could be required just once every day, and were loose. Further, administrations were very expensive and the pictures' quality ordinarily endured on specific days. Time-arrangement movements show the exact improvement of a trim and uncover creation failures, empowering better yield the board. Besides, exorbitant satellite pictures utilized in the past expected pictures to be requested ahead of time and could just catch one photograph a day. Customarily, the photograph quality was low, on account of environmental conditions and satellite areas. Today, robots can give time-arrangement activities for a portion of the expense, uncovering creation failures and constant advancement of a yield.

**Irrigation:** Robots with hyperspectral, multispectral, or warm sensors can recognize what parts of a field are dry or need enhancements. Moreover, when the yield is developing, drones permit the estimation of the vegetation list, which portrays the general thickness and wellbeing of the harvest, and show the warmth signature, the measure of energy or warmth the yield radiates. Water system drone is introduced in Drones equipped with warm, hyperspectral or multispectral sensors can rapidly recognize which yields are dry. Moreover, robots can likewise figure the thickness and strength of the edit and give the warmth signature, cautioning the rancher which yields are needing more water and which harvests need less. This proficient utilization of water is a huge expense saving measure when water costs rise and dry seasons strike a district Careful water system additionally lessens the odds of compost spillover into streams and waterways, forestalling the pointless demise of oceanic life and hazardous green growth blossoms.

**Health Assessment:** Wellbeing evaluation drone is fundamental to survey crop wellbeing and spot bacterial

or contagious contaminations on trees. By examining a harvest utilizing both noticeable and close infrared light, drone-conveyed gadgets can recognize which plants reflect various measures of green light and NIR light. This data can deliver multispectral pictures that track changes in plants and show their wellbeing. A rapid reaction can save a whole plantation. What's more, when an infection is found, ranchers can apply and screen cures all the more absolutely. These two prospects increment a plant's capacity to beat infection. Also, on account of yield disappointment, the rancher will actually want to archive misfortunes all the more effectively for protection claims. Utilizing both apparent and close infrared light, robots can recognize plants reflecting various measures of NIR and green light. The multispectral pictures delivered would then be able to represent track changes in the plants and give a sign of their general wellbeing (Gerard 2018).

Usage Of Technology In The Agricultural Sector: Agribusiness needs compelling use of innovation to speed up creation and employability of people. The primary motivation behind this examination paper is to see, how to utilize advancements in the rural area. There are various sorts of innovations that are utilized to improve efficiency. The fundamental regions that have been considered are, factors identifying with selection of innovations, sorts of advances, advances utilized in the rural area, progressed farming advances utilized in the current presence, spaces of data innovation and job of data innovation in rural instruction the executives. For proficient development and improvement of the rural area, there is a need to acquaint with new advancements, similar to biotechnology, nanotechnology, cutting edge ensured development and current water system strategies to speed up creation (Gerard 2018).

These advancements, when used in a proper way, would end up being advantageous in improving usefulness and productivity. Utilization of innovation would upgrade in supporting occupation openings for the ranchers. Farming is viewed as an essential control of the people in country regions. To take care of the expanding populace, it is fundamental to present current and creative methods in the farming area. New advances are needed to urge the yield wildernesses to a high level stage, utilize the data sources ingeniously and enhance to a more supportable and higher worth trimming designs. These are all information concentrated advances that require both a solid examination and augmentation framework and gifted ranchers. What's more, it's anything but a fortified interface, where accentuation is put on mutual trade of data, carrying benefits to all. Utilizing assets in a powerful way is expressed as the main thrust behind the utilization of horticultural advances (Swapnil 2018).

A few asset preservation advances are, green fertilizer, crop revolutions and so forth The meaning of utilization of innovation in the farming area has been perceived with the principle motivation behind gathering the food necessities of the people. India has gained ground in agribusiness, however efficiency of the major rural and plant crops is low in contrast with different nations. There are still shortages in the use of innovation. Yields per hectare of food grains, products of the soil inside the nation are far the underneath worldwide midpoints. Indeed, even India's most useful states are behind the worldwide normal. Additionally, the efficiency of heartbeats and oilseeds can be expanded, through offering thought to the seeds, soil wellbeing, bother the board, crop life-saving water system techniques and post-collect innovation (Swapnil 2018).

**Literature Review:** Farming is the main business for the utilization of robots. Given the tremendous number of hectares of land that are offered over to horticultural exercises and the distance (for example absence of wired or Wi-Fi foundation), this is maybe to be expected. Robots are cheap and dependable. What has been missing up to now is the capacity to add significant experiences into the information caught by rambles. The difficulties to doing this effectively have been demonstrated to be:

- 1. Preparing the huge measures of information caught (5 000 PCs worth in one month for 20 sensors at 1 Hz for a normal homestead); E-agribusiness in real life: Drones for Agriculture 55 Actionable insight from robots to the rural business
- 2. Coordinating numerous information sources on various conventions (for example GIS information, different sensor sellers, pre-preparing of picture information);
- 3. Investigating the resultant datasets in an ideal way to deliver noteworthy experiences; and
- 4. Introducing the significant experiences in a way that can be seen without any problem.

SAP has brought three of its innovations together to empower the data catch by robots to be powerful. These innovations are:

(1) The HANA cloud data set innovation with boundless rapid information catch, recovery and investigation; (2) the Leonardo IoT suite to associate and trade data over any convention; and (3) the Connected Agriculture suite to give an instinctive and graphical front finish to ranchers and cultivators. The exercises of the utilization cases can be stretched out to any farming test. In spite of the fact that tree/shrub manors and steers grouping were the models given here, any farming administration and choice help issue can be addressed with this vigorous, develop and fit for reason innovation.

The job of reconnaissance in horticulture shows extraordinary guarantee, for example, in natural fasco counteraction in ranger service and ranch plant assurance, fisheries and so forth Thusly, minimal expense, constant, huge scope and stable observation, precise information obtaining and transmission just as preparing are extremely essential for horticulture creation and catastrophe anticipation. Nonetheless, in most country regions the shortfall of remote base stations and Wi-Fi stations is a significant obstruction in carrying out reconnaissance frameworks. That implies the information procured through the Wireless Sensor Network (WSN) can't be sent utilizing remote correspondences. An elective arrangement is to utilize UAV to speak with the WSN in huge regions to get constant information for handling and examination. There are WSN networks that consolidate many Zigbee hubs that are associated with sensor modules, and which then, at that point speak with the UAV that is outfitted with one Zigbee hub. Each Zigbee hub can cover a range of 200 m to 500 m of land along these lines many hubs can really cover around 1000 to 2000 sections of land of ranch. Every sensor module comprises of up to ten sensors for soil and climate data, for instance soil temperature, soil stickiness, soil manure, daylight power, CO2, soil PH esteem, downpour force, wind power. The information procured will then, at that point be sent from the organizer inside the WSN to the UAV side for information assortment.

**Challeges:** One of the difficulties is the harmony between the UAV cost and the exhibition. Superior of the UAV with long flight time, solidness, just as restricted obstruction will be costly and keep ranchers from receiving the application as they are impervious to any new expenses. The subsequent test is that ranchers need time to acknowledge new innovation and to be persuaded those benefits from this plan are ensured.

Learnings: These UAV-based strategies will improve ranch creation productivity altogether with an ever increasing number of utilizations, which have shown exceptional upgrades for enormous homestead information securing contrasted with ordinary homestead observation. Notwithstanding, the UAV-based reconnaissance actually needs to address difficulties like soundness in poor natural and climate conditions. Subsequently, the UAVbased WSN is a promising innovation and an elective that will accomplish minimal expense, wide-running correspondence, continuous, dependable information procurement when the base station isn't free. UAV-WSN based observation framework is applied broadly sooner rather than later, a great many ranchers will actually want to profit with the obtaining of ongoing homestead data. Ranchers won't have to invest a lot of energy on obtaining ranch information and will approach debacle cautioning and climate data when a fiasco occasion appears to be conceivable. By and by, the UAV-WSN innovation is as yet not develop enough for huge scope application. More UAV-WSN innovative work is required, including the advancement of utilizations for fishing, poultry and cultivating ventures (Swapnil 2018).

One of fundamental kind of revenue in of India is Agriculture. The creation pace of harvests in farming depends on different boundaries like temperature, stickiness, downpour, and so forth Which are regular elements and not in rancher's control. The field of agribusiness is likewise relying upon some of elements like irritations, illness, composts, and so on which can be control by giving appropriate treatment to crops. Pesticides may build the efficiency of harvests however it additionally impacts on human wellbeing. So the fundamental point of this paper is to plan farming robot

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for showering pesticides. In this paper, we will examine diverse design dependent on automated flying vehicles (UAVs) (Yuwalee 2018).

The utilization of pesticides in agribusiness is vital to horticulture and it will be so natural if will utilize keen machines, for example, robots utilizing new innovations. This paper gives the thought regarding different innovations used to lessen human endeavors in different tasks of horticulture like location of essence of vermin, splashing of UREA, showering of composts, and so forth This paper depicts the advancement of quad copter UAV and the showering component. In this paper we additionally talk about mix of sprayer module to quad copter framework. The examined framework includes planning a model which utilizes straightforward financially savvy hardware like BLDC engine, Arduino, ESC wires, and so forth.

**1.** Monitoring and controlling crop irrigation systems via smartphone: Mobile technology is playing an important role in monitoring and controlling crop irrigation systems. With this modern technology, a farmer can control his irrigation systems from a phone or computer instead of driving to each field. Moisture sensors in the ground are able to communicate information about the level of moisture present at certain depths in the soil.

**2. Ultrasounds for livestock:** Ultrasound is not only for checking on baby animals in the womb. It also can be used to discover what quality of meat might be found in an animal before it goes to the market. The testing of DNA helps producers to identify animals with good pedigrees and other desirable qualities. This information can also be used to help the farmer to improve the quality of his herds.

**3. Usage of mobile technology and cameras:** Some farmers and ranchers use apps like 'Foursquare' to keep tabs on employees. They also put-up cameras around the farm. Livestock managers are wiring up their barn feedlots and pastures with cameras that send images back to the central location like an office or home computer. They can keep a closer eye on the animals when they are away or home for the night.

**4. Crop Sensors:** Crop sensors help apply fertilisers in a very effective manner, maximising uptake. They sense how your crop is feeling and reduce the potential leaching and runoff into ground water. Instead of making a prescription fertiliser map for a field before you go out to apply it, crop sensors tell application equipment how much to apply in real time. Optical sensors are able to see how much fertiliser a plant may need, based on the amount of light reflected back to the sensor.

Vision about modern agriculture: Horticulture is the main business for the use of robots. Given the tremendous number of hectares of land that are offered over to agrarian exercises and the distance (for example absence of wired or Wi-Fi framework), this is maybe to be expected. Robots are cheap and solid. What has been missing up to now is the capacity to add significant bits of knowledge into the information caught by rambles. The difficulties to doing.

#### **Objectives**

- To study the collection soil samples in various regions with the aid of GPS (global positioning system) coordinate and analyse the field condition with the help of drone.
- To monitor the forest and identify changes in specific points of forest cover undergoing deforestation and degradation processes, to monitor the status of crops and to monitor invasions of territory.
- To calculate the vegetation index, which describes the relative density and health of the crop, and show the heat signature, the amount of energy or heat the crop emits.
- To study the efficiency with a reduction of in the amount of chemicals penetrating into groundwater.

# **RESEARCH METHODOLOGY**

This paper is based on published resources. The nature of the study is Exploratory analysis. After careful analysis this study explores the role of agricultural drones in irrigation and agricultural. The agriculture industry is no stranger to embracing changing technological trends to streamline business. The use of drones in agriculture will help agricultural businesses meet the changing and growing demands of the future. Agricultural Drones Ground-based and aerial-based drones are being used in agriculture in order to enhance various agricultural practices: crop health assessment, irrigation, crop monitoring, crop spraying, planting, and soil and field analysis.

Analysis And Findings: Horticulture Wonder Drone System utilizing miniature regulator 8051 The proposed framework is an inserted framework which will intently screen and control the microclimatic boundaries of a nursery consistently nonstop for development of harvests or explicit plant species which could amplify their creation over the entire yield development season and to dispose of the troubles engaged with the framework by decreasing human intercession to the most ideal degree. The framework contains sensors, Analog to Digital Converter, microcontroller and actuators. At the point when any of the previously mentioned climatic boundaries pass a wellbeing boundary which must be kept up to ensure the harvests, the sensors sense the change and the microcontroller peruses this from the information at its info ports in the wake of being changed over to a computerized structure by the ADC.

The microcontroller then plays out the required activities by utilizing transfers until the wandered out boundary has been taken back to its ideal level. Since a microcontroller is utilized as the core of the framework, it makes the set-up minimal expense and powerful by and by. As the framework additionally utilizes a LCD show for constantly alarming the client about the condition

inside the nursery, the whole arrangement becomes easy to use. Hence, this framework dispenses with the downsides of the current set-ups referenced in the past area and is planned as a simple to keep up, adaptable and minimal expense arrangement. The cutting edge cultivating industry is at a defining moment. With the improvement of further developed ranch the board strategies, like exactness farming, industry experts presently have more instruments than any time in recent memory to improve the precision and proficiency of cycles. The utilization of the various sorts rural robots for settling explicit assignments of plant developing is considered: production of electronic guides of fields, operational observing of harvest conditions, assessment of germination and foreseeing crop yields, checking the nature of furrowing, keeping up ecological checking of agrarian land, and so forth Thus, drones are vital devices in the cutting edge horticulture and cultivating frameworks.

Robots are utilized in a wide scope of errands like coordinations undertakings, watch regions, framework support, maps age utilizing cameras or sensors. A considerable lot of the stages utilize associated drones as teleoperated vehicles through the web, putting together the framework correspondence with respect to low even out administrations straightforwardly identified with the robot essential developments or orders. Environmental change is significantly affecting food security. Cultivating people group and others associated with horticulture need to adjust farming to environmental change and different difficulties. Current administration in practical agribusiness requires the quick data about state of developed plants and the speedy reaction to unwanted events. Essential reason and the utilization of robots for showering plants could be considering quick use of plant insurance specialists on the developing regions. Likewise, paper presents the pertinent sorts, job and meaning of robot's use in the cutting edge agribusiness.

Perhaps the most recent improvement is the increment in the utilization of little, automated ethereal vehicles or distantly guided airplane framework, normally known as robots, for horticulture. Robots, can change from light, straightforward, short-range vehicles, radio controlled in visual view of the administrator, to huge scope airplane, tele-worked abroad through satellite connection. For example, the Northrop Grumman "Worldwide Hawk", can fly at an elevation more than 65,000 feet, outfitted with sensors to see through mists or in complete haziness. A wide scope of revolving wing stages is additionally being used and creation, particularly smaller than normal helicopters for neighborhood observation or discovery. Now and again, drones can gather information significantly more effectively than either satellites or monitored airplane at any point could. The mission relies upon the payload and the ground station ability to gather, measure and disperse information for the mission's targets. Robots can gather high-goal pictures and recordings, phone discussions, catch electronic interchanges and some other wave or sign contingent upon the payload introduced ready.

They can likewise perceive faces, or even recognize "unusual practices" and distinguish human targets. Future sun oriented force robots will actually want to remain noticeable all around perpetually, turning into a nonstop reconnaissance apparatus in the hand of public specialists. There is no uncertainty that robots may address a genuine danger to the protection right. The utilization of robots in horticulture is reaching out at a lively speed in crop creation, early admonition frameworks, debacle hazard decrease, ranger service, fisheries, just as in untamed life preservation. For instance, drone innovation will give the farming business a high-innovation makeover, with arranging and methodology dependent on ongoing information assembling and handling following: soil and field investigation, planting, crop showering, crop observing, water system, and wellbeing evaluation.

Agrarian innovation can influence smallholder pay, work openings for poor people, food costs, ecological manageability, and linkages with the remainder of the country economy:

- Agricultural innovation has been an essential factor adding to expansions in ranch efficiency in non-industrial nations over the past 50 years. Despite the fact that there is as yet broad food frailty, the circumstance without current innovation improvement would have been inconceivable.
- New innovation can give extra provincial work, yet there are continually countervailing pressing factors to decrease work information and lower its expenses.
- Food costs are certifiably lower due to innovation, yet the dispersion of advantages among shoppers and makers relies upon the idea of the nearby economy and exchange designs.

Quite possibly the most troublesome decisions is that confronting the fitting degree of (rural) support for neediness decrease in minimal regions. A significant test is marshaling adequate (and sound) support for public examination and expansion notwithstanding extreme imperatives being developed financial plans. Private area innovation age (and innovation conveyance) is of developing significance to destitution decrease techniques, however it is likely nonsensical to put exclusive requirements on limitlessly extended conventional public-private organizations. Sensors are machines that can detect for example sound, light and weight without direct contact with the item. Sensor innovation is additionally helpful for the assurance of the organization or potentially the nature of food. The agro and food area utilizes sensor innovation to gather information on the dirt, harvests and creatures through sensors that are incorporated in a wide range of farming hardware and machines, airplane and drones or even satellites. Sensors furnish ranchers with ongoing data on their harvests and domesticated animals, empowering

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them to react all the more successfully, for example by taking (restorative) measures. Sensor innovation can be utilized to build up item quality and security, yet for example additionally the beginning. Instances of sensor innovation in farming incorporate airborne.

Brilliant cultivating is horticulture in which the yield, creatures and soil get the specific treatment that they need. Other than in conventional agribusiness, in shrewd cultivating the rancher takes a gander at the need per plant or animal rather than per field or group. Considering the particular states of the dirt, long stretches of daylight and environment will improve the yield. Compelling shrewd cultivating depends on information examination. Regarding the yields and creatures as precisely and successfully as conceivable requires a few center components – like programmed discovery – to decide the variety in soil, harvest and creature conduct.

# CONCLUSION

Drones can scan the ground and spray the correct amount of liquid, modulating distance from the ground and spraying in real time for even coverage. Aerial spraying can be completed up to five times faster with drones than with traditional machinery. These systems shoot pods with seeds and plant nutrients into the soil, providing the plant all the nutrients necessary to sustain life. First, a drone scans the topography to create a 3D map. Then, the most efficient planting pattern for that area is calculated using algorithms. A drone loaded with germinated seeds fires pods into the ground at a rate of one per second, or about 100,000 a day. Scale this up and 60 drone teams could plant 1 billion trees a year.

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# Pharmaceutical Companies: A Study of their Operation and Regulatory Mechanism in India

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#### ABSTRACT

The Research topic under the caption aims at its own essence especially dealing with Pharmaceutical Companies, their products and operation within the Indian territories whether as Foreign Company and/or Indigent incorporated legal entity. A general ascertainment of such companies places them at a figure more than 10563 as up to 2020 out of total active companies including other than pharma companies in India standing at 1,19,5045. The Pharmaceutical Companies are located in different Indian state with highest number in Maharashtra being 3139 .Most of the states do not show the presence of said companies in their geographical areas . In India the top of the Pharmaceutical Companies still are non-indigent like Johnson and Johnson with 56.1 bn US\$ , Pfizer with 51.75bn US\$ , Roche at 49.23 bn US\$ , Novartis with 47.45 bn US\$ and at fifth one finds Merch &Co having 46.84bn US\$ as capital adequacy . All these companies in addition to other Regulatory Mechanism fall within the Regulatory mechanism of Indian laws including that provided under the Companies Act as far the Incorporation is concerned and for manufacturing , sale and like other activities they come under the Drugs and Pharmaceutical Companies Act,1940.The Regulatory system covers the compliances for various laws including those under respective States where the Pharmaceutical Company(s) is Registered, established and/or operating in a way India reflects multiple Regulators with divergent approach .The analysis and deliberations are based on doctrinal methodology based on both primary and secondary source of data for answer to Research question with respect to diverse Regulatory mechanism and its effectiveness in achieving the objective.

KEY WORDS: PHARMACEUTICAL, COMPANIES, REGULATIONS, COMPLIANCES, DRUGS, DOMESTIC MARKET, TURN OVER, INDIGENOUS COMPANIES

#### **INTRODUCTION**

The pharmaceutical companies are not different from others sector companies as per as legalities and procedures there to for incorporation are concerned. A pharmaceutical like other companies ought to get themselves Registered under the Companies Act and/or like law to become an incorporated entity capable to sue and be sued. The members of the such company are separate and distinct from the corporation as a jurists person .Though this is the case, but the objective of the company being of special nature to carry on the activities of pharmacy including the drug manufacturing , patenting there to, besides others. In this way ,once company comes into being as a legal entity



but for carrying out its object of drug manufacturing, they have to approach the controller whether State or Centre or both for obtaining licence to manufacture and for other allied activities .The pharmaceutical industry comprising of Companies /Corporations have number of unusual characteristics that make them very different from what people normally think of as an industry.

It is an industry replete with contradictions while contributing to human wellbeing and the reduction of ill health at the cost and consideration. As such it is undoubtedly considered as one of the riskiest businesses in which to invest money as being perceived to be excessively profitable. The major pharma companies rightly promote themselves as being research-based organizations yet top five pharma companies in India are non-indigenous like Johnson and Johnson with 56.1 bn US\$, Pfizer with 51.75bn US\$, Roche at 49.23 bn US\$, Novartis with 47.45 bn US\$ and at fifth one finds Merch &Co having 46.84bn US\$ as capital adequacy. Indian Manufacturing Companies are also in race and respectability (Ahmed 2014).



The objective of the Research paper is to provide a backdrop to the business so that the challenges of the issue of pharmaceuticals in the environment can be better understood especially in multidimensional Regulatory Mechanism. One need to note that the words "medicine," "pharmaceutical" and "drug" are often used interchangeably and the word "drug" can also mean both a medicine and an illegal substance, depending on the context. The word "pharmaceutical" is deliberately assigned to the end-products of the pharmaceutical industry, the product where are is used by patients, medical professionals and hospitals saleable and exhibited at different pharma outlets. The word "drug" so far mentioned is mainly used for potential pharmaceuticals which is one of the world's most research-intensive industries, generating a continuing steam of new products that save lives and raise the quality of life. The safety and efficacy of new pharmaceutical products are stringently regulated in most industrialized nations, adding to clinical testing costs.

Constitutional Mandate & pharmaceutical companies:

India is a Constitutional Governance Sovereign State. The governance and law making derives its power from the Constitution which stands as a ground norm.1 Nobody shall be deprived of his life and personal liberty except the procedure established by law when read with directive principles like the state shall endeavor among others 'Child Care',2 besides the duty is imposed on State to raise the level of nutrition and standard of living and to improve public health.3 For Law making on pharmaceuticals including Drugs same falls under the concurrent list of the constitution giving power to both state and Centre to make the laws on 'Drugs and poisons , subject to provisions of entry 59 of List -I with respect to opium. The entry before that in concurrent list gives power to make laws for Adulteration of foodstuffs and other goods (Bhurosy & Jeewon 2014).

**Pharmaceutical companies and Policies for Guidance:** India in its post-independence laid emphasis on Agriculture and Industry as national policy. The Industries Act, 1949 is an indicator for industrialization especially manufacturing industries with substantial net worth. Other legislations also assumed importance like the Companies Law as an entity for manufacture. The creation of legal entity, as a juristic person made things easy for manufacture of pharmaceuticals which include drugs. But even after creation of a legal entity , it became imperative to provide a Regulatory mechanism for licensing, inspection and monitoring the manufacture of drugs with standards and genuineness.

In this the Pharmaceutical Companies emerged though as ordinary companies with an object of drug manufacturing, sale and marketing of manufacture of drug as remedy for disease or otherwise. At the same one sees the import of drugs in India as indigenous products with marketing and operation within the Indian territories whether as Foreign Company and/ Indigent incorporated legal entity for the purpose. The quantum of such companies as up to 2020 is estimated at more than 10563 out of total active companies in India including pharma companies standing at 1,19,5045. The Domestic Market Turnout of manufacturing Pharma units /companies itself is increasing which reached 20.03 bn US \$ in 2019. There was upward trend of 9.3bn US\$ from the then figure of 2018 .The Pharmaceutical Companies are located in different Indian state with highest number of 3139 being in Maharashtra.5 In this way one arrives at a finding that there is an expansion of indigenous Pharmaceutical companies from decade to decade. Side by side foreign pharmaceutical companies are also operating with Indian offshore office and/or manufacturing unit including as operating Transnational Company (TNC's /Multinational Company (MNC's) as the case may be (Chak 2007).

**Regulatory Mechanism in relation to Drug Manufacturing:** For manufacturing the drugs whether in relation to Allopathic or Ayurvedic, a license is needed before carrying any such manufacturing activity. The Licensing Authority is provided under the Drugs and Cosmetics Act ,1940 amended from time to time to cover the changing scenario and time to time developments. The Licensing Authority is at State and Central Level. The State licensing Authority has its role with respect to manufacturing units operating within the state. The State level Authority has a power not only to issue license but also to monitor drug manufacturing, which is imperative on them by adhering to regular inspections of manufacturing units , sale premises to prevent abuse and other malpractices inter-alia by enforcing the Food and Drug laws.

For manufacturing of drugs /pharmaceuticals the mandatory function of the inspection and office work is to recommend and issue manufacturing licenses under the referred statutes and rules thereto. Towards this an Application for availing License under drugs and cosmetic Act, 1940 is filed before the state authority or under the referred Act which is entrusted to senior Inspector for inspecting the premises etc. and for submission of report. On the strength of report when received either the license is granted, or the Application filed for grant of license is rejected. The license may specify other additional items only after due scrutiny. It is also perceived that for testing Laboratories to carry out the test/analysis on behalf of manufacturers, a procedure of joint inspection is carried out by the State Authority and the central Drug Inspectors (Das 2011; Hussain 2015).

**Other Compliances:** As already deliberated that in India, the Regulatory Mechanism with respect to manufacturing pharmaceuticals companies is multifarious which for understanding can be categorized into two broader areas like i) Core Regulatory Mechanism; and ii) Non-Core Mechanism. The Core Regulatory Mechanism has been dealt herein before while the Non-Core Regulatory Mechanism commences from the very beginning of creation as company/corporation and/or otherwise as may thought as a proper entity for carrying the manufacturing of drug activity. Once a legal entity is constituted ,it is followed by infrastructure including land and building for which different Regulator manages the affairs that of Development Authority within the

Metros and Cities, while for Semi-Urban and Rural the Revenue and Panchayats rules /procedures are to be followed in presence of Regulator for Drugs under the Drug and cosmetics Act, 1940 modified from time to time7 with Notification of 2020 for effective compliance. In some circumstances, compliances under the Shop and Establishment Laws of respective state may also get attracted. This apart for manpower management, the labor laws like Equal Remuneration Act, 1976 Payment of wages Act, 1936, besides others may have to be followed. The other Regulations mentioned though not Core Regulatory Mechanism still retain fringe aspects for ancillary compliance. The Compliance and Regulatory Mechanism stands diversified with core issues Under the Drug policy and the Statute(s) thereto (Jayaraman et al., 2008; Sripati 2004; Tripathi 2007)).

Judicial Adjudication and Sanctions: In the context referred above number of cases have come for judicial adjudication for which selected few are dealt and deliberated. In Swantraj V. State of Maharashtra,9 the judgement deals with manufacture, stock, and sale of drugs. The judgement of the Bombay High Court in no uncertain terms observes that that no person shall manufacture for sale, or sell, or stock or exhibit for sale or distribute any drug except under a licence and s. 27(b) provides for punishment for its contravention. Similarly, in Southern Pharmaceuticals & Chemicals ,Trichur and others V. State of Kerala, 10 where the Appellants were manufacturers of medicinal and toilet preparations containing alcohol, challenged the Constitutional Validity provisions 12-A, 12-B, 14-e and f, 56-A and section 68 - A of Kerala Abkari Act ,1967 in their writ petition under Article 226 of the Constitution of India. The legislation and Regulatory actions were subject matter of the cases also like in Vincent Panikurlangara V. Union of India & others 11 where the petitioner, an advocate by profession moved the Supreme Court in public interest seeking directions banning import, manufacture, sale and distribution of such drugs which have been banned in Western countries or recommended to be banned by the Drugs Consultative Committee under the respective laws thereto (Pinto 2021; Remya 2020).

The Judicial approach has been conducive and curative as it has expanded the Powers of the Central Government under section 26-A of the Drugs Act thereby enabling the Central Government to prohibit the use and manufacture of any drug without the consultation of the DTAB12 or any other Committee provided the parameters of section 26-A of the Drugs Act are met. Although the fate of FDC's which have been referred to DTAB is still to be decided, the pharmaceutical companies can manufacture and sell those FDC's till the Central Government issues appropriate Notifications after receiving the recommendation s of DTAB. The fate of pre 21 September ,1988 FDC's which were approved by DCG(I) is not yet clear. In short, the Supreme Court has preserved the right of Central Government to carry out an inquiry as to whether such drugs should be the subject matter of a notification under section 26-Aof the Drugs Act.

#### **CONCLUSION AND SUGGESTIONS**

The deliberations afore mentioned on 'Pharmaceutical **Companies:** A Study of their Operation and Regulatory Mechanism in India' leads to believe that the pharma sector is distinct in its own nature with base being in the Companies Act ,2013 at present. However, for carrying the objective of manufacturing drugs and other related commodity the approval from Regulator is warranted in the form of license with such conditions as may be deemed appropriate. The Pharmaceutical Manufacturing Companies is subject to periodical inspections by the drug controller through its inspectors. Other than Core Regulator, the ancillary Regulators towards infrastructure, labor, technician, and others have also monitoring role but confined to their respective areas . The State and Centre Licensing authority have onerous obligations as the manufacturing is concerning physical health, care for maintenance of standards Constitution carves out obligations and government has state responsibility for any wrong and/or deviation even as reflected in referred case deliberated hereinbefore. In the process it is expected that there ought to be strong and credible Regulatory Mechanism for which the identification of experts is required with sincerity, zeal and clarity about law and health hazards. The Industry requires a cross check to ascertain the proper functioning of controllers. All this will necessitate internal as well as external monitoring. The grant of License or refusal thereto needs urgent disposals. The adjudication of cases concerning Drug manufacture violation ought to be dealt expeditiously by the present dispensation. In alternative special Tribunals ought to be entrusted for dispensation of violation and cases where cause of action arises.

**Ethical clearance:** The approval of Institutional Ethics Committee is not required as the research does not involve any in-vivo study.

Source of funding: From own resources.

**Conflict of Interest:** Meenu Sharma and Prof. Dr. Sachin Rastogi declare that they have no conflict of interest.

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# Isolation of Yeast from Industrial Food Waste Peel and Metal Along with the Effectiveness on Ethanol Production Metals Ions

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#### **ABSTRACT**

This research work explores the potential for the isolation and use of yeast from industrial food waste i.e., here pineapple and cherry peel-based ethanol bioprocesses. The process of fermentation has a long history in the production of Bioethanol. Bioethanol is the best alternative source of clean and renewable sources of energy and the only winner in this category. The objective of this research work was to isolate and characterize high potential ethanol producing yeast strains from industrial fruit peel waste. Two yeast isolates from (Ch) and (P) have been isolated, both yeasts have been characterized and identified on the basis of characteristics and optimized on ethanol producing capabilities using substrates. The highest production by using the yeasts was 7.12% and 5.22% for P and Ch, at pH 5.5, at 30° C temperature in medium. Metal ions helped to increase the highest rate of ethanol production is 09.56% by  $KH_2PO_4$ . This research work revealed that these yeast isolates can also be used to benefit the industrial production of alcohol and also help into the benefit of fuel demand.

KEY WORDS: BIOETHANOL, INDUSTRIAL WASTE, FERMENTATION, MICROBIOLOGY, WASTE MANAGEMENT.

#### **INTRODUCTION**

Bioethanol is the most common and most widely used type of biofuel, that is basically ethyl alcohol, the same type of alcohol found in beverage alcohol. Which can also be used as fuel or as motor fuel, it is most often used mainly as a biofuel additive for gasoline. As a form of renewable energy source that can be generated or produced using agricultural feedstock or can also be produced using food industrial waste as a feedstock. During the ethanol production or fermentation, the different types of sugars mainly glucose (in substrate) are converted into ethanol and carbon-dioxide. The basis for the production of ethanol is microbial fermentation of sugar by yeast (Brooks 2008; Gamborg 1995).



Compared to other types of microorganism's yeast, specifically Saccharomyces cerevisiae is the most common microbe for the production of ethanol, due to its high production of ethanol capacity. In this study the Saccharomyces cerevisiae were selected as production microbes on account of their availability and after detailed study and characterization and optimization of parameters (Gamborg 1995).

#### MATERIAL AND METHODS

**Collection of Raw Material:** Collection of Fruit waste (Peel) from Food processing industry for the isolation of Yeast from mainly Pineapple (P) and Cherry (Ch) peel which is denoted as Ch and P (Lee 2018).

**Other instruments are:** Autoclave for sterilization, spectrophotometer, Laminar air flow (Biosafety Chamber), Shakin and Non-Shaking incubator for incubation, test tubes, petri plates and many more (Lee 2018).

**Isolation and screening of Yeast:** Fruit samples from waste (Cherry and pineapple) were collected from local food processing industry basically from canning unit, and then



their peels were extracted. And then the isolation is done by using the procedure from (Lee, 2018), Single colony formed was to be picked, and the cells were observed under a compound microscope. (Brooks, 2008)

**Culture maintenance:** The maintenance of culture was done by slants subculturing using YMM, incubating for 2 days at 28 to 3° C, thereafter, use refrigerator for further storage at -5 to -9 °C for future use as per the requirement (Lee 2018).

**Growth of Isolates:** In this current study the selected isolates, the morphology of cells of and their appearance on YEPD (yeast extract peptone dextrose) agar media was examined (Ortiz-Muñiz, 2010). The medium was then sterilized at 121 °C at 15 psi and poured on a petri dish and cooled down (Gamborg, 1995). 2 days old yeast strain than incubated at 30 °C  $\pm$  2 for 2 days. Features of the appearance of cultures were recorded.

The isolates Ch and P were cultured in YEPD (yeast extract peptone dextrose) liquid medium. Incubated at 28-32 °C for 72 hr. The culture for the growth is to examined visually on the surface of liquid medium, and the shape of cells using compound microscope (Lorenz, 2000) (Magnus,India)

**Carbohydrate's fermentation:** The fermentation ability of seven different carbohydrates by selected isolates (Miller, 1959) (Ch & P) was examined anaerobically and is assessed by looking for the formation of gas (CO2) in Durham tube and change in colour of the fermentation media.; the media colour changed from red to yellow due to the formation of gas and acid produce.. The medium was prepared by using these- peptone (10 gm), NaCl (5 gm), phenol red (Indicator) and carbohydrate (5 gm). A volume of 15 ml aliquots dispensed in different tubes were then autoclaved, after cooling 2 days old selected yeast strain (Lodder 1970).

Table 1. Fermentation of different carbohydrates using P isolate						
Carbohydrate	ydrate Colour of the medium After Fermentation					
(Sugar)	Before Fermentation	Colour of the medium	Production of gas			
Glucose	Pink colour	(yellow)	yes			
Sucrose	Pink colour	(yellow)	yes			
Maltose	Pink colour	(Yellow)	yes			
Lactose	Pink colour	(No change in colour)	no			
Fructose	Pink colour	(yellow)	yes			
Xylose	Pink colour	Yellow	yes			
Trehalose	Pink colour	Yellow	yes			

Table 2. Fermentation of different carbohydrates using Ch isolate				
Carbohydrate	Colour of the medium	n After Fermentation		
(Sugar)	Before Fermentation	Colour of the medium	Production of gas	
Glucose	Pink colour	(yellow)	yes	
Sucrose	Pink colour	(yellow)	yes	
Maltose	Pink colour	(yellow)	no	
Lactose	Pink colour	(No change in colour)	no	
Fructose	Pink colour	(yellow)	no	
Xylose	Pink colour	(No change in colour)	no	
Trehalose	Pink colour	(yellow)	yes	

 Table 3. Growth of Ch yeast isolate in liquid media with
 different temperatures

Temperature	Initial optical (O.D)	density O.D (after 2-days of growth)
25°C	.240	1.365
30°C	.342	1.427
32°C	.328	1.650
37°C	.439	1.987
40°C	.458	2.001
45°C	.489	.681

#### Table 4

Temperature	Initial	optical density (O.D)	O.D (after 2-days of growth)	
25°C	.323		1.002	
30°C	.202	.695		
32°C	.265	265 1.322		
37°C	.582 2.890		2.890	
40°C	.552		2.154	
44°C	.511		.496	

**Thermotolerance detection:** YEPD liquid medium is used for thermotolerance detection and growth in liquid media of selected yeast isolates of cherry and pineapple. The medium was Sterilized and cooled. Medium was distributed into tubes and after that inoculated 2-days selected yeast isolates (Ch & P). The initial (O.D) of each tube is recorded by using spectrophotometer at 600 nm against the medium as blank (control sample). The increase in O.D in a tube was recorded as evidence of growth. The growth in YEPD agar medium at different temperature to ensure the strains thermotolerance.

**Growth at different pH in liquid media:** YEPD liquid media is used to find out the ability to grow on different pH. The media was sterilized by autoclaving and then cooled. YEPD broth mediaum is prepared at different pH which are 2–10. Then, each was inoculated with the yeast (the initial O.D at 600 nm was to be measured) and then incubated at 30 °C for 2 days. After 2 days the cell density was further recorded at 600 nm for the growth.

Table 5. P (Pineapple) isolate in liquid media with different pH growth

pH	Initial optical density (O.D)	O.D (after 2-days o growth)	
2	.333	.899	
3	.428	1.866	
4	.345	1.870	
6	.390	1.788	
7	.184	1.489	
8	.259	1.455	
9	.277	1.219	
10	.422	1.326	

Table 6. Ch (Cherry) isolate in liquid media with different pH growth

pH	Initial optical density (O.D)	O.D (after 2-days of growth)	
2	.342	.840	
3	.389	1.457	
4	.269	1.379	
6	.309	1.470	
7	.200	1.366	
8	.220	1.270	
9	.209	1.222	
10	.428	1.203	

Observation of Osmotolerance: YEPD broth was prepared containing with different range in between 6%- 20% of NaCl. Each tube contained 10 ml of YEPD liquid media with appropriate concentration of NaCl, and the blank media were used as a control sample. Then, each was inoculated of the yeast cell (the initial 0.D at 600 nm was measured) and then incubated at 28-30 °C for 2 days. After, cell density was further recorded by spectrophotometer at 600 nm (Lorenz 2000).

**Molasses fermentation:** Molasses fermentation is done in the conical flasks. A total of 200 ml of fermentation medium is taken into the 500 ml of flasks and then the suspension of yeast was inoculated into the medium in an aseptic condition and then incubated at different temperatures in an incubator under non-shaking (N.S) and shaking (S) conditions (Lodder 1970).

**Effect of sugar concentration:** The effect of concentration of sugar in ethanol production by S. cerevisiae were studied, media is prepared by molasses dilution to reducing sugar concentration which ranges between 04.5% to 07%, and fermentation is carried out of 200 ml medium in to 500-ml conical flask. Inoculate is added in to the medium. After that Samples were withdrawn at different times and estimated for residual sugars as well as ethanol content in the medium (Miller, 1959).

Na CI percentage	Initial optical density (O.D)	O.D (after 2-days of growth)	
6%	.235	1.365	
9%	.217	.645	
12%	.259	.423	
15%	.208	.289	
18%	.259	.271	
20%	.257	.240	

Table 7. P isolate in liquid media with different NaCl

Table 8. Ch (cherry) isolate in liquid media with differentNaCl concentration

NaCl percentage	Initial optical density (O.D)	O.D (after 2 days of growth)
6%	.209	.872
9%	.227	.239
12%	.239	.250
15%	.187	.149
18%	.285	.178
20%	.251	.189

**pH effect:** To study the pH effect on ethanol production by S. cerevisiae, fermentation media with different reducing concentration of sugar were used for the production of ethanol. Fermentation is carried out at pH 05.0 in of 200 ml media in a 500-ml conical flask. A 2-day-old inoculum is added to the media. Samples were than withdrawn at different times and estimated for residual sugars as well as ethanol content in the medium (Lorenz 2000).

**Effect of metals:** For determination of the effects of metals on ethanol production which are MnCl2, ZnSO4, CuSO4, KH2PO4, and were added at different concentrations and then the fermentation was carried out in the presence of different types of metals. Observation of ethanol production was done at the temperature of 30 °C, pH 5.0, and using the reducing sugar concentration of 7.0% in shaking (S) condition (Lorenz 2000).

#### **RESULTS AND DISCUSSION**

**Growth of isolates:** The morphology of yeast cells was observed grown in solid media and on liquid media according to the standard method using microscope. Six petri dishes are used to confirm the identification of the

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cell morphology of cherry and pineapple yeast isolates under compound microscope.

**Carbohydrate's fermentation:** Here, S. cerevisiae shows variations in terms of utilization of different sugars in the below Tables 1 & 2. The isolated strain utilises all seven sugars but failed to grow on lactose. Change in the colour of the media confirmed the fermentation. The results were recorded after 2-days of inoculation.

# Different environmental conditions to check the yeast Tolerance

**Temperature effects on growth:** YEPD agar plates containing yeast cell were incubated for 2-days at different temperature. Both isolates were able to grow at 25–45 °C. Thermotolerance were repeated in liquid media, for the confirmation of results obtained from the solid media, Table-3, Growth of P yeast isolate in liquid media at different temperatures From the table-3, that shows the P yeast isolate is highly thermotolerant because it is able to grow up to 45 °C. From the table-4, which shows that the Ch yeast isolate is highly thermotolerant also as it is able to grow up to 40 °C (Miller 1959).

**pH effect on growth:** Both the isolates of Ch and P shows the ability to grow in a wider range of pH, from between two to ten. Both isolates with pH 10, but pH 04.0 for P isolate and pH 6 for Ch isolate shows the optimum and best result. After 2-days, the cell optical density is recorded at 600 nm and given gradually for evidence of growth in the below table-5 and 6 (Miller 1959).

**Observation of Osmotolerance:** The pineapple (P) isolates tolerate up to 09% NaCl successfully in the medium, and this was seen an index of osmotolerance. But at the higher concentration, the growth is reduced with accordance to time. The isolate of cherry (C) showed optimum at up to 12% NaCl concentration.

**Ethanol production:** The results of ethanol production and its tolerance at different concentration of sugars at 30 °C and pH 05 in shaking (S) and non-shaking (N.S) condition, Pineapple (P) yeast shows good results than the Cherry (C). Thus, some series of experiments are conducted at different-different physicochemical conditions for the optimization of ethanol production by the Pineapple isolate. For the optimum result, shaking condition experiments were carried out and the result can be seen in the below table- 9 (Nasir 2017).

**Metal ions effect on ethanol production:** Ethanol production optimization by additional nutrient supplements as effect of metals such as MnCl2 (Manganese (II) chloride), CuSO4 (Copper (II) sulphate), KH2PO4 (Potassium dihydrogen phosphate), and ZnSO4 (Zinc Sulphate) was analysed. Both cherry and pineapple isolates show high productivity after adding of supplements, as studied. The highest ethanol production observed is 09.56% by P isolate with KH2PO4 supplements in shaking condition (Nasir, 2017) shown in below graph fig.2. Ch isolate produced 8% ethanol after MnCl2 supplementation in shaking condition as shown in below graph (fig. 1). the average of all results is shown in below graphs (fig.1 and fig.2) and in table-10.

Table 9. Under shaking and non-shaking condition ethanol production by Ch isolate at initial pH 5 and with different sugar concentration. The highest production recorded 5.22% at sugar concentration of 5.5%. The data shown are the average of 3 individual experiments under given condition. And for P isolate the highest production at 7.89% at sugar concentration of 6.5.

Concentration of glucose (%)	Cherry (shaking)	Cherry (non-shaking)	Pineapple (shaking)	Pineapple (non-shaking)
4.5	2.56	0.56	3.523	2.18
5.5	5.22	2.28	7.12	6.
6	4.56	4.22	5.19	3.49
6.5	3.22	2.27	7.89	3
7	3.55	3.56	5.55	3.08



Table 10. Production of ethanol by P and Ch isolate in<br/>presence of metalsMetals ionEthanol (%) by P (2-days)Ethanol (%) by Ch isolate (2-days)MnCl28.88CuS 047.486.20

7.40

6.80

9.56

8.12

# DISCUSSION

KH2PO4

ZnSO4

Both isolates of cherry and pineapple that were found belong to saccharomyces type unicellular. The P isolate shows better tolerance than the Ch isolate at up to 15% of NaCl equivalent of that osmotic pressure. (Lodder, 1970). As we know from past studies that yeasts are mesophilic with upper limit growth temperature between 30C to 3°C. This is the reason why the temperature must be maintained between 30 to 35 °C for fermentation process. The P yeast shows far better tolerance than of the Ch peel isolate at up to 15% NaCl equivalent of osmotic pressure. This study shows that the highest ethanol production observed is 09.56% by P isolate with KH2PO4 in shaking (S) condition. Ch isolate produced 8% ethanol after MnCl2 supplementation in shaking (S) condition. The isolates are tested for fermentation of carbohydrates, P (Pineapple) isolate is able to utilize six out of the seven tested total sugars, and cherry isolate is able to utilize five sugars out of seven, which indicates that both were diverse in sugar utilization that is shown in table-1 & 2 (Nofemele 2012).

# CONCLUSION

The results reported in the present study revealed that both the P and Ch yeast isolates were highly tolerant to ethanol and as well as thermotolerant and osmotolerant, both can survive at various pH ranges. These results shows that the isolates can be used at industrial and at heigh level for the fermentation of various raw materials in reference to obtain an increased production of bioethanol.

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# **Properties of Emulsified Meat Systems**

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#### **ABSTRACT**

Proteins of muscle tissue affect not only the nutritional and biological value of meat, but also predetermine the condition of physico-chemical, structural-mechanical and technological parameters of raw materials (stickiness, viscosity, water binding capacity, pH, etc.) and finished products (juiciness, delicacy, output). They are different in structure, biological functions, physicochemical indicators, including solubility. Using sequential extraction of muscle proteins with water, saline and alkaline it is possible to obtain different protein fractions. Differentiation of proteins by solubility (water-soluble, soluble in salts, alkaline-soluble, albumins, globulins), fractional composition (sarcoplasmic, myofibrillar and connective tissue), peculiarities of the biochemical structure (high-grade and inferior). Protein extracts of muscle tissue of wild and domestic animals obtained during sequential extraction are used to quantify the protein content of a certain fraction, as well as to research the properties of proteins.In this scientific article the comparative analysis of functional and technological emulsions properties of cooked sausages is given. Cooked sausages are manufactured according to the national standard. Hydrated rice and flax flour formulations in a volume of 7% were used instead of semigreasy pork. The rheological properties of cooked sausages' meat emulsions have been studied. The vegetable ingredients addition into the formulation of cooked sausages has been justified in order to stabilize the protein-in-oil emulsion.

KEY WORDS: MEAT, QUALITY, EVALUATION, EXAMINATION, RESEARCH

## **INTRODUCTION**

Scientists have been working on the cooked sausages manufacture with an ideal combination of taste qualities, organoleptic characteristics, high food and biological value and also in the price bracket of economy class. Rice and flax flour adding in the product content helps to improve functional and technological properties of cooked sausages and also to reduce the price (Kabanova et al., 2020).

From the muscle tissue of meat, proteins can be isolated and divided due to their different solubility in different solutions. Soluble proteins are mainly found in the



sarcoplasm of muscle fibers, and soluble salts form myofibrils. Insoluble protein fractions in water-salt solutions are conditionally called stroma proteins, which contain proteins of sarcolemma, nuclei and intracellular connective tissue proteins. Muscular proteins, according to their solubility, are divided into three groups – myofibrillar (55% of total proteins), sarcoplasmic (35% of total proteins) and connective tissue proteins (3-5% of total proteins) (Tsaregorodtseva et al., 2020).

Sarcoplasmic proteins: myogen, globulin X, myoalbumin, myoglobin – are located inside the membrane of muscle cells in the sarcoplasm and account for about 30-35% of the total number of proteins in the muscle. These proteins are soluble in water or in solutions with a low ionic power (<0.6 millimole / cdm). Proteins of sarcoplasm are water soluble, mostly high-grade and well digested. This group of proteins also includes oxidative enzymes, heme pigments, glycolytic enzymes, which are responsible for glycolysis, and liposomal enzymes (Dolgorukova et al., 2018; Okhotnikov et al., 2020).


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Myofibrillar proteins, or salt-soluble proteins, are insoluble in water, but most of them are soluble in a solution of table salt with a concentration of more than 1%. This group consists of approximately 20 individual proteins which are part of the myofibrils of the contractile muscle. Myofibrillar proteins include the contractile proteins myosin, actin and actomyosin, as well as regulatory proteins tropomyosin, troponin and alpha and beta actin. Myofibrillar proteins provide contractile muscle function (Kabanova et al., 2016; Kuzmina et al., 2020).

Connective tissue proteins of meat form a net that envelops the muscle fibers and pervades the entire muscle. Because of this, they serve as a frame that supports the structure of the muscle. These include proteins of sarcolemma and intramuscular connective tissue (collagen, elastin, reticulin, mucins, mucoids, lipoproteins, acidic and residual proteins). These proteins, except for collagen and elastin, can be extracted from muscle tissue with a 0.25% solution of NaOH (Kuzmina et al., 2018; Dolgorukova et al., 2018)).

# MATERIAL AND METHODS

Experimental data showed that rice flour has a gelforming capacity of 19.0 g, and flax flour's gel-forming capacity is 17.0 g, which corresponds to the level of soy protein isolators (16 g). Consequently, the ability of nutrient additives to gel formation affects the consistency of processed meat products, especially those which recipe contains a large amount of non-meat ingredients (fig. 1).





On the basis of the functional and technological properties' analysis it can be stated that rice and flax flour addition to the meat farce should improve WBC, FBC and gel-forming capacity of meat system.

Then loose sausage was made in the meat cutter according to the recipe:

Control: 25% of prime beef, 70% of semigreasy pork, 3% of egg, 2% of milk.

Experiment  $N_01$ : 25% of prime beef, 63% of semigreasy pork, 7% of rice flour, 3% of egg, 2% of milk. Experiment  $N_02$ : 25% of prime beef, 63% of semigreasy pork, 7% of flax flour, 3% of egg, 2% of milk.

In the settings of technological laboratory, laboratories of biological safety of food systems and rheology of the chair of meat and dairy products technologies of Mari State University conducted the following laboratory researches:

- Water binding capacity was determined according to the Grau's compaction method modified by V.P. Volovinskaya, B. Y Kelman.
- Water retaining capacity of minced meat was determined by calculation after drying out hinges in the drying apparatus APS-1 and calculation of the total humidity mass fraction.
- Fat-retaining capacity was determined after centrifugation of the minced meat samples in the eleometer and then calculated by the refraction index of the refractometer.
- Laboratory-scale plant for adhesiveness determination according to S. Tyszkiewicz was used to determine the minced meat's surface characteristics.
- Shift properties were determined by using consistometer.

# **RESULT AND DISCUSSION**

Examination of the WBC level of the moist minced meat showed (table 1) that the Experiment No1 has WBC of 78,5±0,47% and the Experiment No2 has WBC of 77,4±0,32%. These counts are bigger than in Control by 2,6±0,43% and 1,5±0,43% correspondingly (P<0,05). There was no significant difference between the Experiment No1 and the Experiment No2.

Table 1. Amounts of minced meat's WBC and released product's WRC, $_{0\!/_0}$							
Groups	Groups Minced meat's WBC level Released product's WRC						
	M±m         Cv, %         M±m         Cv, %						
Control 75,9±0,43 0,8 72,5±0,04 0,1							
Experiment No1         78,5±0,47*         0,8         74,1±0,11***         0,2							
Experiment $No2$ 77,4±0,32*         0,6         73,6±0,21         0,4							
Henceforward: *- P≤0,05; ** - P≤0,01; *** - P≤0,001							

Determination of released product's water retaining capacity (WRC) proved the hypothesis of the possibility of the larger proportion of moisture maintaining in a sausage link after heat-treating operation, as the Experiment No1 had the largest rate of 74,1±0,11%, which was bigger than in the Control by 1,6±0,04% (P<0,001). There was no significant difference between the Experiment No1 and the Experiment No2. It means that rice and flax flour addition contributed to WBC and WRC increase in comparison with Control. It is the result of the hydrophilic centers of rice and flax proteins' ability to bind and retain more water, increasing the proportion of loosely bound available moisture in raw minced meat and firmly bound moisture in the released product.

Rice flour addition contributed to the protein-in-oil emulsion stabilization in a greater degree than flax flour addition, because in the Experiment  $N\underline{o}1$  WRC level of the released product was reliably higher in comparison with the Control by 1,6±0,04% (P<0,001). In the Experiment  $N\underline{o}2$  there was no significant difference on this indicator in comparison with the Control. At the same time, WRC indicators of test samples did not have significant differences, consequently, addition of 7% hydrated rice and flax flour instead of semigreasy pork contributes to increase of minced meat's water binding capacity and released product's water retaining (fig.2).



Table 2. Plasticity amount of minced meat					
Sample Plasticity amount, g/cm2					
	M±m Cv, %				
Control	10,20±0,07	0,9			
Experiment N <u>0</u> 1	12,60±0,07*	0,8			
Experiment N <u>0</u> 2	15,43±0,11**	0,9			

Variability of WBC and WRC indicators of control and test samples is insignificant, because Coefficient of variation (Cv) is less than 10%. The most complete information about the quality and properties of minced meat systems which depend on the chemical composition and which are determined by the internal structure can be judged using rheological methods. One of the main structural and mechanical characteristics of the quality of minced meat is plasticity. Tenderness and succulence which determine taste of released minced products depend on plasticity (table 2) (Kabanovaet al., 2016).

Unlike emulsified greasy pork (Control), hydrated flax flour (Exp.  $N_{\Omega}2$ ) and rice flour (Exp. $N_{\Omega}1$ ) have a gel texture and their consistency is less sticky. Consequently, while adding them into the cutter, they envelop and bind the muscle fibers and connective tissue components to a single matrix and they improve plasticity of the cutter mass (Fig. 3). Estimated data proves that plasticity indicator in Control is less than in test samples, particularly it is less by 2,4 ± 0,07 g/cm2 in Experiment  $N_{\Omega}1$  (P<0,05), and by 5,2±0,11 g/cm2 (P <0,01) in Experiment  $N_{\Omega}2$ . It means that rice and flax flour usage in cooked sausage significantly increases minced meat's plasticity, making its consistency tight considerably.



Variability of minced meat's plasticity both of control and test samples is insignificant because the Coefficient of variation is < 10%. In the course of the conducted research the adhesion (stickiness) amount was also determined. Obtained data is presented in Table 3.

Emulsion of the Experiment No2 has the greatest adhesiveness, it is 445,26±18,37 Pa, which is bigger than in Control by 112,35±28,4 Pa (P<0,05) (PNC. 4). Emulsion of the Experiment No1 also takes precedence of Control on adhesiveness amount by 97,84±28,4 Pa (P<0.05). There is no significant differences between Experiment No1 and Experiment No2. On this base, it can be concluded that addition of flax and rice flour has a direct impact on structural and mechanical properties of the product. The minced meat of test samples has the greatest binding (adhesive) capacity than a control sample, which determines elastic properties and the ability to form monolithic product. Variability of minced meat's viscosity both of control and test samples is insignificant because Coefficient of variation is less than 10% (Kuzmina et al., 2020).

High adhesion rates influenced the terminal share stress amount: Experiment  $N\underline{o}2$  and Experiment  $N\underline{o}1$  possessed the most strong properties of 264,73±2,81 Pa and 260,3±0,67 Pa correspondingly (Fig.5). Amounts of these test samples took precedence of Control by 84,3±0,64 Pa and 79,9±0,64 Pa correspondingly (P<0,001). There

### Tsaregorodtseva et al.,

is no significant difference between Experiment *N*<u>o</u>1 and Experiment *N*<u>o</u>2.

It means that rice and flax flour added during the chopping process interacted with muscle proteins and fat-containing raw materials and tied up all minced meat's components. This contributed to thickening of protein-oil-fat emulsion, and meat system became stable (table 2). The variability of terminal share stress amount both of Control and test samples was insignificant, as the Coefficient of variation was less than 10%. Observed data obtained during the study of mince meat's viscous properties using Brookfield viscometer showed that the most significant increase in minced meat's viscosity is observed during the addition of 7% flax flour of  $389,53\pm22,71$  Pa×c and of 7% rice flour of  $373,03\pm16,47$  Pa×c, which is bigger than in Control by  $63,9\pm5,66$  Pa×c and  $47,67\pm5,66$  Pa×c correspondingly (P<0,05) (table 2).

Table 3. Rheological properties of minced meat and product				
Sample	Adhesion amount, Pa M±m	Terminate shear stress amount , Pa M±m	Viscosity, Pa×c M±m	
Control	332,91±28,4	180,40 <u>+</u> 0,64	325,63±5,66	
Experiment N <u>0</u> 1	430,75±7,70*	260,30±0,67***	373,03±16,47*	
Experiment N <u>0</u> 2	445,26±18,37*	264,73±2,81***	389,53±22,71*	





There was no significant difference between Experiment  $N_{\underline{0}1}$  and Experiment  $N_{\underline{0}2}$ . It is explained by the fact that there is starch in the rice and flax composition and when heated it forms starch paste which promotes viscosity increase (Fig.6).

# CONCLUSION

Addition of rice and flax flour contributed to increase in WBC and WRC by contrast to Control. It is the result of the hydrophilic centers of rice and flax proteins' ability to bind and retain more water, increasing the proportion



of loosely bound available moisture in raw minced meat and firmly bound moisture in the released product. Meat emulsion of test samples with 7% rice and flax flour addition has high rheological properties, which makes the meat system more stable and contributes to forming sausage links into monolithic product.

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**Conflict of Interest:** The authors declare that there is no known conflict of interest associated with this publication.

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# *In-Silico* Drug Designing and Molecular Dynamics for An Indian Strain of Covid–19 Target Protein from South Africa and Brazil with the Potential Drugs Proved as A Good Inhibitor in China

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### **ABSTRACT**

A joint exploration group of the Shanghai Institute of Materia Medica and Shanghai Tech University performed drug separating silicon and a protein movement test, and they revealed 30 specialists with possible antiviral action against SARS-CoV-2 on January 25, 2020. These specialists are indinavir, saquinavir, lopinavir, carfilzomib, ritonavir, remdesivir, atazanavir, darunavir, tipranavir, fosamprenavir, enzaplatovir, presatovir, abacavir, bortezomib, elvitegravir, maribavir, raltegravir, montelukast, deoxyrhapontin, polydatin, chalcone, disulfiram, carmofur, shikonin, ebselen, tideglusib, PX-12, TDZD-8, cyclosporin A, and cinanserin. A similar report likewise tracked down that Chinese natural meds, for example, RhizomaPolygoniCuspidati and Radix SophoraeTonkinensis may contain dynamic fixings against SARS-COV-2. In this research work, we found by following the techniques of drug designing and molecular dynamics mentioned above that a drug named Carfilzomib (used in top 20 drugs in China against Covid-19) that can be docked against the 7LOP ("South Africa" (B.1.351) and the "Brazil" (P1) variants) of new Indian variant (comes from Brazil and South Africa) and at least cease the activity so that its action of spreading infection can be prevented.

**KEY WORDS:** REMDESIVIR, SARS-COV-2, RHIZOMA POLYGONI CUSPIDATI, RADIX SOPHORAE TONKINESIS, CINANSERIN AND 7LOP.

## INTRODUCTION

The quantity of COVID-19 cases in India expanded at a moderately sluggish speed after the main case was recorded on January 31, 2020. Every day cases topped at around 98,000 cases around September 15, declining consistently for a very long time from that point. A month into 2021, it appeared to be conceivable that India's experience would be not normal for those of the US or Brazil, the two of which saw numerous influxes of the infection and recorded numerous passings inside the previous year (Chan et al., 2020).

Coronavirus is brought about by the SARS-CoV-2 infection, an individual from the Covid family. Viruses have been alluded to as a "piece of terrible news enveloped



with a protein" by the scholars Jean and Peter Medawar. This expression portrays both the shell of protein particles that ensures the hereditary material of the infection, just as the hereditary material, for this situation a solitary RNA molecule, the "awful news". This molecule contains all the infection requires to duplicate itself once it connects to, and afterward enters, a living cell.

**The Background:** At the point when an infection taints a living cell, the data contained in its RNA grouping is perused (or "interpreted") to make proteins. A portion of these proteins help the RNA make duplicates of itself ("replication"), others are associated with "wrapping up" the RNA, but other "bundle" this into new infection particles. The last advance in the life-pattern of the infection is for these new infection particles (or virions) to get away from the tainted cell so they can proceed to contaminate others, rehashing this interaction.

Viruses just exist to make duplicates of them. That they cause infection is really accidental to this bigger reason. In any case, these duplicates are now and then defective. On the off chance that the RNA arrangement varies by at least one letters from the first one it was replicated from, this can now and then prompt an alternate protein succession. This change can influence portions of the



infection, modifying the manner in which the infection ties to the cells it taints. It can likewise intrude with the manner in which antibodies tie to explicit uncovered pieces of the infection they were intended to perceive. A few transformations in areas that antibodies look to tie and kill the infection can make procured invulnerability less viable. This is classified "resistant break" and can prompt reviruses. Individuals can likewise get recontaminated if antibodies melt away with time; however the invulnerable memory of a prior experience with the infection forestalls or restricts sickness.

**The Variants:** Here are some epidemiological inquiries to which we don't have the foggiest idea about the appropriate responses: Has the B.1.617 variation spread all the more adequately in Maharashtra among February and now, supplanting the more established strain? How much is this variation answerable for the spray in cases outside that state? Is the B.1.36 variation, common in south India, likewise more contagious than the first strain? Assuming this is the case, by what amount? At long last, what is the contamination casualty proportion, related with the new strains? Are there huge changes in the manner fatalities emerging from contamination are circulated across ages? A different line of inquiries has to do with the resistant framework's communication with the new variations (Channappanavar et al., 2014).

Does an earlier disease with the first strain or a later immunization shield generously against a contamination from the new variation? Then again, could the result be more terrible? The responses to these inquiries will figure out what we can say about the unfurling of this period of the pandemic. A more contagious illness has a higher related crowd resistance limit, which is the small portion of the populace needed to be inoculated by immunization before those unvaccinated are secured. For the previous strain, 60-70% was a sensible edge. For a quicker spreading new variation, this would be fundamentally bigger. In the event that safe break was huge, the populace powerless to the sickness would need to be extended to incorporate all of India again – we would have returned to where we began in January 2020 (DE et al., 2016).

## Objective

### Our Objectives are:

- 1. To find the target protein of new Indian variant (comes from Brazil and South Africa).
- 2. Prepare that target for drug designing criteria.
- 3. Docking all molecules with target protein active site.
- 4. To find the best docking score against the target protein with best drug.
- 5. Energy minimization by simulation with gromacs software of protein-best ligand complex to check the compatibility of best ligand with target protein.

SARS-COV-2 Infection, Replication and Clinical Implications: SARS-CoV-2 can be transmitted human to human by respiratory drops, close contact with unhealthy patients, and conceivably by faecal-oral and airborne contact. It was as of late shown that airborne transmission is profoundly harmful and addresses the predominant course to spread the illness. This finding was acquired dependent on the investigation of the pattern and alleviation measures in three distinct urban communities considered focal points of COVID-19: Wuhan, China, Italy, and New York City, in the time frame from January 23 to May 9, 2020. Significantly, this outcome uncovers that among the embraced alleviation estimates, for example, social separating and wearing of veils, the distinction with and without ordered face covering addresses the determinant in molding the patterns of the pandemic and spread of the sickness.

Dominant part of SARS-CoV-2 tainted people (80 %) are asymptomatic or present gentle manifestations undoubtedly because of a decent insusceptible reaction ready to control the development of the sickness. There is proof that these asymptomatic individuals can taint others with SARS-CoV-2. In the other hand, indicative people may develop to more extreme manifestations and inevitable demise. The most ideal approach to forestall transmission and ailment is to try not to be presented to the infection. Hence, a few suggestions incorporate wash hands regularly, stay away from close contact, cover mouth and nose with a veil, cover hacks and sniffles, and clean and sanitize every now and again contacted surfaces day by day. In such manner, wearing of face covers out in the open relates to the best way to forestall interhuman transmission (Chan et al., 2020).

The infection spread principally from individual toindividual between individuals who are in close contact with each other and through respiratory drops delivered when a tainted individual hack, wheezes or talk. The most ideal approach to forestall is to try not to be presented to the infection. Upon cell contact, the infection can enter the cells twoly, either by means of endosomes or plasma film combination. In the two different ways spike proteins (S1 e S2) from SARS-CoV-2 intervene connection to the cell film by restricting to the ACE2 as the section receptor. Then again, virions are taken up into endosomes, spike proteins are enacted by cathepsin L or on the other hand by transmembrane protease serine 2 (TMPRSS2) in closeness to ACE2 receptor, which starts combination of the viral film with the plasma layer. The last system is more averse to trigger an antiviral safe reaction and is more effective for viral replication.

Once inside the cell, viral RNA is delivered, and polyproteins are interpreted. Covid genomic RNA encodes nonstructural proteins (NS), that assume a basic part in viral RNA combination, and primary proteins which are significant for new virion get together. First NS proteins 1a and 1ab are deciphered and severed by the papain-like protease (PIpro) and 3C-like protease (3CLpro) to frame practical NS proteins, for example, helicase or RNA-subordinate RNA polymerase complex (RdRp). Underlying proteins S1, S2, envelope (E), layer (M) are made an interpretation of by ribosomes bound to the endoplasmic reticulum (ER) and introduced on its surface as an arrangement of virion gathering (Guan et al., 2020).

The nucleocapsids (N) stay in the cytoplasm and are gathered along with the genomic RNA. The virion antecedent is then shipped from the ER through the Golgi mechanical assembly to the cell surface by means of vesicles. At long last, virions are delivered from the tainted cell through exocytosis and another replication cycle starts. Manifestations and signs related with viral pneumonia like fever, hack, sore throat, cerebral pain, weakness, myalgia and dyspnea are habitually appeared by patients during the beginning of COVID-19.

Moreover, loss of taste or smell and gastrointestinal indications like queasiness, spewing or looseness of the bowels has likewise been accounted for by contaminated patientz. All things considered, illness seriousness is by all accounts emphatically connected with hidden host conditions including age, sex and generally speaking wellbeing. The last appears to assume a basic part in weakness and add to the danger of disease. At the point when extreme and non-serious patients are analyzed, conditions like hypertension, diabetes, cardiovascular and kidney sicknesses increment the danger of disease a few overlap. Momentum helpful treatment for COVID-19 identified with the beginning and physiopathology of the infection (Hindson 2020).

Albeit observational researchs announced more established age and the presence of comorbidities as hazard factors for expanded infection seriousness in patients with COVID-19, it quickly turned out to be certain that extreme sickness can likewise happen in more youthful patients with no prior ailments. Serious COVID-19 is firmly connected with hyperinflammation as confirmed by more significant levels of C-responsive protein, ferritin and D-dimers in blood just as expanded neutrophil-to-lymphocyte proportion and serum levels of a few fiery cytokines and chemokines.

# MATERIAL AND METHODS

### (Database):

Ncbi (National Center For Biotechnology Information) Pubmed Pdb (Protein Data Bank) Pubchem Materials (Softwares): Open Babel Autodock Autodock-Vina Pymol Gromacs

Found the target protein ("South Africa" (B.1.351) and the "Brazil" (P1) variants) of new Indian variant (comes from Brazil and South Africa) from literature database PubMed (NCBI) and to download from RCSB-PDB.

Prepared the protein.pdb molecule and all ligand

pdb format for docking through AutoDock software. Downloaded all the potential drugs proved as good inhibitor in China from PubChem and PDB database in 3d-sdf or 3d-pdb format. Changed all sdf format in .pdb by Open Babel software because .pdb format is compatible in AutoDock. Prepared all ligand pdb format for docking through AutoDock software. Docked all ligands with protein one by one and found best drug with best docking score affinity (kcal/mol). Energy minimized by simulation with gromacs software of protein-best ligand complex and checked the compatibility.

## **RESULT AND DISCUSSION**

#### Target Protein (7LOP)

**Preparation of Protein:** Opened protein (7LOP) in AutoDock – Deleted all unnecessary chains but chain A – deleted all water molecules – deleted all already present ligands – added all polar hydrogen – added kollman charges on protein chain A – through grid box prepared configuration file and saved the final prepared protein in protein .pdbqt (Hoffmann et al., 2020).

Figure 1: Downloaded the target protein 7LOP ("South Africa" (B.1.351) and the "Brazil" (P1) variants) of new Indian variant (comes from Brazil and South Africa) from literature database PubMed (NCBI) and to download from RCSB-PDB.

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Figure 2: Prepared the protein.pdb molecule and all ligand pdb format for docking through AutoDock software.



Drug Downloading From Pubchem And Pdb Database Format Change

**Preparation of Ligands:** In AutoDock one by one opened ligands in pdb format - made their torsion angle non-

### Mishra & Teotia

rotable (0/32) – then saved all in .pdbqt format.



Figure 4: Downloaded all the remaining (which not found in PubChem) potential drugs proved as good inhibitor in China from RCSB-PDB.



Figure 5: Changed all sdf format in .pdb by Open Babel software because .pdb format is compatible in AutoDock.

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Figure 6: Prepared all ligand pdb format for docking through AutoDock software.



Figure 7: Carfilzomib (4qw5\_GA\_3BV) downloaded from RCSB-PDB had the lowest docking score affinity (-9.3 kcal/mol) against our target protein 7LOP (SARS-CoV-2 receptor binding domain) new strain came from South Africa and Brazil

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Figure 8: Carfilzomib (4qw5\_GA\_3BV) shown H-Bond interaction with Glutanin 493 amino acid in PyMOL software



**Docking With Autodock–Vina:** Docked all ligands with protein one by one and found best drug with best docking score affinity (kcal/mol) (HU et al., 2020).

**Molecular Dynamics (Energy Minimization/Simulation):** Prepared Protein & best ligand complex gro files and topology – Solvation of complex – added ions on

topology - energy minimized - NVT equilibrated - NPT equilibrated - production of molecular dynamics - run a

10-ns MD simulation and found lesser H-Bond distance with energy minimized complex structure.

against target protein				
Drug Name	Database ID	Database ID Database Name		
Indinavir	Conformer3D_CID_5362440	PubChem	-9	
Carfilzomib	4qw5_GA_3BV	RCSB-PDB	-9.3	
Ritonavir	3tne_C_RIT	RCSB-PDB	-9.2	
Remdesivir	Conformer3D_CID_121304016	PubChem	-9	
Darunavir	Conformer3D_CID_213039	PubChem	-8.1	
Tipranavir	Conformer3D_CID_54682461	PubChem	-8.8	
Fosamprenavir	Conformer3D_CID_131536	PubChem	-8.1	
Enzaplatovir	Conformer3D_CID_58406357	PubChem	-7.2	
Presatovir	Conformer3D_CID_58029842	PubChem	-8.5	
Abacavir	Conformer3D_CID_441300	PubChem -7.3		
Elvitegravir	Conformer3D_CID_5277135	PubChem -7.5		
Maribavir	Conformer3D_CID_471161	PubChem	-7.2	
Raltegravir	Conformer3D_CID_54671008	PubChem	-8.5	
Montelukast	Conformer3D_CID_5281040	PubChem	-9	
Deoxyrhapontin	Conformer3D_CID_5316606	PubChem	-9.2	
Polydatin	Conformer3D_CID_5281718	PubChem	-9	
Chalcone	Conformer3D_CID_637760	PubChem	-7	
Disulfıram	Conformer3D_CID_3117	PubChem	-4.7	
Carmofur	Conformer3D_CID_2577	PubChem	-6.1	
Shikonin	Conformer3D_CID_479503	PubChem	-8.4	
Ebselen	5040_E_9JT	RCSB-PDB -6.6		
Tideglusib	Conformer3D_CID_11313622	PubChem	-7.7	
Px12	Conformer3D_CID_219104	PubChem	-4.5	
Tdzd-8	Conformer3D_CID_4124851	PubChem	-5.8	
Cinanserin	Conformer3D_CID_5475158	PubChem	-8.4	

Table 1. All other drugs, their databases id, databases name and their docking sc

Figure 10: Energy minimized by simulation with gromacs software of protein-best ligand complex and checked the compatibility



Figure 10: Energy minimization graph by simulation with gromacs software of protein-best ligand complex and checked the compatibility



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Thus, the results obtained depicts that the drug candidate namely Carfilzomib have the potential to inhibit or slow down the activity of 7LOP ("South Africa" (B.1.351) and the "Brazil" (P1) variants) of new Indian variant (comes from Brazil and South Africa) (Huang et al., 2020 LI et al., 2020).

# CONCLUSION

Vaccines are urgently needed to control the coronavirus disease 2019 (COVID-19) pandemic and to help the return to pre-pandemic normalcy. A great many vaccine candidates are being developed, several of which have completed late-stage clinical trials and are reporting positive results. In this research work, we found by following the techniques of drug designing and molecular dynamics mentioned above that a drug named Carfilzomib (used in top 20 drugs in China against Covid-19) that can be docked against the 7LOP ("South Africa" (B.1.351) and the "Brazil" (P1) variants) of new Indian variant (comes from Brazil and South Africa) and at least cease the activity so that its action of spreading infection can be prevented.

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# **Identification of Bird Species Using Yolact Classifier**

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### ABSTRACT

Capturing a perfect shot for an ornithologist is a challenging task when a bird is distant or the image captured is blurred or not recognizable due to motion, geographical, or weather phenomenon. Researchers from MIT have developed a novel semantic segmentation model based on public segmentation benchmarks achieving a state-of-art performance on datasets being efficient and accurate compared to other pre-existing models. In this paper, we have proposed a novel segmentation model based on the YOLACT classifier for real time instant segmentation of bird species and classifying them according to their class. This model overcomes the development and classification challenges faced using other preexisting classification models. The model is trained using a Caltech-UCSD dataset containing more than 11,788 images classified under 200 species categories. The model creates pseudo masks at a rate of 34 fps from features extracted and predicts the class of the species combining all the pseudo masks and comparing the features from the train data.

**KEY WORDS:** BIRD CLASSIFICATION, DEEP LEARNING, YOLACT CLASSIFIER.

# **INTRODUCTION**

Growing species of birds, many times can confuse to specify which class it belongs to. An ornithologist should be aware of the physical and geographical properties of the birds to recognize, but as there are thousands of species one may find it difficult to recognize it in different environments. To deal with these problems there are already many feature extraction and classification architectures like ResNet, YOLO, Inception, etc, they have several drawbacks. While taking pictures of the bird it should be stationary and also the weather should be suitable for example hail, sleet, fog, snow, and rain can give blur and hazy pictures as well as when the bird is not stable and is flying it makes a challenging task to capture a perfect shot for the specification of the bird.

To capture a perfect shot there is a need for a pre-trained architecture, where the focus is much more accurate than the others and it should capture the various colors and their variations in beak, eyes, feathers clause, etc.



The problems of previously architectures take a lot of time to be trained and may have some issues with the specifications identification. YOLACT is a classifier consisting of 101 ResNet layers that are responsible for perfect object detection. The higher the epoch more the accuracy but if the training times longs too much it may defect the model. YOLACT consists of strong focus, less training time, and higher accuracy (Bolya et al., 2019).

Semantic segmentation of LIDAR achieves a performance above benchmark that is significantly faster and more efficient than existing methods for semantic analysis of bird species. A group of researchers has developed a new instance segmentation method that works in real-time. Identifying the bird species is a complicated task that often results in ambiguous labels sometimes even professional bird watchers fail to identify the bird in the image. This results in pushing the limits of the visual ability of humans and computers and is a difficult problem (Bolya et al., 2020).

Although different bird species have the same parts they dramatically differ in shape, size, and appearance. Due to extreme variation in pose, background, and variation in lighting intraclass variance is high. Bird watching is an art of studying, observing, and researching birds. Birdwatchers are those who enjoy observing birds and are passionate about it and others involved in scientific study and research of birds are termed as ornithologists. Bird-



identification should be accurate and is an important aspect of bird watching. In India, not many software are available for the identification of bird species thus making the identification process tough for the birdwatchers. Feature extraction obtained from an image with Transfer learning and pre-trained algorithms.

The Mask R-CNN algorithm builds on the previous Faster R - CNN, enabling the network to not only performs object detection but pixel-wise instance segmentation as well. Unlike polygonal segmentation devised specifically to detect a defined object of interest, full semantic segmentation provides a complete understanding of every pixel of the scene in the image. By applying an instance segmentation method and geometry projection of the LIDAR points in world coordinates we can generate the semantic segmentation of each object in terms of LIDAR points. Object instance segmentation in 3D point clouds is formulated by considering all the input LIDAR points X-1 from Y-1 to Geo points. The semantic segmentation of each object is created by applying a combination of two methods: semantic and non-semantic segmentation. In the case of the image scan, we formulate the semantics of objects in terms of their position in the scene, taking into account the position of LiDAR points and their distance from each other and other objects.

Literature Survey: Automated model identification of bird species has been developed by the researchers from their audio segments. Using the signal process and machine learning techniques they tend to resolve the bird's species identification problem. Initially, audio features are extracted from the audio fragments then according to a traditional machine learning scenario, where labeled information of earlier identified bird songs are used to style a choice procedure that's wont to predict the species of a new bird song the problem is Experiments are performed in a dataset of recorded songs of bird species which emerge in a specific region. The experiments are results compared based on the performance obtained in different scenarios, enclosing the complete audio signals, as recorded in the field, and short audio segments (pulses) acquired from the signals by a split procedure. The impact of the number of classes (bird species) in the identification accuracy is evaluated. While on the contrary, most approaches apply within reach to neighbor matching or decision trees using extracted templates for each bird species, our attracts upon recent advances within the domain of deep learning strategies and from speech recognition, on the largest publicly available dataset we train a 3D-CNN.

Researchers have used a 3D-CNN with one dense layer and five convolution layer. Every convolution layer firstly uses a rectify activation function followed by a max-pooling layer. The signal including bird songs or calls were audible and a noise part where no bird is calling or singing. It includes background noise. Spectrogram (Short Time Fourier Transform) of both parts is computed and splits each spectrogram into two equally sized chunks. Around 3 seconds each chunk can be seen as the spectrogram. As a special testing sample for our neural network, we can use every chunk from the signal part.

However, a large number of object categories and occlusion from nearby objects in complex environments pose great challenges in urban Coupling instances and semantic segmentation. iMerit enrichment teams identify the pixels in images as belonging to a class and identify what instances of that class they belong to. Instance segmentation models are a little more complicated to evaluate whereas semantic segmentation models output a single segmentation mask instance segmentation models produce a collection of local segmentation masks describing each object detected in the image. The way YOLACT addresses the problem of instance segmentation is by breaking the task into two smaller tasks that run in parallel: generating a dictionary of prototype masks. The function of this model is to map the input LiDAR to a space that reflects the objects in the scene like semantic segmentation or object detection networks. LiDAR points within the ground truth 3D bounding box are utilized as the supervising signal for 3D instance segmentation to filter out background points, the point cloud data is segmented to determine the class of objects using the points network (Tang et al., 2017).

Evidence theory adopts a formalism that can effectively counter the incoherence of multiple segmentation pieces: instance segmentations that give each example of a particular object in the image a unique label. Depending on the boundary field used, semantic segmentation can distinguish between individual instances of an object or only regions with more meaningful segmentation. The network prints a list of all instances of an object in the image with the same label and label for each instance of that object.Mask (RCNN 9.0) has taken over the instance, but is integrated differently than the Mask R -CNN algorithm, which builds on the previous Faster - R CNN, to enable the network not only a more efficient and accurate image recognition but also a semantic task. While polygonal segmentation is specifically designed to recognize the defined objects, full semantic segmentation provides a complete understanding of each pixel in the scene of the image. In the case of the image scan, the segmentation mask predicted by DCNN is projected to infer the position of each object in an image, such as a bird, tree, or object with a name (Catherine et al., 2011).

The iMerit Enhancement Team identified each pixel in the image as belonging to a class and identified the instance of the class to which it belongs. The instance segmentation model is a bit more complicated, as it needs to be evaluated and evaluated in real-time, which creates a local segmentation mask that describes all objects discovered in an image. This is a big challenge, but the way YOLACT addresses the issue of instance segmentation is to break the task down into two small tasks that run in parallel: creating a dictionary of prototype masks and predicting a series of linear combinations of coefficients for each instance. First, the 3D LiDAR data is transformed and fed into the instance segmentation model to obtain a predicted instance mask for each class. The function of the model is to assign the input LiDAR to a space that reflects the objects in the scene through semantic segmentation in an object recognition network. These points are used as background points, provided by the three-dimensional model for the 2D suggestion region and the background point for 3D instance segmentation. The class of the object used by the Point segment network is determined by semantic segmentation in the 3D LiDAR data and by a binary classification of the LiDAR points (Choi et al., 2019).

Researchers want to explore how they can use deep learning and deep neural networks (DNN) to solve the problem of image classification in many classes. The data set includes 200 bird species, so there are over 200 different classes of output that we want to predict by training our model. What makes the problem difficult is that the order can vary, includes a very large vocabulary of input symbols, and must be chosen by 12 December 2019. Faced with this problem, transfer learning techniques are generally used to strengthen the capacity of deep neural networks. Important thing that makes deep learning compatible for NLP is the ability to select functions from a large number of different datasets. A text collector is a great example of a project in which we build a deep neural network using natural language processing. We take a text sequence as input, learn its structure, and then summarize it as we do the structure (Hong et al., 2020; Islam et al., 2019).

This is often referred to as a large-scale fine grain, but identifying bird species can be difficult. The proposed system will enable a deep neural network to mimic a pathologist's perception and acquire knowledge related to pathology. This should be possible for medium-level datasets by imitating the deep neural network in the way it is perceived and by acquiring knowledge about pathology. This has proved to be a very difficult task, and it can challenge even the most advanced deep learning techniques, such as neural networks. Sources: 5, 7, 12 The classification of multiple markings is a type of classification in which an object can be divided into more than one class. Ornithology experts carry out bird identification based on classifications proposed by Linnaeus, such as the classification of bird species.

In image classification by transfer learning, one usually takes a layer of the Convolutional Neural Network (CNN) from a pre-trained model and adds a final layer. The output of the feature Extraction Network can then be fed into a classifier of choice, which does not necessarily have to be machine learning to perform the class prediction. If you are interested in how to train your classification or object recognition model, there is a great article about Deep Learning for Computer Vision, which Python calls Deep Learning for Computer Vision. In image classification through transfer learning, the pre-trained network is usually supplemented and used as a feature extraction network, removing the last layers of classifiers and using the extracted feature output as input, Some approaches show excellent results in the transfer of learning outcomes, which means that the image classification that the model generates can be applied to other AI systems. In deep learning, a revolutionary neural network (CNN) or CNN is a type of machine learning in which a model learns to perform classification tasks directly on an image, video, text, or sound. Neural networks such as CNN are deep neural networks that are mainly used for the analysis of visual images. Programming ResNet models is easy because they allow the creation of networks that are often used in many transfer tasks - learning tasks related to image classification, object localization, segmentation, etc.

Convolutional neural network models are developed for image classification, in which the model learns to display two-dimensional input internally through a process called feature learning. For image classification, models of conventional neural networks were developed that learn the internal representations of two-dimensional input through the process of "feature learning." For Bild-Kleinanzeigen, evolution-oriented models of the Neural Network were developed, for example in the form of convolutional, a type of machine learning in which a model learns the internal representations for twodimensional input via the processes known as "feature learning. Transfer learning refers to the process of reusing a large, pre-trained model by recycling the parameters it has learned in a new model with other learning parameters. In the case of image classifieds, this means, for example, using a trained neural network with the same parameters as the original model. Transfer learning can also be applied to other types of machine learning, such as image classification (Jeongjin et al., 2019).

Design Methodology: We have used the Caltech-UCSD Bird detection dataset containing over 11,788 images mostly of North American Birds categorized into 200 bird species. Every image in the dataset is labeled with one bounding box and 312 binary attributes. The classes from the dataset are much imbalanced containing an unequal amount of images. The images are of high resolution ranging from image resolution 800X600 to 4000X6000. The downloaded dataset is then divided into training and testing categories in a ratio of 80:20. The Pre-processing stage is being carried out on the dataset before using the images to train the model. All the images were scaled and re-sized into the same ratio using CV2 libraries. To reduce the noise, harshness, and disturbances in the image, the pixel values are normalized and later used for training the model. The model focuses and extracts features such as color, pattern or shape of a particular part highlighting a particular area. The training dataset contains over 9,430 images and the testing dataset contains over 2,358 images. The model is trained using several features as per the Table 1. such as size, wing\_shape, body\_color, back\_pattern, wing\_color, eye\_color, head\_pattern, bill\_pattern, wing\_shape, etc (Jeongjin et al., 2019).

### Pillai et al.,

**Architectural Overview:** The input images are fed into a fully convolutional neural network backbone. The CNN backbone is a combination of ResNet-101 which is a long 101 layer network combined with a feature pyramid network. ResNet-101 is a long neural network that passes the image through tons of layers. It pulls out the result at a certain point before it's fully processed and then it

passes it into the feature pyramid network which is a simplified processed version of images at different scales. It is difficult to train deep neural networks progressively; the ResNet-101 architecture is capable of extracting features from birds. Low resolution maps are generated via CNN backbone identifying rough locations.

Table 1. Multi-valued bird attributes			
Attribute	Values		
Size	3-5 in, 5-9 in, 9-16 in, 16-32 in, 32-64 in		
Wing_Shape	long-wing, pointed-wing, broad-wing, tapered-wing		
Body_Color	brown, gray, pink, white, green, red, blue		
Back_Pattern	spotted, striped, multi-colored, lined		
Wing_color	Black, buff, gray, white, pink, yellow, brown		
Eye_Color	Black, buff, gray, white, pink, yellow, brown		
Head_Pattern	Malar, stripped, spotted, eyebrow, crapped, unique pattern		
Bill_Pattern	cone, all purpose, hooked, dagger		
Wing_shape	Long, short, tapered, pointed, round, broad		

Figure 1: YOLACT evaluation results on Caltech-UCSD Dataset



Figure 3: YOLACT Architecture for Bird Detection Model

Figure 2: System flow for YOLACT Bird classification model



The prediction head looks over the scales and makes predictions according to the pseudo mask scales. Non Maximum Suppression (NMS) filters the mask scales based on the features extracted and trained dataset to predict the model correctly. Protonet makes the prototype masks and tries to predict the mask then combine those in a way that makes pseudo masks as per the features extracted and compiled using convolutional neural network models and then it combines them to make an intelligent mask decision. The intelligent mask decision is a correct prediction about the species made according to the trained dataset and their characteristics.

**YOLACT Architecture:** YOLACT architecture is a fully CNN model for segmentation at real-time for bird species greater than 30 frames per second that have a state-of-art performance and results above benchmarks using Caltech-UCSD-200 dataset executed on Google Collaboratory using a single Titan XP GPU which is significantly considered to be faster and state-of-theart approaches and architectures. The initial branch of the model uses a fully convolutional neural network to produce pseudo prototype masks of the size of images using several features extracted from the input image. Later, the model adds an extra head to the branch for predicting vector masks from prototype space that represents the instances for bird detection.

Finally, the model linearly and partially combines the work of the first and second branches and constructs a prototype mask that survives non-maximum suppression. After creating a pseudo mask following parallel steps the model carries out the assembly step. For each instance, matrix multiplication and cropping operation is being carried out by a simple linear combination with the predicted bounding boxes. Cropping the instances reduces the network load and suppresses the disturbance factor outside the bounding box but still keeps a look at leakages on other instances of the same class of the bounding box. The instance segmentation divides the architecture into two parts. The first part generates the prototype masks and another part produces mask coefficients as per the instances. The feature pyramid network develops prototype masks that openly benefit from semantic segmentation in advances.

Data Argumentation: The Caltech-UCSD dataset contains bird images that can be fairly categorized according to the size into two types as 800 X 600 pixels and 4000 X 6000 pixels. The size of the image was approximately calculated and pre-processed to 600 X 600 pixels as it is difficult to process images with different several parameters. We applied cropping techniques on the dataset and obtained a total of 11,788 images. To make bird species detection robust, it is very important in the aspects of deep learning to ensure the diversity of data. We augmented all the images from the dataset and randomly selected images for dividing the dataset for training and testing purposes. Initially, we considered the center of a bird image and added it to the center of another image and produced sub-images for the whole dataset. Secondly, all the images were 50% cropped and flipped in vertical and horizontal manner. Similarly, the RGB values and probability were re-adjusted.

## **RESULTS AND DISCUSSION**

We have used Caltech-UCSD-200 dataset for instance segmentation using standard metrics. We have divided the dataset into training and testing categories with a ratio of 80:20. The pre-processing stage is being carried out on the dataset before using the images to train the model. All the images were scaled and re-sized into the same ratio using CV2 libraries. To reduce the noise, harshness, and disturbances in the image, the pixel values are normalized and later used for training the model. The model focuses and extracts features such as color, pattern or shape of a particular part highlighting a particular area. The training dataset contains over 9,430 images and the testing dataset contains over 2,358 images. We have trained the model with a batch size 8 on Google colaboratory with a single Titan XP GPU using ImageNet based pre-trained weights. We have normalized the pre-trained batch and kept unfrozen and haven't added any extra convolutional pooling layer as the batch size used is enough for batch normalization (Pralhad et al., 2019)

Table 2. Prototype Results				
k	АР	FPS	Time	
9	27.2	34.1	31.0	
17	28.3	33.8	31.4	
*33	28.6	33.6	31.8	
65	28.4	32.5	32.7j	
129	28.9	32.3	32.5	
257	28.1	30.0	30.2	

Method	AP	FPS	Time
FCIS w/o Mask Voting	28.9	21.4	106.5
Mask R-CNN (550 x 550)	33.6	10.7	74.8
FC-Mask	14.4	26.7	39.6
YOLACT-550 (Ours)	30.1	34.0	31.2

The model carries out up-to 1, 50,000 iterations and divides the training rate at 50,000 and 1, 00,000 for Pascal dataset and for bigger objects multiplied the anchor scale with 4/3. Training the model is a time consuming process depending on the GPU configuration. We have compared the performance of YOLACT model with other pre-existing architectures on MS COCO dataset setting up benchmarks and using state-of-the-art methods considering the main parameters as speed, train time and test time. As compared to the fully convolutional instance aware semantic segmentation and region based convolutional neural network, the YOLACT architecture has comparatively less noise and follows a boundary (Ragib et al., 2020).

The map with 5.6 worse overall intersection over the union threshold at 95% threshold our model has a 1.6 AP with R-CNN. This indicates that re-polling results decrease the mask quality. As compared to the R-CNN model architecture, our model produces more temporal stability on visual masks by not applying temporal smoothing even when objects are stationary. As our masks produced by our model are of higher quality and have good stability as our model is a one stage shot detection model. Two stage shot detector methods are mostly dependent on features extracted at the initial stage. The prototypes are not much affected if the model predicts boxes across different frames giving more stable masks (Nadimpalli et al., 2006).

The speeds are calculated based on the experimental results on Titan XP GPU. YOLACT offers the fastest instance segmentation method on Caltech-UCSD-200 at a speed of 4.0x segmentation performance based on competitive instances as compared to other performances of existing architectures. The YOLACT architecture performs 50% more accurately than the R-CNN model with a threshold of 9.6 arithmetic progressions and

79% intersection over union threshold. There exists dissimilarity for instance between the results of Caltech-UCSD -200 with arithmetic progressive values as 7.5 and

7.6 respectively. The model clearly specifies that it has been built for speed. Hence we compare the no test time argumentation results with our model.

Table 4. Comparative analysis of different object detection architecture and their Intersection over Union (IoU) values

intersection over onion (100) values				
Architecture	Feature Extractor	Interference Time	AP Intersection over Intersection over	
YOLACT	ResNet-101	97	96.54	81.12
	ResNet-50	83	95.48	80.36
Faster R-CNN	Inception V2	89	95.65	80.45
	ResNet-50	76	92.45	74.87
YOLO V2	DarkNet-19	24	86.12	67.96
	Tiny YOLO	41	92.32	55.85
YOLO V3	MobileNet-V2	35	91.85	59.52
	DarkNet-53	22	89.25	57.41

From the accuracy results, it can be evaluated that the YOLACT model with ResNet-101 as a feature extractor has a good mean error value of 4.2% which is higher than the values for YOLACT ResNet-50 module and other subsequent values. The IoU can be elaborated as the ratio between the union and intersection of the detected box and ground truth box. These values are usually used to determine the precision and accuracy of the model architecture as the bird is identified and classified into the correct class or not (Galvez et al., 2018; Lee et al., 2019). The values of AP depend on IoU values and change accordingly. Basically, The values for AP are calculated with Intersection over union threshold over 0.3, or by changing the threshold values from 0.3 to 0.5. The Table IV shows results for comparative analysis between YOLACT and other preexisting models for their intersection over Union (IoU) values and concludes that YOLACT model has the highest AP values among all other pre-existing models. On the basis of performance results for bird species detection and identification using Caltech-UCSD-200 dataset can be considered fairly satisfactory for AP values ranging from 85% to 97% during testing performed on different models (Zhiqiang & Jun 2017).

# CONCLUSION

In this paper, the model is developed to classify and identify bird species according to their feature characteristics extracted using YOLACT classifier. As per the results obtained the YOLACT architecture has best performance and accuracy compared to other architectures which balances the precision between training and accuracy values. The model extracts the features from the visual images as per the trained data and makes pseudo masks for the visuals plotting them on scales. The model uses the ResNet-101 backbone architecture combined with a feature pyramid network for extracting the bird features. The architectural model combines the pseudo masks and scales produced and predict the bird species. These areas can be considered to have more scope for real time classification using YOLACT according to the accuracy and prediction rate and its capability to produce good masks and speed. This model overcomes the development and classification challenges faced using other pre-existing classification models. The model is trained using a Caltech-UCSD dataset containing more than 11,788 images classified under 200 species categories. The model creates pseudo masks at a rate of 34 fps from features extracted and predicts the class of the species combining all the pseudo masks and comparing the features from the trained data.

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# **Effectiveness of Structured Teaching Program on Knowledge and Practice Regarding MEOWS Chart Among Staff Nurses Working in Maternity Unit**

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### ABSTRACT

Background:The high mother'sillness constitutes one of major concern worldwide.Mothers mortality has been like"the tip of the iceberg" while its base co-relates to the overall morbidity which occurs in mother due to health problems associated with pregnancy and postpartum.For every woman who dies from pregnancy-related causes, another 20-30 mother suffer the effects of acute or chronic morbidity causing permanent squeals.Modified Early Warning Score (MEOWS) was introduced to obstetric units in the UK to decrease mother's mortality by enhancing early diagnosis of clinical signs of collapse in mother who were evolving critical illnesses. Thevariables of vital signs for the MEOWS chartaccounts for this.The use of the MEOWS is a tool to assist the early identification and management of the diagnosis mothers. Methodology:In this study quantitative research approach with one-group pretest-posttest design is used. 50 staff nurses were selected by Non-probability convenience sampling technique Results:The findings of the study disclosed that the mean post test knowledge score was significantly higher than their meanpretest knowledges core. Thecalculated,,t"value (t=12.565, p<0.001) was greater than the table value at 0.001 levels. Hence it is concluded that there was a highly significant increase in knowledge of labour room staff nurses through structured teaching programme regarding MEOWS chart. Therefore the formulated hypothesis (H1) was accepted at 0.05 levels of significance.

**KEY WORDS:** KNOWLEDGE , PRACTICE, MEOWS, STAFF NURSES.

### **INTRODUCTION**

Mothers Early Obstetric Warning System (MEOWS) chart approvefrom Confidential Enquiry into Mothers and Child Healthreport is based on the principle that malformation in physiological variables introducecritical illness. The 'track and trigger' of physiological variables on this chart can helpin recognition of mother's morbidity at an early stage, ultimately hesitantthe cascade of severe mothers morbidity and mortality. In the UK a MEOWS chart has been used in obstetric clients to track mothers physiological variables, and to helpearly recognition and therapy of clinical retrogressionafter recommendation by



the Confidential Enquiry into Mothers and Child Health report (Carle et al., 2013).

The development of early warning systems from simple bedside monitoring charts appear from the knowledge that physiological malformationintroduces critical illness. A variety of early warning systems, developed in the non-obstetric client population, assign weighted values to a number of physiological variables according to their degree of digressionfrom the normal. When the measurement reaches defined threshold, a mandatory action is started to expedite further assessment of the client by a suitably qualified clinician. It is thought that early intervention will result in improved client outcome. MEOWS are a score attributed to these variables and documented on the MEOWS monitoring chart. The further away from 'normal' the individual's monitoring are the higher will be the score. A score  $\geq$  3 triggers the use of a 'call out cascade' giving specific instructions regarding level of monitoring, referral for advice, review, and instant actions to be considered (Cullinane et al., 2005).



Need Of The Study: MEOWS chart emerged as a useful bedside screening tool for prediction of mother's deathand should be used routinely in every obstetric unit. Strict monitoring and proof of all the vital variables should be fundamental part of any client's assessment to pick up acute illness at very early stage and to make a difference in final outcome. The use of the MEOWS does not demand critical care or define therapy but is a tool to help the early recognition and management of the collapse woman. However, no tool can replace the actual physical examination of a woman and clinical assessment of her condition. Often there are clinical signs that introduce collapse. In the last two 'Saving Mothers' Lives' reports substandard care was identified where signs and symptoms were not realize and acted upon. Both reports recommended that a national Obstetric Early Warning Scoring system should be introduced and used for all obstetric mother, including those being cared for outside the obstetric setting (Dellinger et al., 2012).

In the study of the CEMACH recommended modified early obstetric warning system (MEOWS) they prospectively reviewed 676 consecutive obstetric admissions, looking at their completed MEOWS charts for triggers and their notes for evidence of morbidity. Two hundred clients (30%) triggered and 86 clients (13%) had morbidity according to criteria, including hemorrhage (43%), hypertensive disease of pregnancy (31%) and suspected infection (20%). The MEOWS was 89% sensitive, 79% specific, with a positive predictive value 39% and a negative predictive value of 98%. There were no admissions to the intensive care unit, cardio respiratory arrests or deaths during the study period. This study suggests that MEOWS is a useful bedside tool for predicting morbidity. Adjustment of the trigger variables may improve positive predictive value.

In South Africa, Modified Early Warning Scoring (MEWS) chart was develop for general wards and the aim of the study was to validate and construct the content of amonitoring chart for nurses incorporating a modified early warning scoring (MEWS) system for physiological variablesin bedside. Result was Five consensus rounds achieved ≥70% agreement for cut points in five of seven physiological variables respiratory and heart rates, systolic BP, temperature and urine output. For conscious level and oxygen saturation a relaxed rule of <70% agreement was applied. A reporting algorithm was established and incorporated in the MEWS chart representing decision rules determining the degree of urgency. Variables and cut points differed from those in MEWS used in developed countries. Conclusionof the study was that MEWS for developing countries should record at least seven variables. Experts from developing countries are best placed to specify cut points in physiological variables. Further research is needed to explore the ability of the MEWS chart to identify physiological and clinical retrogration.

### **Objectives:**

To assess the existing knowledge regarding MEOWS 1 chart among Staff nurses.

- To assess the practice regarding MEOWS chart 2. among Staff nurses.
- To assess the efficacy of structured teaching program 3. on knowledge and practice regarding MEOWS chart among Staff nurses.
- To associate the knowledgeand practice with selected 4. demographic variables among Staff nurses.

### MATERIAL AND METHODS

In this study quantitative research approach with onegroup pretest-posttest design is used. 50 staff nurses were selected by Non-probability convenience sampling technique.

#### **Inclusion Criteria**

- Staff nurses who are working in labor room. .
- Staff nurses who are willing to participate.
- **Exclusive** Criteria
- Staff nurseswho have attended classes regarding . MEOWS chart.

Data Collection Method: The investigator obtained approval from the concerned authority of AVBR Hospital. Informed consent is taken from the participants. Sampling method is convenience sampling. Data is collected from the subjects using demographic variables and structured questionnaire and implementing the structured teaching program. The subject is requested to complete the tool after assuring confidentiality of the information. Consent is obtained from the subject. Pretest on knowledge given and practice was observed. After the pretest, Staff nurses were given a teaching by using planned teaching program. After 7 days of time the participants were given posttest with the same questionnaire on knowledge and monitoring checklist on practice (Dresang et al., 2010).

### **RESULTS AND DISCUSSION**

#### Part I: Description Of Baseline Variables. N=30



Figure 1: Distribution of subjects according to their age in years

Figure 1 shows that greater percentages 86.66% of subjects were in the age group of <25 years, whereas 13.33% were between 25-30 years of age. N=30

Figure 2 shows that 36.66% of the respondents were B.Sc nursing, and 60% of the respondents were GNM and 3.33% of the respondent was PBB.sc. N=30



Figure 3 shows that 46.66% had <1year experience, 43.33% had 1-3 years of experience and 6.66% had 3-5 years of experience in labourroom.



Part Ii: Analysis Of Knowledge And Practice Score Regarding Meows Chart Among Staff Nurses Section A: Analysis of pretest and posttest knowledge percentage score regarding MEOWS chart among staff nurses N=30

The table 4 depicts that in pretest 15 (50%) subjects had poor level of knowledge, 15 (50%) subjects had average level of knowledge and none of the subjects had good level of knowledge, whereas in posttest 20(66.66%) subjects had gained good level of knowledge, 10(33.33%) staffs gained adequate level of knowledge while none had inadequate level of knowledge regarding MEOWS chart (Milne et al., 2009).

### Section B

# Analysis of pretest and posttest practice percentage score regarding MEOWS chart among staff nurses N=30

The table 5 depicts that in pretest none of the subjects had poor level of practice, 30 (100%) subjects had average level of practice and none of the subjects had good level of practice, whereas in posttest 28(93.33%) subjects had gained good level of practice, 2(6.66%) staffs gained average level of practice while none had poor level of practice regarding MEOWS chart (Jennings 2012).

# Part III: Evaluation of the efficacy of structured teaching programme regarding MEOWS chart.

The table 6 reveals that pretest mean score was 18.60, posttest mean score was 29.40 with a mean difference of -10.80 and itsSD of 0.859. The paired,,t" test value is 12.565 at df=29 at <0.001 level of significance. Hence it is concluded that there is a highly significant increase in knowledge regarding MEOWS chart among staff nurses through structured teaching programme. Therefore the formulated hypothesis (H1) is accepted at 0.001 levels of significance (Lee 2014; Lewis 2007).

The table 7 shows that pretest mean score was 22.07, posttest mean score was26.93 with a mean difference of -4.86 and its SD of 1.907. The paired test value is 13.978 at df=29 significant at <0.001 levels. . Hence it is concluded that there is a highly significant increase in practice of MEOWS chart among staff nurses through structured teaching programme..Therefore the formulated hypothesis (H2) is accepted at 0.001 levels of significance (Marchant et al., 2002).

The high mothers morbidity and mortality rates constitute one of major concern worldwide. This rate can be reduced through the intervention of MEOWS chart. As it is routine procedure performed by the labour room nursing staffs, it is very necessary to know about the procedure. The study has been carry out to evaluate the efficacyof a structured teaching programme on knowledge and practice regarding MEOWS chart among staff nurses in selected Hospitals atWardha. In order to achieve the objectives of the study, a one group pre test-post test quasi- experimental design was adopted. The data was collected from 30 labour room staff nurses before and after administration of structured teachingprogramme.

**Part I: Description of baseline variables:** Distribution of study subjects according to their age showed that majority 86.66% of the subjects were in the age group of <25 years. The distribution of subjects according to the educational qualification revealed that among the 30 subjects about 60% were GNM qualified, and (36.66%) were B.sc nursing qualified. Among the 30 subjects majority 46.66% of subjects were having <1 year experience, 46.66% were having 1-3 years of experience and 6.66% were having 3-5 years of experience.

Table 1. Analysis of pre test and post test knowledge percentage score regarding MEOWS chart among staff nurses.

Level of knowledge (score)	Number of staffnurses				
	Pretest		Postt	est	
	Frequency	Percentage	Frequency	percentage	
< 50% (Poor)	15	50	0	0	
51-74% (Average)	15	50	10	33.33	
75% and above (Good)	0	0	20	66.66	

Table 2. Analysis of pre test and post test practice percentage score regarding MEOWS chart among staff nurses

Level of practice (score)	Number of staffnurses				
	Pretest		Posttest		
	Frequency	Percentage	Frequency	percentage	
< 50% (Poor)	0	0	0	0	
51-74% (Average)	30	100	2	6.66	
75% and above (Good)	0	0	28	93.33	

Table 3. Comparison of pre test and post test knowledge score among the subjects.

Knowledge score	Mean score	Mean difference	SD of Mean difference	Paired "t" test value	df	Level of significance
Pretest	18.60					0.000
Posttest	29.40	-10.80	0.859	12.565	29	Sig

Table 4. Comparison of pre test and post test practice score among the subjects.

Practice score	Mean score	Mean difference	SD of Mean difference	Paired "t" test value	df	Level of significance
Pretest	22.07					0.000
Posttest	26.93	-4.86	1.907	13.978	29	Sig

**Part II: Analysis of pretest and posttest knowledge and practice score of labor room staff nurses:** In pretest 15 (50%) subjects had poor level (< 50%) of knowledge, 15 (50%) subjects had average level (51-74%) of knowledge and none of the subjects had good level (75% and above) of knowledge, whereas in posttest 20(66.66%) subjects had gained good level (75% and above) of knowledge, 10(33.33%) subjects gained adequate level (51-74%) of knowledge while none had inadequate level (< 50%) of knowledge regarding MEOWS chart. In pretest none of the subjects had poor level (< 50%) of practice, 30 (100%) subjects had average level (51-74%) of practice and none of the subjects had good level (75% and above) of practice, whereas in posttest 28(93.33%) subjects had gained good level (75% and above) of practice, 2(6.66%)

subjects gained average level (51-74%) of practice while none had poor level (< 50%) of practice regarding MEOWS chart.

# Part III: Evaluation of the efficacy of structured teaching programme regarding MEOWS chart:

**H1:** The mean post-test knowledge score of staff nurses who have received structured teaching programme will be significantly higher than their mean pre test knowledge score at 0.05 level. The findings of this study revealed that the mean post test knowledge score significantly higher than their mean pretest knowledge score.Thecalculated,,t"value (t=12.565, p<0.001) was greater than the table value at 0.001 levels. Hence it is

concluded that there was a highly significant increase in knowledge of labourroom staff nurses through structured teaching programme regarding MEOWS chart. (Table 6). Therefore the formulated hypothesis (H1) was accepted at 0.05 levels of significance. The above finding was supported by the study conducted at college of nursing, Indore. In thisstudy the "t"test computed knowledge wasshowed high significance("t"=9.58,P<0.05).

H2: The mean post-test practice score of staff nurses who have received structured teaching programme will be significantly higher than their mean pre test practice score at 0.05level. The findings of this study also revealed that the mean post test practice score wassignificantlyhigher than their mean pre testpractice score. The calculated,,t"value (t=13.978, p<0.001) was greater than the table value at 0.001 levels. Hence it is concluded that there was a highly significant increase in practice of labour room staff nurses through structured teaching programme regarding MEOWS chart. Therefore, the formulated hypothesis (H2) is accepted at 0.05 levels of significance. The above results were supported by the study conducted by school of nursing and midwifery, London, U.K, on an evaluation of teaching intervention to improve the practice of MEOWS chart in labour room. After teaching programme significant improvements were seen in both posttest knowledge and practice. 4 week later nurses adhered and sustained the taught practices. (29) The finding of this study connects with finding of another study conducted in college of nursing, Indore to assess the efficacy of planned teaching programme regarding MEOWS chart. The result showed that "t' test computed practice was ( $_{,t}$  = 17.58, P<0.05) showed high significance.

Hence using a planned structured teaching programme was highly effective in improving the knowledge and practice regarding MEOWS chart among labourroom staff nurses.

### Recommendations

- 1. Similar study may be undertaken with a larger sample to have a better generalization.
- 2. The same study can be conducted with an experimental research approach having a controlgroup.

# CONCLUSION

Childbirth is a major life event and the physiological and psychological implications of serious illness on the woman and her family cannot be dismissed. While midwives strive to encourage and support normality for expectingand postnatal mother, equal importance must be assigned to identifying and acting on physiological changes occurring in mother, which may indicate illness that without timely intervention can lead to significant mothers morbidity. A modified early obstetric warning tool provides a useful help to clinical judgment during the assessment process and a structure to follow which should ensure timely and appropriate intervention when required. A locally devised tool can be modelled on the NEWS. The space available must be utilized effectively and enable clear and legible proof.

The MEOWS booklet in AVBR hospital is commenced at 6 weekspregnancy; however, it is possible that a modified MEOWS is applicable for all hospital admissions from pregnancy booking. Some physiological adaptations will be apparent early in pregnancy and may therefore warrant the use of a modified obstetric tool on admission to gynaecology wards. There may be a place for adapting the principles of early warning scoring for use by community midwives. Childbearing mother may develop illness outside hospital and a structure for assessment, intervention, escalation and appropriate referral is equally relevant in the community setting. A validated national obstetric early warning tool would enable consistency and a necessary uniform approach to the assessment and management of potentially collapse childbearing mother.

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# Antimicrobial and Antioxidant Properties of Common Indian Medicinal Plants

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### ABSTRACT

The Vedas point out Indian medicinal herbs as having healing properties. Since time immemorial, the humans of this vicinity have utilized them to deal with endemic illnesses along with malaria, in addition to pores and skin illnesses, not unusual place pains, and fevers, and they're referred to as to as "jadibuti." The development of recent lines of contamination-inflicting difficulty depends specialists, in addition to the flip of activities and unfold of antimicrobial check, are of superb situation to the general prosperity neighborhood. Commonly used remedial vegetation of our community be an incredible wellspring of drugs to combat down this issue. The antibacterial effect of a few selected Indian restorative vegetation became assessed on a few bacterial lines. Therapeutic vegetation has an inborn capacity to limitation pathogenic natural entities. This assignment makes a specialty of 5 plant species which might be not unusual place withinside the Eastern vicinity of the world, mainly the Indian subcontinent. Although large research has been executed through manner of way of several scientists, now not a bargain is thought about the antimicrobial and antioxidant houses of moringa, gotu kola, adusa, agathi and golden shower. Hence, this test has a bent to evaluate the identical for the cause of future reference withinside the region of producing broad-spectrum medicinal drugs from vegetation. Agar well-diffusion method, Total Phenolic Content, Total Flavonoid Content, Ferric Reducing Antioxidant Power, and DPPH have been used to check leaf extracts of the 5 vegetation in ethanol for his or her hobby towards 3 bacterial species and antioxidant hobby at 200mg/ml concentrations.

KEY WORDS: ANTIMICROBIAL, ANTIOXIDANT, AGAR-WELL DIFFUSION METHOD, DPPH AND FRAP.

# **INTRODUCTION**

During the numerous apparently all the time there was a developing sales withinside the exam of widespread flora and their remedial really well worth in one-of-akind bits of the world. The remedial houses of flora were investigated in view in their strong pharmacological activities, low harmfulness and financial practicality. This rebuilding of hobby in plant derived medicines is prevalently a end result of the contemporary unpreventable conviction that inexperienced prescription is secured and greater reliable than the acute fabricated drug, an intensive a part of which can also additionally have opposed outcomes. (Chew, 2012).



Standard scientific remedy makes use of flowers and those can also additionally helper metabolites and fundamental oils that may be used to deal with illnesses. It is on this way vital to research the antimicrobial homes of those ethnomedicinal flowers which might be constantly now no longer pharmacologically idea of and clinically attempted. In the Philippines, its plant networks are special a lot that limitless concentrates from community useful flowers may be used as professionals in opposition to microbial microorganisms. Around two decades earlier, most effective a chunk of a part of this plant collection had long gone via drug screening. (Selvamohan 2012).

Restorative plants have been referred to for centuries and are considered as a rich wellspring of drug specialists for the counteraction and treatment of sicknesses and afflictions. As indicated by WHO, over 80% of the populace inside agricultural nations utilizes natural and other customary medications to treat their regular afflictions. (WHO,1998) Nature has bestowed Oman with an sizable wealth of medicinal flora which can be extensively utilized in conventional machine of medicine.



(Ghazanfar 1993) Moringa oleifera normally called pony radish or drumstick tree in English, has an area with own circle of relatives Moringaceae. It is a touch predicted tree, that's nearby to South Asia, Africa and Arabia and is applied as traditional remedy in several tropical and subtropical nations.

It is a deciduous tree growing quick even in helpless soils, all round adjusted to dry seasons and geared up to attain up to fifteen m in tallness. It is one of the 14 varieties of kind Moringa, that's nearby to India, Africa, Arabia, Southeast Asia, the Pacific and Caribbean islands, and South America. The blossoms and the natural merchandise display up double each year, and seeds or cuttings are applied to engender the tree. Practically each one of the portions of M. oleifera are applied for special ailments withinside the local remedy of South Asia,counting the remedy of diabetes, hypertension, infection and impossible to resist ailments. Its leaves, gadgets and blossoms are for the maximum component gobbled for sustenance (Alhakmani 2013).

Flavonoids are a gathering of polyphenolic compounds with known properties which incorporate free extremist rummaging, hindrance of hydrolytic oxidative catalysts and calming activity. In the current investigation, the relative lipid peroxidation restraint movement was done with chosen therapeutic plants; Golden Shower (*Cassia fistula*), Adusa (*Adhatoda vasica*), Agathi (*Sesbania grandiflora*), Gotu Kola (Centella asiatica), and (*Moringa oleifera*). (Kumarl 2008) *Moringa oleifera* Lam. (*M. oleifera*), commonly known as horse-radish or drumstick tree in English, belongs to family Moringaceae. It is a small sized tree, which is native to South Asia, Africa and Arabia and is used as traditional medicine in many tropical and subtropical countries. (Moyo B,2011).

*Cassia fistula* having a place with Leguminosae family has been chosen. In the Indian writing, this plant has been depicted to be valuable against skin sicknesses, liver inconveniences, tuberculosis organs and its utilization into the therapy of hematemesis, pruritus, leukoderma, and diabetes has been recommended. (Alam 1990, Asolkar 1992) Cassia fistula plant organs are known to be a significant wellspring of auxiliary metabolites, Indian individuals are utilizing the leaves to treat aggravation; Cassia fistula plant organs are known to be a significant wellspring of optional metabolites, prominently phenolic compounds. (Morimoto 1988) Adhatoda vasica and Sesbania grandiflora Pers are the two significant restorative plants local to India and were utilized in Indian medication since old occasions. a. It is utilized as expectorant, antispasmodic, bronchodilator, hostile to histaminic, uterine energizer, utilized in the treatment of feminine issues, eye contaminations, skin infections, sore throat, draining loose bowels and has narcotic properties.

(Claeson 2000) *Sesbania grandiflora* Pers (own circle of relatives Fabaceae) an decorative tree, is a peoples treatment for bruises, catarrh, dysentery, fevers, headaches, rheumatism, small pox and stomatitis.

According to Avurveda culmination are used for the remedy of anemia, bronchitis and tumors. (Kirtikar 1995) Centella asiatica Urban (Umbelliferae/Apiaceae family) is commonly known as Mandukparni. It is an enduring crawling spice, widely advanced as a vegetable or zest in India. Since historical times, it's been used as a reminiscence enhancing, electricity promoting, wound healing, immune booster, anti-anxiety, ant epilepsy and anti-strain substance. (Kartni1998, Chen 2003) Centella asiatica has been clinically applied in intellectually hindered kids and moreover in remedy of anxiety intellectual issues. This plant is also determined to enhance short-term reminiscence and learning. Centella asiatica has moreover proven a shielding effect in opposition to oxidative damage added approximately through lead acetic acid derivation actuated neurotoxicity. (Meena 2012).

**Review of Literature:** Sometime before humanity found the presence of microorganisms, the possibility that specific plants had recuperating potential, surely, that they contained what we would presently portray as antimicrobial and cancer prevention agent standards, was well accepted. Since vestige, man has utilized plants to treat normal irresistible infections and a portion of these conventional drugs are as yet included as a component of the ongoing treatment of different ailments. (Calixto 2005).

Countless therapeutic plants have been perceived as important assets of common antimicrobial mixtures as an elective that can possibly be compelling in the treatment of these hazardous bacterial contaminations. According to the World Health Organization (WHO), medicinal plants would be the best source to obtain a variety of drugs. Sarita (Manandhar 2019) In recent years, secondary plant metabolites (phytochemicals), previously with unknown pharmacological activities, have been extensively investigated as a source of medicinal agents. (Krishnaraju 2005) Thus, it is anticipated that phytochemicals with adequate antibacterial efficacy will be used for the treatment of bacterial infections. (Balandrin 1985).

# MATERIAL AND METHODS



**Materials:** The plants used in this study are in popular demand throughout the nation, and I easily obtained them from the local community gardens in my neighborhood. This name is likewise utilized for *Cassia* 

*fistula*, the brilliant downpour tree. Moringa is filled in home nurseries and as living wall in South Asia and Southeast Asia, where it is normally sold in nearby business sectors. The bark, sap, roots, leaves, seeds and blossoms are utilized in customary medication.

**Agathi:** *Sesbania grandiflora*, generally known as vegetable hummingbird, West Indian pea, agati, or katurai, is a little tree in the class Sesbania in the vegetable family. It has consumable blossoms and leaves generally eaten in the Southeast Asia and South Asia.



Figure 3: Agathi (Sesbania grandiflora)



Figure 4: Gotu Kola (Centella asiatica)



Exploration has analyzed what it may mean for blood lipid profiles and insulin emission.

**Adusa:** Justicia adhatoda, commonly known in English as *Malabar nut, adulsa, adhatoda, vasa, vasaka.* Leaves of justicia adhatoda contains phytochemicals such as alkaloids, tannins, saponins, phenolics and flavonoids. This shrub has a number of traditional medicinal uses in siddha medicine, Ayurvedic, Homeopathy and Unani system of medicine.





Figure 6: Aeromonas hydrophila





The leaf concentrate may repress the development of cutting-edge glycation finished results.

*Centella asiatica*, normally known as Gotu Kola, brahmi, Indian pennywort and Asiatic pennywort, is a herbaceous, lasting plant in the blooming plant family Apiaceae. In customary medication, *Centella asiatica* has been utilized to treat different issues and minor injuries, albeit clinical adequacy and security have not been

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deductively affirmed. Brilliant shower: *Cassia fistula*, generally known as brilliant shower, cleansing cassia, Indian laburnum, or pudding-pipe tree, is a blossoming plant. It is the state blossom of Kerala in India.

**Human pathogenic bacterial species:** Pathogenic strains of gram-positive bacteria *Aeromonas hydrophila*, as well as gram-negative bacteria *Pseudomonas* and *Escherichia coli* were obtained from Helix Biogenesis Laboratory, Noida and stored at 4 degrees C as nutrient broth cultures for further assay for susceptibility towards the medicinal plant extracts on MHA media.





Figure 10: 10gm plant extract dissolved in 10 ml of ethanol



Aeromonas hydrophila is a heterotrophic, Gram-negative, bar formed bacterium chiefly found in regions with a warm environment. This bacterium can be found in new or bitter water. It can make due in vigorous and anaerobic climate and can process materials like gelatin and hemoglobin. *Pseudomonas* is a typical sort of microbes, which can make diseases in the body in specific situations. There are a wide range of kinds of *Pseudomonas* microscopic organisms. A couple of types can cause a disease. *Pseudomonas* microscopic organisms tend to live and raise in water, soil, and sodden regions.

*Escherichia coli* is a kind of microbes that ordinarily lives in your digestive organs. It's likewise found in the gut of certain creatures. Most sorts of *E. coli* are innocuous and even assistance keep your stomach related plot sound. However, a few strains can cause looseness of the bowels in the event that you eat sullied food or drink fouled water.

### Preparation of plant extracts

- 1. Separate the leaves of each plant from its stems (or any other plants parts). Leaves were thoroughly washed with distilled water to remove any traces of dust and dirt present on the plants. Plants were then dried under complete shade.
- 2. Next, leaves were grounded in a standard kitchen grinder and stored in separate sterile glass bottles.
- 3. Next, I weighed out 10g of each plant leaves and incubated them in 50 ml of ethanol at room temperature for a period of 24 hours.
- 4. Plants are filtered using funnel and standard laboratory filter/blotting paper.
- 5. The resulting liquid obtained is kept to dry in sterile petri plates. Methanol vaporizes overnight. However, plants with water solvent require drying in hot air oven.
- 6. When plates are completely dried, scrap off the leftover plants on the surface of the plates with a scalpel or blade, and store in fresh Eppendorf tubes at 4 degrees C temperature.
- 7. The final extracts so obtained are ready to be further assessed for their antibacterial properties by agar well-diffusion method and antioxidant properties by total phenolic content, total flavonoid content, DPPH and FRAP.
- 1. Screening for antimicrobial activity by agar-well diffusion method

Mueller-Hinton Agar (MHA) is the standard media for antimicrobial susceptibility testing (AST) of various clinical isolates (here, medicinal plant extracts). The WHO has accepted and recommended this media for extensive AST due to its following properties:

- It demonstrates good batch-to-batch reproducibility for susceptibility testing.
- It is low in tetracycline and sulfonamide inhibitors.
- It supports the growth of the most non-fastidious bacterial pathogens

MHA agar was prepared by standard protocol adopted from (Jan 2009), and sterilized by autoclaving at 15 lbs

pressure (121 degrees C) for 15 minutes. This was then poured into sterile petri plates (approx. 35 ml per plate), and allowed to solidify. 200 microlitre cultures of each of the 3 bacterial species was poured using a pipette onto separate sterile MHA plates, ethanolic extracts of the plants under study, and uniformly distributed throughout the surface areas of the plates by generalized spreading technique. Wells of diameter 6-8 mm were then punched onto each plate for the 5 plant extracts in use, ethanol extracts of the plants. 150microliter of each plant extract was poured into the wells corresponding to their name on the respective plates, those of., Aeromonas hydrophila, Escherichia coli, as well as Pseudomonas. These were then incubated at 37 degrees C for a period of 24 hours and observed for their zone of inhibition\*against the respective bacterial strains, thereafter.

### **2. Estimation of phenolic content** Aim: Total Phenolic Content

**Principle:** Phenolic evaluation measure depends on folin ciocalteu technique. The strategy depends on the exchange of electrons in antacid medium from phenolic compound to frame a blue chromophore established by phosphotungstic complex where the greatest assimilation relies upon the centralization of phenolic compound. In the first F.C. test, carbonate cushion is utilized from pH change. Quercetin is utilized as the reference standard compound. (Singleton 1999).

Material required: Gallic acid, 20% NaNO3, 0.5N FCR and distilled waster

### Procedure

- 1. 1ml sample extract added to the tube.
- 2. Quercetin as standard was added.
- 3. 100µl FCR was added.
- 4. Incubate for 10 mins at for temperature
- 5. 2,5 ml NaNO3 was added
- 6. Incubate at room temperature for 30 mins.
- 7. Absorbance measured at 760nm.

### 3. Estimation of flavonoid content

Aim: Total flavonoid content

**Principle:** Determination by aluminum chloride color metric method. Aluminum chloride forms complex with the hydroxide group of flavonoids present in sample. Formation of acid stable complexes with C-4 keto group and either C-5 hydroxide group off flavones and flavanols in addition with aluminum chloride. (Jiao 2000) Aluminum chloride also forms acid labile complexes with ortho di-hydroxide group in the A or B ring of flavonoids for building the calibration curve quercetin is used as a standard material. This complex has the maximum observance at 420 nm.

**Material required:** 10% AlCl3, methanol, quercetin, 1M potassium acetate distilled water.

### Procedure

- 1. Prepare 1mg/ml quercetin stock solution and prepare different concentration from 10µg/ml to 200µg/ml
- 2. Blank consist of all reagent except quercetin.
- 3. 1ml from each sample.
- 4. 3ml methanol was added
- 5. 200µl ALCL3 was added.
- 6. 200µl potassium acetate was added.
- 7. 3ml distilled water was added.
- 8. Incubate at room temp. for 30 mins.
- 9. Absorbance measured at 420nm.

# 4. Estimation of antioxidant activity by DPPH Aim: Determine antioxidant activity.

**Principle:** 2,2-Diphenyle-1-picrylhydrazyl (DPPH) is a stable free radical method is an antioxidant assay based on electron-transfer that produces a violet solution in ethanol. Antioxidant react with DPPH and reduce it to DPPH-H and as consequence the absorbance decrease. DPPH then acted upon an antioxidant it converted into diphenyl picryl hydrazine. This can be identified by the conversion of purple to light yellow color. That means the antioxidant effect is proportional to the disappearance of the DPPH in test samples. (Lee 2007)





**Material required:** Ethanol, 0.1mM DPPH solution (in ethanol), DMSO, distilled water, samples

#### Procedure

1. 2-20µl of plant extract (final vol. 40µl with

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DMSO)

- 2. 2.96µl of DPPH solution (0.1mM)
- 3. Incubate for 20 mins at room temperature.
- 4. Observed absorbance at 517nm

% RSA = Abs (control) – abs (sample)/ Abs (control) X 100

Control: 3ml of DPPH solution

5. Estimation of antioxidant activity by FRAP

**Aim:** Ferric reducing antioxidant power



Principle:

Ferric reducing antioxidant power (FRAP) was determined by the method of Benzie & strain. (Benzie 1996)



**Material required:** Acetate buffer (300mM, pH 3.6), 2,4,6-tripyridye-s-traizine (TPTZ) (10mM in 40mm of HCl), Fecl3.6H20 (20mM)

### Procedure

- 1. 0.1mLnof ethanolic extract was taken in test tube.
- 2. 2ml pre-warmed FRAP reagent was added & solution was incubated at room temperature for 10 mins.

3. Absorbance was measured at 593nm.

Note – FRAP reagent was prepared freshly & consisted of acetate buffer, TPTZ and Fecl3.6H20 mixed in ratio 10:1:1 respectively:





Antimicrobial activity

Ethanol extracts of Agathi, Adusa, Golden shower, Moringa and Gotu kola showed no ZOI against Aeromonas hydrophila, Pseudomonas and E.coli.









**Estimation of phenolic content:** The plant samples phenolics are composed of phenolic acids, flavonoids, tannins and proanthocyanidins. Plant samples shows low phenolic content and lowest phenolic content was present in Gotu kola. The phenolic content of the other samples I,e Moringa (23.95468), Golden shower (25.16003), Agathi (26.34363) and Adusa (27.47892) respectively.

**Estimation of flavonoid content:** Flavonoids are structurally diverse secondary metabolites in plants, with a multitude of functions. These span from functions in regulating plant development, pigmentation, and UV 127

protection, to an array of roles in defense and signaling between plants and microorganisms. Plant sample Adusa has been found to have highest flavonoid content i.e 48.052%. In rest of the samples the flavonoid content lies between 30-38%.

**Estimation of antioxidant activity by DPPH:** The antioxidant in plant samples are mainly polyphenols (phenolic acids, flavonoids, anthocyanins, lignans and stilbenes), carotenoids (xanthophylls and carotenes) and vitamins. out of five sample, four samples has antioxidant activity in range of 0.255-12.388% discoloration. However, one sample (Golden shower) showed extremely high antioxidant activity (41.49%).

**Estimation of antioxidant activity by FRAP:** The FRAP assay is high-throughput, adaptable and can detect antioxidant capacities as low as 0.2 mM Fe2+ equivalents. The assay measures the antioxidant potential in samples through the reduction of ferric iron (Fe3+) to ferrous iron (Fe2+) by antioxidants present in the samples. The lowest antioxidant activity was found in Moringa (37.7888%). Out of five samples, four samples has antioxidant activity in range of 37.7888-54.4855%. one sample (Golden shower) showed extremely high antioxidant activity (142.577%).

# **CONCLUSION**

The purpose of this study is to reevaluate the work done by scientists earlier in this field of plant biotechnology and microbiology to broaden the aspect of plant and plant substances as treatments to common infections in the Indian community. However, it could not be proved by this study that as to what extent these plants are useful in providing medical aid, and confirmatory research by professional scientists is still required. Five plant samples were tested for antimicrobial activity, phenolic content, flavonoid content and antioxidant activity.All the five plant samples did not show any antimicrobial activity against bacterial strains.From the study we can conclude that the plant sample adusa has highest phenolic and flavonoid content as compared to other plant samples. This medicinal plant can be proved to be useful for future pharmaceutical purposes. On the other hand, plant sample golden shower showed highest antioxidant activity from both FRAP and DDPH assays. Due to presence of high antioxidant properties, this medicinal plant could be used for making anticancer drugs for future purposes.

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# **Evaluation of the Effectiveness of Awareness Program on Self Care Management Among Patients Undergoing Radiotherapy**

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### ABSTRACT

Diagnosis and treatment of cancer can contribute to psychological distress and anxiety among cancer patients. Evidence indicates that information giving can be beneficial in reducing patient anxiety. To assess the pre-test knowledge regarding self care management among patients undergoing radiotherapy. To assess the pre-test perception regarding self care management among patients undergoing radiotherapy. To evaluate the effectiveness of awareness program on self care management among patients undergoing radiotherapy. To assess the post-test knowledge regarding self care management among patients undergoing radiotherapy. To assess the post-test perception regarding self care management among patients undergoing radiotherapy. To associate the knowledge regarding self care management among radiotherapy receiving patients related to their demographic variable. To associate the perception regarding self care management among radiotherapy receiving patients related to their demographic variable. This study was based on an Interventional evaluatory approach. In this study 60 Head and Neck cancer patients undergoing radiotherapy were included. The result shows the findings of the study were discussed. The mean value of the pre-test knowledge score is 4.68 and effectiveness of the awareness program is 13.88. The mean difference between pre-test and post-test knowledge scores is 9.20±3.01. The mean value of the pre-test perception score is 44.56 and effectiveness of the awareness program is 76.76. The mean difference between pre-test and post-test perception scores is 32.20±12.89. Hence it is statistically interpreted that the awareness program on knowledge and perception regarding self care management among cancer patients undergoing radiotherapy was effective.

**KEY WORDS:** EFFECTIVENESS, AWARENESS PROGRAM, SELF CARE MANAGEMENT, PATIENTS UNDERGOING RADIOTHERAPY.

# **INTRODUCTION**

Cancer is one of the most significant as well as a lifethreatening disease. In the health care delivery system, a large number of care efforts are required for this disease. Cancer is a large group of diseases it commences in our body in any system when cells started to grow rapidly without control. In cancer cell growth is considered abnormal. In the current situation, According to estimates



from the World Health Organization (WHO) in 2019 cancer is the first or second leading cause of death worldwide. Overall, the burden of cancer incidence and mortality is rapidly growing worldwide. The worldwide cancer burden is estimated at 19.3 million new cases and 10 million deaths occurred in 2020. breast cancer has surpassed lung cancer as the most commonly diagnosed cancer, with an estimated 2.3 million new cases (11.7%), followed by lung (11.4%), colorectal (10.0%), prostate (7.3%), and stomach (5.6%) cancers. Lung cancer remained the leading cause of cancer death, with an estimated 1.8 million deaths (18%), followed by colorectal (9.4%), liver (8.3%), stomach (7.7%), and female breast (6.9%) cancers.

According to the head and neck cancer burden, the prevalence of head and neck cancer has 57.5% globally occur in the Asian region especially in India. In India,



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30% of patients reported head and neck cancer from all types of cancers. Patients in India have advanced stages of disease in 60 to 80 percent of cases, compared to 40 percent in more developed nations. The upper aerodigestive tract, paranasal sinuses, salivary glands, and thyroid glands are all affected by head and neck cancer. Managing head and neck cancer needed a multidisciplinary approach, but surgical procedure and radiotherapy became the most effective therapies.

Patients with head and neck cancer commonly having a significant problem with body image because of disfigurement of body parts and organ dysfunction due to disease and the treatment. The patient with head and neck cancer having extensive disfigurement especially after surgery had a significantly higher impact on their self-image. Eighty-five percent of head and neck cancer caused due to use of tobacco and it is the largest risk factor which includes smoking and chewing tobacco. Other risk factors are considered such as heavy alcohol consumption, environmental or occupational inhalants, poor oral and dental hygiene, Human papillomavirus (HPV) are risk factors for developing head and neck cancer.

According to different types of cancer and their location, every person reacts uniquely to the treatment of cancer. The side effect of radiotherapy had classified the acute and chronic side effects. The acute side effect occurs instantly within weeks of during the treatment period. The adverse effect for short periods such as on acute basis includes nausea and vomiting like feeling, exhaustion, skin desquamation and chronic adverse effects of radiotherapy include bald-headedness, scaring, cancer blood-forming tissue (Leukemia) and hereditary problems.

Cancer survivors are increasingly focusing on optimizing their general well-being and quality of life by adopting illness self-management principles and encouraging safe habits such as stopping smoking, keeping a healthy body weight, limiting ultraviolet radiation exposure, and remaining physically active throughout their lives. Several strategies for cancer patients have been created and tested to help them control their diet, weight, and physical activity.

Research has shown that Radiotherapy (RT) is an effective treatment modality in head and neck cancer. RT has the potential treatment to improve the rate of cure and provide palliative relief to additional people. These optimistic assumptions are based on the fact that only about half of all cancer patients will benefit from radiation therapy in the treatment of their disease. 10 Studies on self care awareness and perception undergoing radiotherapy patients have shown that the patient having low levels of awareness and negative perception regarding self-care management.

#### **Objectives**

1. To assess the pre-test knowledge regarding self care management among patients undergoing

radiotherapy.

- 2. To assess the pre-test perception regarding self care management among patients undergoing radiotherapy.
- 3. To evaluate the effectiveness of awareness program on self care management among patients undergoing radiotherapy.
- 4. To assess the post-test knowledge regarding self care management among patients undergoing radiotherapy.
- 5. To assess the post-test perception regarding self care management among patients undergoing radiotherapy.
- 6. To associate the knowledge regarding self care management among radiotherapy receiving patients related to their demographic variable.
- 7. To associate the perception regarding self care management among radiotherapy receiving patients related to their demographic variable.

## **MATERIAL AND METHODS**

An Interventional evaluatory study was undertaken on 60 purposively Head and neck cancer patients who are undergoing radiotherapy from the selected hospital in the Vidarbha region. Data was collected by using a structured knowledge questionnaire and perception questionnaire from November 2020 to December 2020. Before the data collection, the willing consent from a participant was taken in their understanding language. Those who were diagnosed with head and cancer patients undergoing radiotherapy were included in the study and those who already attended a similar type of study before 6 months were excluded from the study. A tool was derived through several steps of item generation, reduction, weightage, pilot testing of the tool and validating of the tool. The content validity was determined after the opinion of 10 experts in the field of medical-surgical nursing. The tool was later revised by English - language expert and then translated into the Marathi language by language experts without altering the meaning of the tools.

The Institutional Ethical Committee of Datta Meghe, Institute of Medical Sciences, deemed to be university sanctioned approval for conducting the research study Central Ethics Committee on Human Research. Ref. No. DMIMS (DU) / IEC / Dec - 2019 / 8686 was obtained. The findings were summarized by concentration and percentages categorically. The program used in the study was SPSS 24.0. To accomplish the objective of the study, the investigator collected data from 60 head and neck cancer patients undergoing radiotherapy. A structured knowledge questionnaire and perception questionnaire including 20 items based on self care management undergoing radiotherapy scoring for knowledge questionnaire each correct answer carried 1 mark and 0 were given for the wrong response. Knowledge was graded from poor to very good knowledge based on scores (Soko et al., 2019).

The minimum score was (1) and the maximum score was (20). Based on the total number of correct responses the

degree of knowledge was classified as Poor (1-5), Average (6 - 10), good (11 - 15) and very good (16 - 20). The perception level score was graded from strongly agree, agree, neutral, strongly disagree, disagree perception level based on scores. Data collection was conducted with the pre-test questionnaire on1st day and after the pre-test assessment of knowledge and perception. The Informational booklet on awareness program of self care management during radiotherapy was provided to each head and neck cancer patient undergoing radiotherapy. The post-test assessment of knowledge and perception questionnaire was conducted with the same structured questionnaire on the 7th day of assessment.

### **RESULTS AND DISCUSSION**

Section - A The percentage-wise distribution of demographic variables of patient's data undergoing radiotherapy.

variables of patient's data. n=60						
Demographic variables	No. of patients	Percentage (%)				
Age in (yrs.)						
21-30 yrs.	03	05.0				
31-40 yrs.	08	13.3				
41-50 yrs.	26	43.3				
51-60 yrs.	15	25.0				
>60 yrs.	08	13.4				
Gender						
Male	35	58.3				
Female	25	41.7				
Monthly income (Rs)						
Rs 51-10000/-	34	56.7				
Rs 10001-15000/-	14	23.3				
Rs 15001-20000/-	04	06.7				
Rs 20001 and above	08	13.3				
Educational status						
Primary	41	68.3				
Higher Secondary	14	23.3				
Graduate	04	06.7				
Post Graduate and above	01	01.7				
Number of radiotherapy						
cycles completed						
1-10 Fraction	19	31.7				
11-20 Fraction	20	33.3				
21-30 Fraction	17	28.3				
31-40 Fraction	04	06.7				

The above table no - 1 shows that the distribution of head and neck cancer patients according to their age in years indicates that 3 (5%) of the patients were in the 21-30 age group, 8 patients (13.30%) were in 31-40 years age group, 26 (43.30%) had in the 41-50 years age group, 15 (25%) had in 51-60 years age and 8 (13.40%) were more than 60 years age group. The distribution of head and neck cancer patients according to their gender indicates that 35(58.30 %) of male patients and 25 (41.70%) of females. The distribution of head and neck cancer patients according to monthly income in rupees shows that 34 (56.70%) of the patients had monthly income between Rs 5001-10000, 14 (23.30%) had between Rs 10001-15000, 4(6.70%) had between Rs 15001-20000 and 8 (13.30%) of the patients had monthly income between Rs 20001 and more.

The distribution of head and neck cancer patients according to their educational status shows that 41(68.30%) of the patients were educated up to primary standard, 14 (23.30%) up to higher secondary standard, 4 (6.70%) was graduates and 1 (1.70%) of the patients were postgraduates and above. The distribution of head and neck cancer patients according to their number of radiotherapy cycles completed in fraction shows that 19 (31.7%) of the patients completed between 1-10 fraction of radiotherapy cycles, 20 (33.30%) patients completed between 11-20 fraction, 17 (28.30%) completed between 21-30 fraction and 4 (6.70%) of the patients completed between 31-40 fraction of radiotherapy cycles. Section - B The Assessment of existing knowledge and posttest knowledge regarding self care management among patients undergoing radiotherapy. Above table no.2 and fig no.1 shows that 44 (73.33%) of the patients were having a poor level of knowledge score in the pre-test, 10 (16.67%) patients had average, 5 (8.33%) patients had good and 1(1.67%) the patients have a very good level of knowledge score.

Above table no.3 and fig no.2 shows that 3(5%) of the patients were having an average level of knowledge score in the post-test, 44 (73.33%) had good, and 13 (21.67%) of the patients had a very good level of knowledge score. Section - C Assessment of existing perception and post-test perception regarding self care management among patients undergoing radiotherapy.

Score	Percentage score	Level of pre-test knowledge score		
range	(%)	No of patients	Percentage (%)	
1-5	0-25	44	73.33	
6-10	26-50	10	16.67	
11-15	51-75	05	08.33	
16-20	76-100	01	01.67	
		01		
Maximum score			20	
Mean knowledge score				
% of knowledge score			$23.41 \pm 18.44$	
	Score range 1-5 6-10 11-15 16-20	Score range         Percentage score (%)           1-5         0-25           6-10         26-50           11-15         51-75           16-20         76-100	Score range         Percentage score (%)         Level of pre-test           1-5         0-25         44           6-10         26-50         10           11-15         51-75         05           16-20         76-100         01           20         4.68 ± 3.68           23.41 ± 18.44	

Table 2. Assessment with the level of pre-test knowledge

Above table no.4 and fig no.3 shows pre-test perception score regarding self care management among patients undergoing radiotherapy shows that 27(45%) of the patients were strongly disagree, 26 (43.33%) were neutral,6 (10%) agree and 1(1.67%) of the patients strongly agree.

Above table no.5 and fig no.4 show post-test perception score regarding self care management among patients

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undergoing radiotherapy shows that 2 (3.33%) of the patients were neutral, 45 (75%) were agree and 13 (21.67%) of the patients were strongly agree.



Table 3. Assessment with the level of post-test knowledge score. n=60

Level of post-test knowledge score	Score range	Percentage score (%)	Level of post-test knowledge score		
			No of patients	Percentage (%)	
Poor	1-5	0-25	00	00.00	
Average	6-10	26-50	03	05.00	
Good	11-15	51-75	44	73.33	
Very Good	16-20	76-100	13	21.67	
Minimum score			09		
Maximum score			20		
Mean knowledge score			$13.88 \pm 2.40$		
% of knowledge score			69.41 ± 12.00		





The section - D I)The effectiveness of awareness program on knowledge regarding self care management among patients undergoing radiotherapy.

Above table no.6 and fig no.5 shows a comparison of pre-test and post-test knowledge scores of patients undergoing radiotherapy regarding self care management. Mean, standard deviation and mean difference values are compared and the student's paired 't' test is applied at a 5% level of significance. The tabulated value for n=60-1 i.e., 59 degrees of freedom was 2.00. The calculated 't' value i.e., 23.60 is much higher than the tabulated value at 5% level of significance for the overall knowledge score of patients undergoing radiotherapy which is a statistically acceptable level of significance. Hence it is statistically interpreted that the awareness program on knowledge regarding self care management was effective. II) The effectiveness of awareness program on perception regarding self care management among patients undergoing radiotherapy.

Table 4. Pre-test perception score regarding self care management among patients undergoing radiotherapy. n=60

Score range (%)	Level of pre-test perception score		
	No of patients	Percentage (%)	
01-20	00	00.00	
21-40	27	45.00	
41-60	26	43.33	
61-80	06	10.00	
81-100	01	01.67	
	29		
	82		
	44.56 ± 12.43		
	44.56 ± 12.43		
	Score range (%) 01-20 21-40 41-60 61-80 81-100	Score range (%)         Level of pre-tes           No of patients         00           21-40         27           41-60         26           61-80         06           81-100         01           29         82           44.56 ± 12.4         44.56 ± 12.4	





Table 5. Post-test perception score regarding self care management among patients undergoing radiotherapy. n=60

Level of post-test	Score range (%)	Level of post-test perception score		
perception score		No of patients	Percentage	
Disagree	1-20	00	00.00	
Strongly Disagree	21-40	00	00.00	
Neutral	41-60	02	03.33	
Agree	61-80	45	75.00	
Strongly Agree	81-100	13	21.67	
Minimum score		56		
Maximum score		89		
Mean perception score		76.76 ± 5.95		
% of perception score		$76.76 \pm 5.95$		




S, p<0.05

Table 6. Significance of difference between knowledge score in pre and post-test of patients undergoing radiotherapy. n=60

Overall	Mean	Standard	Mean	T-	P-
test		Deviation	Difference	Value	Value
Pre-test	04.68	3.68	9.20±3.01	23.60	0.0001 S, p<0.05

Figure 5: Significant difference between pre-and post-test knowledge scores of patients undergoing radiotherapy.



Above table no.7 and fig no.6 shows a comparison of pre-test and post-test perception scores of patients undergoing radiotherapy regarding self care management. Mean, standard deviation and mean difference values are compared and the student's paired 't' test is applied at a 5% level of significance. The tabulated value for n=60-1 i.e., 59 degrees of freedom was 2.00. The calculated 't' value i.e., 19.33 is much higher than the tabulated value Table 7. Significance of difference between knowledge score in pre and post-test of patients undergoing radiotherapy. n=60 Overall Standard T-P-Mean Mean Deviation Difference Value test Value Pre-test 44.56 12.43 32.20±12.89 19.33 0.0001

 Post-test
 76.76
 05.95

 Figure 6: Significance of difference between perception score in pre and post-test of patients undergoing



at a 5% level of significance for the overall perception score of patients undergoing radiotherapy which is the statistically acceptable level of significance. Hence it is statistically interpreted that the awareness program on perception regarding self care management was effective.

Table 8. Correlation between knowledge and perception score of patients. Pearson's Correlation Coefficient						
	Mean	Std. Deviation	N	Correlation 'r'	p- value	
Knowledge score	13.8833	2.40121	60	0.341	0.008, S	
Perception score	76.7667	5.95567	60			



The section - E Correlation between knowledge and perception regarding self care management among patients undergoing radiotherapy.

Above table no.8 and fig no.7 show by using Pearson's correlation coefficient positive correlation was found between knowledge score and perception score of patients (r=0.31, p=0.008).

The section – F Association of knowledge and perception score regarding self care management among patients undergoing radiotherapy with their selected demographic variables.

There is no significant association of knowledge score with gender, monthly income in rupees, number of radiotherapy cycles completed only there is a significant association of knowledge score with age and educational status. The perception score is not significantly associated with age, gender, monthly income in rupees, only there is a significant association of perception score with educational status and number of radiotherapy cycles completed.

#### DISCUSSION

The findings of this study show that the mean value of the pre-test knowledge score is 4.68 and effectiveness of the awareness program is 13.88 The mean difference is  $9.20\pm3.01$  between the pre-test and the post-test information score. 23.60 is the calculated t-value and 0.0001 is the p-value. The mean value of the pre-test perception score is 44.56 and effectiveness of the awareness program is 76.76. The mean difference between the perception score for the pre-test and posttest is  $32.20 \pm 12.89$ . 19.33 is the calculated t-value and 0.0001 is the p-value. Hence it is interpreted that an awareness program on knowledge and perception regarding self care management during radiotherapy was effective.

A similar type of study was conducted in the Ashwin Cancer Hospital Coimbatore between April 2015, a total of 30 patients with head and neck cancer i.e., oral cancer to determine the efficiency of intervention (Package for Information Education and Communication) on knowledge and practice concerning the management of side effects due to radiotherapy. Using the structured knowledge and practice questionnaire, Pre-test knowledge and practice score regarding the management of radiotherapy side effects. The mean knowledge score of pre-tests was 8.93 and the post-test was 26.03. The mean score for pre-test practice was 7.23 and for posttest practice was 16.36.

The mean difference between the pre-test and the post-test indicates that the patients had insufficient knowledge and poor practice concerning the side effects and radiotherapy management. The intervention i.e. The package on Information, Education and Communication booklet for managing the side effects due to radiotherapy was distributed to patients. The calculated t-value was 20.29 for the knowledge score and 13.91 for the practice score. At p<0.05 significance level. The outcomes after intervention show that there has been a significant improvement in knowledge and practice regarding the management of radiotherapy side effects among patients with oral cancer receiving radiotherapy. After that reveals the intervention i.e., the IEC package was effective.

#### **CONCLUSION**

The present research was conducted to determine the effectiveness of the awareness program on self care management during radiotherapy among head and neck cancer patients undergoing radiotherapy. The result of this study shows Mean value of the pre-test knowledge score is 4.68 and effectiveness of the awareness program is 13.88. The mean difference is 9.20±3.01 between the pre-test and the post-test score of knowledge. 23.60 is the calculated t-value and 0.0001is the p-value. The mean value of the pre-test perception score is 44.56 and effectiveness of the awareness program is 76.76. The mean difference between the perception score of the pre-test and the post-test is 32.20±12.89. 19.33 is the calculated t-value and 0.0001 is the p-value. Hence it is interpreted that an awareness program on knowledge and perception regarding self care management during radiotherapy was effective.

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### **Prevalence of Thyroid Disorders in Antenatal Care Mothers**

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#### ABSTRACT

Thyroid hormone is essential for early placental development in pregnancy. Especially during the first twelve weeks of pregnancy the fetus entirely depends upon the maternal thyroid hormone for the normal neural and skeletal development. Pregnancy had a crucial effect on the thyroid and function of thyroid. 1.To assess the prevalence of thyroid disorders in ANC mothers.2.To find the association between thyroid disorder with selected demographical variables. Study Design:Cross sectional research design with Quantitative research approach. Sample were ANC mothers. Population: ANC mothers in first trimester. Setting of the study: Selected hospital in wardha district. Samples Size: 90. hyroid profile estimation (T3,T4,TSH). Frequency of participant majority of 76( 84.40%) were in the age group of 21-30 years. Frequency 46 ( 51.10%) of them had 11-12 year of age at menarche . Frequency is 80 (88.90%) of the ANC mothers had regular menstrual history. Frequency of 68 (70%) of them did not have any family history. Frequency of 56 (62.20%) of them had municipal corporation without RO. It is interpreted that Age in years (p=0.001) and menstrual history(p=0.002) of ANC mothers area correlating with TSH Level of ANC mothers. In conclusion, our current study shows that the high prevalence of thyroid abnormality particularly hypothyroidism in low-risk women who are pregnant. Due to adverse pregnant outcome, it is recommended that all the pregnant women may be screened for thyroid dysfunction to reduce the maternal and neonatal morbidity in the population.

**KEY WORDS:** ASSESS, THYROID DISORDER, SUBCLINICAL HYPOTHYROIDISM ,PREVALENCE.

#### INTRODUCTION

The second most important endocrinological disorder in pregnancy is thyroid dysfunction. The common cause of hypothyroidism is primary abnormality in thyroid. In some cases it is also caused by hypothalamic dysfunction. In antenatal women most common causes are Hashimotos thyroiditis, iodine deficiency, radioactive iodine therapy and surgical removal of thyroid. Auto immune thyroiditis commonly occurs during the first postpartum year it will present with hypothyroidism or thyrotoxicosis following which patient may develop hypothyroidism. Secretion of thyroid gland is essential for the normal development of the placenta. There is evidence that preeclampsia,



placental abruption and preterm labor are all causatively linked to faulty early placentation (Brain 2006).

Thyroid hormone is important for normal neuronal migration, synaptic transmission and myelination during the early stages of neuro development. Women with severe hypothyroidism are at high risk of childbirth complications such as early pregnancy, preeclampsia, placental abruption, low birth weight, and stillborn 8-9. Women's direct hypothyroidism medication has been linked with better childbirth results. The prevalence of hypothyroidism in pregnancy is 2 to 5 percent, according to the American Congress of Obstetricians and Gynecologists (ACOG). Indian studies show the incidence of hypothyroidism during pregnancy ranging from 4.8% to 11%. fetus depends completely on maternal thyroid hormone for the normal brain development.

**Need Of The Study:** Thyroid disorder is one of the most general endocrine disorder in pregnant women, pregnancy how great effect on the thyroid gland and function of thyroid, thyroid gland may increase by 10% during pregnancy. Thyroid hormone development and the



need for iodine increase to about 50% during pregnancy. Pregnancy is a thyroid stress test that results in the role of thyroid in women with reduced thyroid reserve. It is well known that not only open but subclinical thyroid dysfunction has adverse effects on the mother and fetus, including miscarriage, premature birth, preeclampsia, eclampsia, and placental abruption.Higher maternal thyroid secretion may also interfere with the intelligence development of the fetus (Braverman 1998).

**Aim of the study:** To assess the prevalence of thyroid disorder in ANC mothers and to associate with the demographic variables.

#### Objectives of the study:

- 1. To assess the prevalence of thyroid disorders in ANC mothers.
- 2. To find the association between thyroid disorder with selected demo graphical variables.

#### MATERIAL AND METHODS

In present study the Study Design used is Cross sectional research design. This study works with the research approach of Quantitative research approach. In the study Sample were ANC mothers and the target Population were ANC mothers in first trimester. Setting of the study which was Selected hospital in wardha district with the Samples Size: 90 who fulfilled the criteria laid down for the selection of the sample. The sampling technique used in the study was probability purposive sampling. Inclusion criteria in study was All ANC mothers in 1st trimester, All gravidarum irrespective of primi and multipara, ANC mothers who are willing to participate, ANC mothers who are available during data collection. Exclusion criteria ANC mother who are already having thyroid disorder. Material for the study used was Thyroid profile estimation (T3,T4,TSH) (Donmez et al., 2006).

**Statistical Analysis:** Statistical analysis was done by descriptive and inferential statics with the help of SPSS 16.0 software.The statistical tests used for the analysis of the result were:

- 1. Students unpaired t test
- 2. One way ANOVA
- 3. Pearson' Correlation Coefficient
- 4. Reliability Analysis

Ethical Aspect: The study proposal has sanctioned by the Institutional ethical committee of DMIMS (DU). Informed consent has been taken from the participants.Concerned information regarding the study was provided to the participants. Permission obtained from the concerned authority of the selected hospital (Glinoer et al., 1990).

#### **RESULTS AND DISCUSSION**

Percentage wise distribution of ANC mothers according to their demographic characteristic Frequency of participant is 8 (8.90%) of the ANC mothers were in the age group of less than 20 years, 76( 84.40%) were in the age group of 21-30 years and remaining 6 (6.70%) of them were in the age group of 31-40 years of age. Frequency of participant is 7 (7.80%) of the ANC mothers had below 10 years of age at menarche,46 (51.10%) of them had 11-12 years and 35 (38.90%) of them had 13-14 years of age at menarche and 2 (2.2%) Of the had in 15-16 years of age. Frequency of participant is 80 (88.90%) of the ANC mothers had regular menstrual history and 10 (11.10%) of them had irregular menstrual history.

All of the ANC mothers who had menstrual history irregular had missing periods for 2-3 months. Frequency of participant is 22 (30%) of the ANC mothers had family history and 68 (70%) of them did not have any family history. Frequency of participant is 20 (22.20%) of the ANC mothers had bore well without R0,56 (62.20%) of them had municipal corporation without R0 and 14 (15.60%) of them had RO water supply. Prevalence of Thyroid disorder in ANC mothers The above table shows assessment of prevalence of thyroid disorder in ANC mothers. Mean T3 level was  $2.03\pm2.27$ , 74 (82.22%) of the ANC mothers were below normal range and 16 (17.78%) of them were above normal range.

Table 1.1. Percentage wise distribution of ANC mothersaccording to their demographic characteristics. n=90					
Demographic Variables	No. of ANC mothers	Percentage (%)			
Age(vrs)					
< 20 vrs	8	89			
21-30 vrs	76	84.4			
31-40 yrs	6	67			
Age at menarche	0				
Below 10 vrs	7	7.8			
11-12 vrs	46	51.1			
13-14 vrs	35	38.9			
15-16 vrs	2	2.2			
Menstrual History					
Regular	80	88.9			
Irregular	10	11.1			
IF Irregular					
Oligomenorrhea	0	0			
Periods which occurs less	0	0			
than 21 days					
Missing periods for	10	100			
2-3 months					
Menorrhagia	0	0			
Family History					
Yes	22	24.4			
No	68	75.6			
Water Supply					
Bore well without RO	20	22.2			
Municipal corporation	56	62.2			
without RO					
RO	14	15.6			

Mean T4 level was $10.29\pm2.73$ , 79 (87.78%) of the ANC mothers were below normal range and 11 (12.22%) of them were above normal range. Mean TSH level was 2.71 $\pm$ 3.55, 1 (1.11%)of the ANC mothers were below normal range and 89 (98.89%) of them were above normal range. Meanwhile the Hypothyroidism is identified when the T3,T4 level is lower than normal and TSH level

is higher and Hyperthyroidism is identified when the T3,T4 is higher than the normal level and TSH is lower than normal .By the analysis it is found that T3 level 74 (82.22%) is lower than normal and T4 79(87.78%) is lower than the normal and TSH 89(98.89%) found higher than the normal that shows that 89 of participant has hypothyroidism (Haddow et al., 1999).

Table 1.2. Assessment with Prevalence of Thyroid disorder in ANC mothers n=90						
Thyroid Disorder	Normal Range	Mean	SD	No of ANC mothers below normal range	No of ANC mothers above normal range	
T3 Level	0.60 - 1.81	2.03	2.27	74(82.22%)	16(17.78%)	
T4 Level	3.2 - 12.6	10.29	2.73	79(87.78%)	11(12.22%)	
TSH Level	0.25 – 5	2.71	3.55	1(1.11%)	89(98.89%)	

Demographic Variables	No. of ANC mothers	Mean ± SD	F-value/ t-value	df	Tabulated Value	p-value
		Age(y	rs)			
$\leq$ 20 yrs	8	3.04±4.36	1 mar 1 mar	1.5.2.1	I was been and	
21-30 yrs	76	1.97±2.04	1.03	2,87	3.07	0.36,NS
31-40 yrs	6	$1.41\pm0.10$	at the second second			
		Age at me	narche			
Below 10 yrs	7	1.49±0.18				
11-12 yrs	46	2.19±2.75	0.22	3,86	2.68	0.88,NS
13-14 yrs	35	1.95±1.83	0.22			
15-16 yrs	2	1.76±0.53		1		
		Menstrual	History			
Regular	80	2.12±2.39	1.05	00	1.00	0.00.010
Irregular	10	1.32±0.20	1.05	00	1.98	0.29,NS
1		Family H	istory			
Yes	22	1.48±0.37	1.21	00	1.00	0.10.210
No	68	2.21±2.58	1.31	88	1.98	0.19,NS
		Water St	pply			
Bore well without RO	20	2.28±2.56	1			
Municipal corporation without RO	56	1.74±1.69	1.48	2,87	3.07	0.23,NS
RO	14	2.84±3.51				

Demographic Variables	No. of ANC mothers	Mean ± SD	df	F-value/ t-value	Tabulated Value	p-value
		Age(yi	<b>(s)</b>			
$\leq 20 \text{ yrs}$	8	9.79±1.36		11.000.000	it is an and the set of the	14.00.000
21-30 yrs	76	$10.39 \pm 2.87$	2,87	0.33	3.07	0.71,NS
31-40 yrs	6	9.68±2.26	1			A RECEIPTION
		Age at mer	arche			
Below 10 yrs	7	10.52±1.10				
11-12 yrs	46	9.89±2.80	3,86	0.00	2.68	O AS NO
13-14 yrs	35	10.66±2.86		0.88		0.45,NS
15-16 yrs	2	12.20±2.26	1.4			
		Menstrual	History			
Regular	80	10.46±2.81		1 72	1.00	0.00 310
Irregular	10	8.89±1.38	88	1.75	1.98	0.08,NS
the second s		Family Hi	story			
Yes	22	10.29±2.11	00	0.005	1.08	0.00 M
No	68	10.29±2.91	00	0.005	1.98	0.99,185
		Water Su	pply			
Bore well without RO	20	10.23±3.58	12.24		3.07	0.88,NS
Municipal corporation without RO	56	10.39±2.34	2,87	0.12		
RO	14	9.98±2.98				

Demographic Variables	No. of ANC mothers	Mean ± SD	df	F-value/ t-value	Tabulated Value	p-value
		Age(y)	rs)			
$\leq 20 \text{ yrs}$	8	3.88±3.26	1.000		1	11.2.272
21-30 yrs	76	2.20±2	2.87	3.90	3.90 3.07	0.001,S
31-40 yrs	6	7.58±10.73		The second second		
		Age at men	arche			
Below 10 yrs	7	2.11±1.97				
11-12 yrs	46	2.73±4.36	2.00	0.17	2.68	0.91,NS
13-14 yrs	35	2.88±2.62	3,80	0.17		
15-16 yrs	2	1.46±0.41	1.000	1	1. C.	
		Menstrual ]	History			
Regular	80	2.30±2.19	00	2.22	1.00	0.000.0
Irregular	10	5.97±8.33	80	5.25	1.98	0.002,8
Contraction of Contract		Family Hi	istory			
Yes	22	2.91±2.27	00	0.00	1.00	0.77.10
No	68	2.65±3.89	88	0.29	1.98	0.77,NS
		Water Su	pply	200		
Bore well without RO	20	2.86±2.83				
Municipal corporation without RO	56	2.81±4	2,87	0.08	2.87	0.92,NS
RO	14	2.38±2.57				



## Association of Thyroid Disorder With Demographic Variables

**Association of T3 level with demographic variables:** The association of socio-demographic variables with T3 Level of ANC mothers. The tabulated values is higher than calculated values at 5% level of significance. It is interpreted that socio-demographic characteristics of ANC mothers is statistically not associated with T3 Level (Helfand 2004; Jones 1969; Park 2011).

**Association of T4 level with demographic variables:** The association of socio-demographic variables with T4 Level of ANC mothers. The tabulated values is higher than calculated values at 5% level of significance. It is interpreted that socio-demographic characteristics of ANC mothers is statistically not associated with T4 Level (Krassas et al., 2015; Lavado et al., 2013).

**Association of TSH level with demographic variables:** The association of socio-demographic variables with TSH Level of ANC mothers. The tabulated values is higher than calculated values at 5% level of significance. It is interpreted that socio-demographic characteristics of ANC mothers is statistically not associated with TSH Level. Age in years(p=0.001) and menstrual history(p=0.002) of ANC mothers area correlating with TSH Level of ANC mothers (Park 2005; Suresh 2014).

### CONCLUSION

In this present study the Hypothyroidism is identified when the T3, T4 level is lower than normal and TSH level is higher and Hyperthyroidism is identified when the T3,T4 is higher than the normal level and TSH is lower than normal. By the analysis it is found that T3 level 74 (82.22%) is lower than normal and T4 79(87.78%) is lower than the normal and TSH 89 (98.89%) found higher than the normal that shows that 89(98.89%) of ANC mother has hypothyroidism. Study was done by et al. Rama Saraladevi, T Nirmala Kumari The prevalence of thyroid disorder in this study was 11.6 percent with a CI of 9.64 to 13.54 of 95 percent, India and other part of asia compared to other region shows the higher prevalence.

Subclinical hypothyroidism and overt hypothyroidism were respectively 6.4% and 2.8%. Subclinical and Overt hyperthyroidism was 1.8% and 0.6% respectively. There was more prevalence and hidden subclinical hypothyroidism, leading to poor obstetric outcome and complications of the fetus. In patients with open hyperthyroid, the risk of miscarriage was high. A study was done by et.al.NangiasangitaAjmani, Vinita Sarbhai. On the prevalence of thyroid disorder and its correlation with menstrual history. In menstrual disorders, 44% of patients had thyroid disorders with a prevalence of subclinical hypothyroidism in 20%, overt hypothyroidism in 14% and overt hyperthyroidism in 8% of women. In 30 percent of women with menstrual disorders, autoimmune thyroid antibodies were present.Women who has thyroid disorder from early year of age.

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## Effectiveness of Breathing Exercise on Labour Pain and Behavioral Response of Primi Gravid Mothers During the First Stage of Labour at Selected Maternity Hospitals

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#### ABSTRACT

Childbirth is hard and headaches occur, however women's our bodies are designed to offer birth. The form of the pelvis, hormones, effective muscle mass and extra all paintings collectively that will help you convey your child into the world - before, in the course of and after childbirth. AIM: To assess the effectiveness of breathing exercise on labour pain and behavioral response of primi gravid mothers during first stage of labour, at selected Maternity hospitals. Material and methods: The design was adopted true experimental design with pre-test post-test control group design was used for this study. The sample consisted of 40 mothers, 20 in experimental group and 20 in control group. The simple random sampling technique was used to select the samples. The data was collected by using Baseline Performa and Observational check list. Result: The effect of breathing exercises on pain and behavioral response during the first stage of labour among primigravida mothers in the experimental group. The assessment is done before and after breathing exercises. The mean, standard deviation and range are compared, and student's paired't' test was applied at 5% level of significance. The mean score for pain before breathing exercises and after breathing is 8.85 and is 3.30. The standard deviation for pain before and after breathing exercises is 0.67 and 0.47. The range before and after breathing exercises is between 8 - 10 and 3 – 4. Mean score for behavioral response before and after breathing exercises is 8. 70 and 3.25. Standard deviation before and after breathing exercises is 0.65 and 0.44. The range before and after breathing exercises is between 8 - 10 and between 3 – 4. Mean difference for pain is between  $5.55 \pm 0.60$  and for behavioral responses it is between  $5.45 \pm$ 0.68. Conclusion: The study results concluded that respiration workout is a powerful non pharmacological intervention for decreasing labor pain.

**KEY WORDS:** ASSESS, BREATHING EXERCISE, BEHAVIORAL RESPONSE, EFFECTIVENESS, LABOUR PAIN, PRIMIGRAVIDA MOTHERS,

#### **INTRODUCTION**

Child birth is one of the most marvelous and memorable segment in women's life. It does not really matter if the child is the first, second or the third.Each experience is unique and calls for a celebration. Labour is a natural process by which a viable fetus, at the end of 28 weeks



or more is expelled from the uterus. The fear and anxiety about child birth often prevents most women from enjoying this experience. Although labour is often thought of as one of the most painful events in human life. No two women have the same degree of labour pain and no two labour are exactly alike. Labour pain ranges widely from woman to woman and even from pregnancy. Studies have shown that around 70% of women experience awful labour and around 10% of them experience an almost painless (Asnat 2007; Basil 2001).

**Background and Need of the Study:** Pain is highly unpleasant and very personal sensation that cannot be shared with others. Although pain is a universal experience, its exact nature remains a mystery. Pain during labour is caused by the contraction of the muscles



of the uterus and by the pressure on the cervix. This is mainly manifested as cramping in the abdomen, groin and back, as well as a tired, achy feeling all over the body. Some women experience pain in their sides or thighs as well. Other causes of pain during labour include pressure on the bladder and bowels by the head and stretching of the birth canal and vagina (Field 1997; Grace 2013).

Pain is always present in primi mothers. To ease the pain and to improve the behavioral response of the mother's pharmacological and non-pharmacological management are important. Pharmacological approaches are directed at eliminating the physical sensation of labour pain, whereas non pharmacological approaches such as relaxation, breathing techniques, positioning, massage, hydrotherapy, hot and cold therapy, music guided imagery, acupressure and aromatherapy are simple and safe which enhance the comfort of women and help them to achieve an effective coping level for their labour experience without any maternal and foetal complications. Pregnancy is a time of great change for a woman, not only for the obvious physical change in her body, even her emotional state changes several times throughout the day. Each woman comes into labour with a set of expectations: fear, preparation, pain threshold, personality and behavioral makeup, and ways of experiencing what is happening to her, which has to be maintained effectively. The time of labour and birth, though short in comparison with the length of pregnancy, is the most dramatic and significant period of pregnancy (Jayasudha 2013; Karkada 2013).

Labour pain is the most severe pain experienced by the women. Parity also influences labour pain, that is, primigravida women experience more pain during labour than multigravida mothers.2 Recent studies have shown that the incidence of caesarean sections is increasing throughout the developed and developing countries. Majority of women (68%) are requesting for caesarean section because of psychological indications. Women with adequate psychological support and relaxation techniques had reduced the incidence of caesarean section and 38% of them agreed for normal vaginal delivery. Relaxation techniques, mainly breathing exercises, had brought 50% reduction in caesarean section for psychological indications. Breathing technique is one of the widest, safest, and commonest method of pain relief measures. The theory behind childbirth breathing patterns is based on the concentration required to focus on breathing. During a contraction, thought process is redirected from a pain response to breathing technique.1 Among various breathing exercises, slow paced breathing exercise is one of the simplest. It is slow, deep breathing that increases relaxation. This naturally brings about slower breathing, similar to that during sleep. It can be used as long as possible during labour because it promotes relaxation and oxygenation.

This breathing technique is a deeper, slower way of breathing, which involves filling the lungs to its full capacity when inhaling and then pushing out as much air as possible when exhaling. These breathing techniques are used only during contraction. In between contraction women has to relax to conserve energy where breathing should be smooth and deep through the nose and then letting air through the mouth. This type of breathing is also called as cleansing breath.

A quasi-experimental study was conducted to determine the effectiveness of breathing exercises on duration, outcome of labour, and behavioural response of gravid women during the first stage of labour in a selected hospital at Mangalore. The sample comprised of 20 subjects each in experimental and control group, selected by purposive sampling technique. Data was collected using a structured observation checklist. The results showed the mean percentage scores for the behavioural responses of women in the experimental group to be higher (94.04%) than that of the control group (62.55%). There was significant difference in behavioural responses of women in labour in both experimental and control group (t38=23.19, p<0.05), and also a significant difference in the duration of the first stage of labour in prim gravid mothers (t18=2.40, p<0.05). The results revealed that breathing exercises during labour are effective in reducing the duration and outcome of labour. Breathing exercises does not require equipment and machinery, it require efficient child birth educator and the willingness to practice the exercises on the part of pregnant women.8Since the breathing exercise are easy to practice and help in promoting positive outcome, the researcher felt the need to educate primigravida mothers to practice slow paced breathing during first stage of labour to reduce labour pain (Kavitha 2011; Kuti 2013).

#### Objectives

- 1. To assess pain intensity level among the Primi gravid mothers during first stage of labour in experimental and control group.
- 2. To assess the behavioral response of primi gravid mothers during first stage of labour in experimental and control group.
- 3. To determine the effectiveness of breathing exercise on labour pain among primigravid mothers during first stage of labour.
- 4. To determine the effectiveness of breathing exercise on behavioral response among primigravid mothers during first stage of labour
- 5. To determine the association between selected demographic variables and pain of primigravid mothers during first stage of labour.
- 6. To determine the association between selected demographic variables and behavioral response of primigravid mothers during first stage of labour.

#### Assumptions

- 1. Primi mothers in first stage of labour will have severe pain during uterine contractions.
- 2. Breathing exercise may have an effect on pain and behavioral response of primigravida mothers.
- 3. Behavior responses of primi mothers in labour can be identified by observational checklist.

#### **Hypothesis**

H1- There is a significant difference between the pain score of primigravid mothers in experimental group and control group.

H2- There is a significant difference between the behavioral response of primigravid mothers in experimental group and control group.

H3- There is a significant association between the selected demographic variables and pain scores of primigravid mothers in experimental group.

H4- There is a significant association between the selected demographic variables and behavioral response of primigravid mothers in experimental group.

#### Variables

Independent variable: Breathing exercises during first stage of labour.

Dependent variable: Labour Pain and Behavioral Response during first stage of labour.

Demographic variables: Age, education, Religion, area of residence, occupation, income and family type.

- Methodology
- Research approach: An interventional research • approach.
- Research design:- The design was adopted true . experimental design with pre-test post-test control group.
- Setting of the study: The study will be conducted in selected Maternity hospitals at Wardha.
- Sampling technique:-Probability Simple random ٠ sampling technique.
- Sample: Primigravida mothers at first stage of labour.
- Sample size :- 40 (20 in experimental group and 20 • in the control group)
- Criteria for sample selection :-

#### Inclusion Criteria:-

#### Primi gravid mothers who are:

- Mother in first stage of normal labour. 1.
- Mother in labour with cervical dilatation more than 2. 4 cm
- 3. Admitted in the Labour ward for normal delivery.
- 4. Willing to participate
- Able to communicate in Hindi, Marathi and 5. English,

Table 1. Percentage wise distributions of primigravid mother according to their demographic variables. N = 20 (in each group)						
Demographic		Experimental Group		Control Group		
variables		Frequency	Percentage (%)	Frequency	Percentage (%)	
Age in years	19 - 23	13	65%	15	75%	
	24-28	6	30%	5	25%	
	29-33	1	5%	0	0%	
	34 & Above	0	0%	0	0%	
Educational Status	Illiterate	0	0%	0	0%	
	Primary	2	10%	6	30%	
	Secondary	12	60%	13	65%	
	Graduation & above	6	30%	1	5%	
Religion	Hindu	12	60%	15	75%	
	Muslim	0	0%	0	0%	
	Christian	1	5%	0	0%	
	Others	7	35%	5	25%	
Occupation	Housewife	15	75%	16	80%	
	Daily Wages	1	5%	3	15%	
	Employees	4	20%	1	5%	

#### **Exclusion Criteria:-**

#### Primigravida mothers who are:

2. Prolonged and precipitated labour.

Mother with high risk pregnancy like hypertension, 1. diabetes, multiple pregnancy etc.

#### **Discription of Tools**

#### The tools consist of 3 sections:

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**Section 1:** Baseline Performa.(age, education, religion, occupation)

**Section 2:** FLAAC pain assessment scale tool (0-10) to assess the pain. (Updated September 03-2009 which is standardized tool)

**Section3:** VAS (Visual Analogue Scale) behavioral response (pain assessment) scale which is standardized tool

#### **RESULTS AND DISCUSSION**

The analysis and interpretation of the finding are given under the following sections.

**Section A:** Percentage wise distribution of Primi gravid mothers according to their Demographic variables.

**Section B:** Assess pain intensity level among the primi gravid mothers during first stage of labour in experimental and control group.

Table 2. Pain during the first stage of labour among primigravida mothers in experimental group before breathing exercise. N = 20

	Mean	Standard Deviation	Range
Pain	8.85	0.67	8-10

Table 3. Pain and behavioral responses during first stage of labour among primigravida mothers in control group. N = 20

	Mean	Standard Deviation	Range
Pain	8.95	0.68	8-10

Table 3. Pain and behavioral responses during first stage of labour among primigravida mothers in control group. N = 20

	Mean	Standard Deviation	Range
Behavioral Responses	8.70	0.65	8-10

**Section C:** Assess the behavioral response of primi gravid mothers during first stage of labour in experimental and control group.

**Section D:**Assess the effectiveness of breathing exercises on labour pain among primigravid mothers during first stage of labour.

Table 5. Behavioral responses during the first stage of labour among pimigarvida mothers in control group before breathing exercises. N = 20

	Mean	Standard Deviation	Range
Behavioral Responses	8.85	0.58	8 -10

**Section E (A) :** Associate the effect of breathing exercises on pain during the labour pain among primigravid mothers in the experimental group with the selected demographic variables (Lowdermilk 2010. Nancy 1996).

**Section E-(B):** Associate the effect of breathing exercises on behavioral responses during labour pain among primigravid mothers in the experimental group with selected demographic variables.

Table No. 1 shows that the distribution of subjects according to their age. 65% of subjects in the experimental group and 75% in the control group are belongs to the age group of 19 - 23years, 30% in the experimental group and 25% in the control group belongs to the age group of 24 - 28 years, 5% in the experimental group were belong to the age group of 29 - 33years and 0% from the both group of 34 years and above.

The distribution of the subjects according to their education. 10% from the experimental group and 30% from the control group were educated up to primary level, 60% from the experimental group and 65% from the control group were up to secondary education, 30% from the experimental group and 5% from the control group were educated up to graduation and above and no subjects were illiterate.

The distribution of subjects according to their religion .60% from the experimental group and 75% from the control group were belongs to the Hindu religion, 5% in the study group belong to Christian religion and 35% in the experimental group and 25% from the control group were belongs to the other religion and no subjects were from the Muslim religion in both experimental and control group (Saldanha 2013; Simar 2010).

The distribution of the subjects according to their occupation. 75% from the experimental group and 80% from the control group were house wives, 5% from the experimental group and 15% from the control were daily wages and 20% from the experimental group and 5% from the control group are employees.

#### Section B: Assess pain intensity level among the Primi gravida mothers during first stage of labour in experimental and control group.

Table No.2 shows the mean, standard deviation and range of pain of primigravida mothers in the experimental

group before breathing exercises. The mean score for pain is 8.85 and standard deviation is 0.67. The range for pain was between 8 and 10.

Table No. 3 reveals the mean, standard deviation and range of pain of primigravida mothers in the control group. The mean score for pain is 8.95 and standard deviation is 0.68. Mean score and the range for pain were between 8 and 10 (Sinhgad 2011; Sylvia 2013).

Section C: Assess the behavioral response of primi gravida mothers during first stage of labour in experimental and control group.

Table 6. Assessment of the effect of breathing exercises on labour pain during the first stage of labour among primigravida mothers in the experimental group N = 20 (each group)

		Mean	Standard Deviation	Range	Mean Difference	t-value	p-value
Pain	Before t/t After t/t	8.85 3.30	0.67 0.47	8-10 3-4	5.55 <u>+</u> 0.60	41.03	0.000 S,p<0.05

Table 7. Assessment of the effect of breathing exercises on labour pain and behavioral responses during the first stage of labour among parturient mother in the experimental group N=20

		Mean	Standard Deviation	Range	Mean Difference	t-value	p-value
Behavioral Responses	Before t/t After t/t	8.70 3.25	0.65 0.44	8-10 3-4	5.45±0.68	35.51	0.000 S,p<0.05

Table 8. Significance of difference of effect of breathing exercise on labour pain in relation to demographic variables N=20 (in each group)

Demographic variables		No. of Primigravida Mothers	Mean score	F - value	p- value
Age (yrs)	19 - 23	13 (65%)	3.23±0.43	0.87	0.43 NS,p>0.05
	24 - 28	6 (30%)	3.50 <u>±</u> 0.54		
	29 - 33	1 (5%)	3.00±0.00		
	34 & Above	0 (0%)	$0.00 \pm 0.00$		
Educational Status	Illiterate	0 (0%)	$0.00 \pm 0.00$	0.42	0.66
					NS,p>0.05
	Primary	2(10%)	3.50±0.70		
	Secondary	12 (60%)	3.33±0.49		
	Graduation &	6 (30%)	3.16±0.40		
	Above				
Religion	Hindu	12 (60%)	3.41±0.51	0.96	0.40
					NS,p>0.05
	Muslim	0 (0%)	$0.00 \pm 0.00$		
	Christian	1 (5%)	3.00±0.00		
	Others	7 (35%)	3.14 <u>+</u> 0.37		
Occupation	Housewife	15(75%)	3.26 <u>+</u> 0.45	1.19	0.32
					NS,p>0.05
	Daily Wages	1(5%)	4.00±0.00		
	Employees	4(20%)	3.25±0.50		

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Table No.4 shows the mean, standard deviation and range of behavioral responses of primigravida mothers in the experimental group before breathing exercises. The mean score for behavioral responses is 8.70 and standard deviation is 0.65 and the ranges for behavioral responses are between 8 and 10 (Yildrim & Sabin 2004).

Table No.5 reveals the mean, standard deviation and range of behavioral responses of primigravida mothers in the control group. The mean score for behavioral responses is 8.85 and standard deviation is 0.58 and the range for behavioral responses was between 8 and 10.

#### Section D: Assess the effectiveness of breathing exercise on labour pain among primigravid mothers during first stage of labour.

The above table illustrates the effect of breathing exercises on pain during the first stage of labour among primigravida mothers in the experimental group. The assessment is done before and after breathing exercises. The mean, standard deviation and range are compared, and student's paired't' test was applied at 5% level of significance. The mean score for pain before breathing exercises and after breathing is 8.85 and is 3.30. The standard deviation for pain before and after breathing exercises is 0.67 and 0.47. The range before and after breathing exercises is between 8 – 10 and 3 – 4.

Statistically there is significant decrease in pain in the experimental group after breathing exercises during the first stage of labour. The tabulated 'for 19 df is 2. 09 and calculated' value for pain is 41.03. The calculated 't' value was higher than the tabulated value at 5% level of significance which is statistically acceptable level of significance (p= 0.000 < 0.05).

Assess the effectiveness of breathing exercise on behavioral responses among primigravid mothers during first stage of labour

Table 9. Significance of difference of effect of breathing exercises on behavioral responses in relation to demographic variables n= 20(in each group)								
Demographic varial	Demographic variables		Mean score	F - value	p- value			
Age (yrs) NS,p>0.05	19-23	13 (65%)	3.30 <u>+</u> 0.48	0.34	0.71			
	24-28	6 (30%)	3.16±0.40					
	29-33	1 (5%)	3.00±0.00					
	34 & Above	0 (0%)	$0.00 \pm 0.00$					
Educational Status	Illiterate	0 (0%)	$0.00 \pm 0.00$	5.66	0.013			
					S,p<0.05			
	Primary	2 (10%)	4.00±0.00					
	Secondary	12 (60%)	3.25±0.45					
	Graduation &	6 (30%)	3.00±0.00					
	Above							
Religion	Hindu	12 (60%)	3.25 <u>+</u> 0.45	1.75	0.202 NS,p>0.05			
	Muslim	0 (0%)	0.00 <u>±</u> 0.00					
	Christian	1 (5%)	$4.00 \pm 0.00$					
	Others	7 (35%)	3.14±0.37					
Occupation	Housewife	15 (75%)	3.26±0.45	2.36	0.124			
					NS,p>0.05			
	Daily Wages	1 (5%)	4.00±0.00					
	Employees	4 (20%)	3.00±0.00					

The above table illustrates the effect of breathing exercises on behavioral responses during the first stage of labour among primigravida mothers in the experimental group. The assessment is done before and after breathing exercises. Mean score for behavioral response before and after breathing exercises is 8. 70 and 3.25. Standard deviation before and after breathing exercises is 0.65 and 0.44. The range before and after breathing exercises is between 8 – 10 and between 3 – 4. Mean difference for pain is between  $5.55 \pm 0.60$  and for behavioral responses it is between  $5.45 \pm 0.68$ .

Statistically there is significant decrease in behavioral responses in the experimental group after breathing exercises during the first stage of labour. The tabulated'for 19 df is 2. 09 and for Behavioral responses, calculated 't' value35.51 is higher than the tabulated 't' value at 5% level of significance which is statistically acceptable level of significance (p = 0.000 < 0.05). Hence research hypothesis H2is accepted.

#### Section E (A): Associate the effect of breathing exercise on pain during the labour pain among primigravid

## mothers in the experimental group with the selected demographic variables

This section deals with the association of the effect of breathing exercises on pain during first stage of labour among primigravida mothers in the experimental group with selected demographic variables.

The above table depicts the significance of difference of effect of breathing exercises on pain in relation to age. Number of primigravida mothers between the age group of 19 - 23 years is 13 and means score is  $3. 23 \pm 0.4.3$  and the majority are belonging to this group. Number of Parturient Mother between the age group of 24 - 28 years is 6 and the mean score is  $3. 50 \pm 0.54$ . Between the age group of 29 - 33years is only one and the mean score is  $3.00 \pm 0.00$  and there as nobody between the age group of 34 years and above. Calculated 'f' value is 0.87 and 'p' value is 0.43 which is more than the accepted level of significance i.e 'p' = 0.05. Hence it is interpreted that effect of breathing exercises on pain in relation to the age is not significant in this study.

Table shows the significance of difference of effect of breathing exercises in relation to the educational status. There is no one in the illiterate and 2 are having primary education. The mean score is  $3.50 \pm 0.70$ . Majority is having secondary education i.e 12 and the mean score is  $3.33 \pm 0.49$ . Number of primigravida mothers having Graduation and above education is 6 and the mean score is  $3.16 \pm 0.40$ . The calculated 'f' value is 0.42 and 'p' value is 0.66 which is more than the accepted level of significance i.e 'p' = 0.05. Hence it is interpreted that effect of breathing exercises on pain in relation to the age is not significant in this study.

This table reveals the significance of difference of effect of breathing exercises on pain in relation to religion. Majority of primigravida Mothers i.e 12 are belong to the Hindu religion and the mean score is  $3.41 \pm 0.5$ . There was no one belong to Muslim religion and only 1 belong to the Christian religion and the mean score is  $3.00 \pm$ 0.00.Primigravida mothers belong to the other religion is 7 and the mean score is  $3.14 \pm 0.37$ . Calculated 'f' value is 0.96 and 'p' value is 0.40 which is more than the accepted level of significance i.e 'p'= 0.05.So it can interpret that effect of breathing exercises in relation to religion is not significant.

The above table depicts the significance of difference in effect of breathing exercises on pain in relation to occupation. Majority of primigravida mothers i.e. 75% are housewife and the mean score is  $3.26 \pm 0.45$ . Daily wages are 5% and mean score is  $4.00 \pm 0.00$ . Employees are 20% and the mean score is  $3.25 \pm 0.50$ . The calculated 'f' value is 1.19 and p' value is 0.32 which is more than the accepted level of significance i.e 'p' value = 0.05.So it can interpret that effect of breathing exercises on pain in relation to occupation is not significant.

#### Section E-(B): Associate the effect of breathing exercise on behavioral responses during labour pain among

## primigravid mothers in the experimental group with selected demographic variables.

The above table depicts the significance of difference of effect of breathing exercises on behavioral responses in relation to age Number of primigravida mothers in the age group between 19 - 23 are 13 and he mean score is  $3.30 \pm 0.48$ . Between the ages group of 24 - 28 is 6 and the mean score is  $3.16 \pm 0.48$ . Between the ages group of 29 - 33 is only one and the mean score is  $3.00 \pm 0.00$ . There is no one between the age group of 34 and above. The calculated 'f' value is 0.34 and 'p' value is 0.71 which is more than the accepted level of significance i.e 'p' value = 0.05.So it so it can interpret that effect of breathing exercises on behavioral responses in relation to age is not significant.

Above table shows the Significance of difference of effect of breathing exercises on behavioral responses in relation to educational status. In the illiterate group there is no body, in primary education there is 2 and the mean score is  $4.00 \pm 0.00$ . In the secondary education group there is 12 and the mean score is  $3.25 \pm 0.45$ . Graduation and above there is 6 and the mean score is 3. 00  $\pm$  0.00. Calculated 'f' value is 5.66 and 'p' value is 0.013 which is less than the accepted level of significance i.e 'p' value = 0.05.So it can interpret that effect of breathing exercises on behavioral responses in relation to education has a positive association in this study. The above table reveals the Significance of difference of effect of breathing exercises on behavioral responses in relation to religion. Majority of the primigravida ie 12 are belong to Hindu religion and the mean score is 3.25  $\pm$  0.45. There is no one belong to the Muslim religion, only 1 belongs to the Christian religion and the mean score is  $4.00 \pm 0.00$ . Number of primigravida belong to other religion is 7 and the mean score is  $3.14 \pm 0.37$ . Calculated 'f' value is 1.75 and the 'p' value is 0.202 which is more than accepted level of significance i.e 'p' value = 0.05.So it can interpret that effect of breathing exercises on behavioral responses in relation to religion is not significant.

The above table illustrate the Significance of difference of effect of breathing exercises on behavioral responses in relation to occupation. Majority of the primigravida mothers i.e. 75% are housewives, the mean score is 3.26  $\pm$  0.45. Daily wages is 5%, mean score is 4.00  $\pm$  0.00 and employees are 20% and the mean score is 3.00  $\pm$  0.00. Calculated 'f' value is 2.36 and the 'p' value is 0.124 which is more than accepted level of significance i.e 'p' = 0.05.So it can interpret that effect of breathing exercises on behavioral responses in relation to occupation is not significant in this study.

**Nursing Implications:** The findings of this study have implications for nursing practice, nursing education, nursing administration and nursing research.

**Nursing Services:** For centuries, human touch has been shown to be emotionally and physically healing. Particular massage techniques may either stimulate or

calm the body's muscles and tissues to create a desired effect. When massages soft tissue, electrical signals are transmitted both to the local area and throughout the body. These signals, in combination with the healing properties of touch, help heal damaged muscle, stimulate circulation, clear waste products via the lymphatic system, boost the activity of the immune system, reduce pain and tension, and induce a calming effect. Massage may also enhance well being by stimulating the release of endorphins (natural painkillers and mood elevators) and reducing levels of certain stress hormones.

The most important role of the nurse is to provide individual, family and community oriented service with adequate attention to vulnerable group of the community. The nursing services should be based on felt needs of the people. The nurse should be responsible for preventive, promotive, curative and rehabilitative aspects of care.. The most important is the preventive aspect of the care which is best achieved through the health education. The present study will help the nurses for coordinating health care services to health care professionals.

**Nursing Practice:** When professional liability is recognized, it defines the parameters of the profession and the standards of professional conduct. Nurses should therefore enhance their professional knowledge. The nurse can incorporate throughout labour is the promotion of relaxation through the use breathing exercises. Pace breathing exercises have been shown to the factors in promoting the labour progress, decreasing pain perception, increasing the women's ability to cope with labour. The midwifery nurse should consider that every primigravida mothers are the consumer of nursing and health care. The nurse can provide knowledge about pace breathing exercises to the mothers and the nurse can utilize to create awareness among the other health care personnel regarding the same.

**Nursing Education:** Nursing education helps the students with adequate knowledge, skill and attitude to fulfill their duties and responsibilities in the nursing field. The awareness of use of pace breathing exercises during the first stage of labour should be emphasized in the curriculum. The knowledge of health professional can be improved by the conducting in service education in the curriculum.

**Nursing Administration:** Findings of the study can be used by the Nursing Administrator in creating policies and plan for providing education to the nursing staff regarding the use of pace breathing exercises during the first stage of labour. In-service education programme to be initiated for nurses to update knowledge regarding the use of non pharmacological approaches to the management of first stage of labour. More information in the form of booklets, pamphlets can be given to the nurses.

**Nursing Research:** Nursing research is an essential aspect of nursing as it uplifts the profession, develop new nursing norms and enhance the body of nursing

knowledge. Nursing research improves the image and perception of nursing in society which is urgently required for the future of nursing. It also motivate for evidence based practice. There is a need for extended and intensive nursing research in the areas of one of the non pharmacological approach i.e. effect of pace breathing exercises during the first stage of labour in primigravida women. It is based on the principles of nursing interventions. The findings of the study have added the knowledge in the nursing profession. Other researchers may utilize the suggestions and recommendations for conducting further study. The tool and technique used has added to the body of knowledge and can be used for further references.

**Recommendations:** Keeping in view the findings of the study, the following recommendations are made

- 1. A same study can be conducted on large samples so that it can be generalized.
- 2. A similar study on selected non pharmacological approach towards the management of first stage of labour can be conducted.
- 3. A comparative study to find out similarities or differences between rural and urban mothers regarding the use of effect of pace breathing exercises on pain and behavioral responses during the first stage of labour.
- 4. A study to assess the knowledge of staff nurses regarding the effect of pace breathing exercises on pain and behavioral responses during the first stage of labour among primigravida.
- 5. A comparative study can be conducted by using back massage and pace breathing exercises.
- 6. A comparative study can be conducted on pace breathing exercises by the health care personnel and the life partner.

Breathing exercise is a natural way to relieve labour pain.. Mothers who have used breathing exercise during child birth have been incredibly satisfied with this natural method. So it is valuable to offer complementary pain relief methods to women in childbirth. Most childbirth education classes and most books on childbirth present relaxation techniques, along with a variety of rhythmic breathing patterns intended to complement and promote relaxation or to provide distraction from labor pain. They are also used to enhance a woman's sense of control.

A similar study was conducted by Jayabharathi.B to assess the effectiveness of relative nursing interventions (such as breathing exercise, massage and positions) on pain during labour among primigravida mothers. In this study the post-assessment level of labour pain perception of primi mothers showed a mean value of 3.33 with SD of 1.86 in experimental group and mean value of 5.69 with SD of 2.59 in control group. The mean value (3.33) of experimental group was comparatively lower than the mean value (5.69) of control group. Therefore the study concluded thatselected nursing interventions (such as breathing exercise, massage and positions) to the primi mothers were effective in reducing their labour pain perception in experimental group.

This study was similar to another findings conducted in Coimbatore indicating there was a significance difference between the mean pain scores of experimental group (4.28) was lower than the mean pain scores of control group (6.22) which shows that that the slow paced breathing initiated by the investigator was effective in reduction of pain during the first stage of labour. Another study similar to this study is a study conducted in the city of Goiânia, in the state of Goiás (GO), Brazil, using individualized assistance with guidance and encouragement of breathing exercises and muscle relaxation techniques during labor, it was found that in the active phase of labor there was a predominance of pain; with the increase in pain tolerance during labor, encouragement, force, and physical and psychoemotional well-being occurred in that period. 17 Another study using methods of progressive muscle relaxation showed significant reduction in the level of pain in parturient women subjected to this technique.

A survey of women in the United States who gave birth in 2005 found that 49 percent of the respondents used breathing techniques, and of those, 77 percent rated them as "very" or "somewhat" helpful, while 22 percent rated them as "not very helpful" or "not helpful at all" 17 This finding may reflect differences in the quality of the teaching received by the women, or indicate that breathing techniques are not helpful for everyone. A survey of British women found that 88 percent of women who reported using relaxation techniques found them to be "good" or "very good". Findings of the study clearly indicate that breathing exercise is an effective complementary means for inducing a relief from labour pain (p<0.01 as per t-test). Hence the null hypothesis is rejected at 0.05 level of significance. So it is concluded breathing exercise is effective in decreasing intensity of labour pain. So it can be effective nursing management for women in labour.

#### CONCLUSION

As mothers pass into labour, the frame briefly is going right into a panic reaction because of the pressure of the moment. This induces panic respiration that's shallow and rapid. It has been discovered that respiration and rest strategies significantly lessen the depth of labour pains and girls to have greater manipulate of their bodies and assist them deal with contractions better. There changed into a enormous depletion in labour ache on the primary degree of labour concerning primigravida moms after training the patterned respiratory approach, thus it has confirmed to be an powerful approach for lowering labour ache. Therefore, this intervention should be advocated as health facility coverage and applied as recurring take care of all of the primigravida moms in first degree of labour for lowering labour ache

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Ethical Clearance: Prior permission was obtained from the Institutional Ethical Committee (Datta Meghe Institute of Medical Sciences (Deemed to be University), Wardha. Ref. No. DMIMS (DU)/IEC/2017-18/6777. Informed written consent was taken from each participant under the study. An objectives of the study was maintained with honesty, privacy confidentiality and anonymity.

#### Conflict of Interest: Nil

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## **Cognitive Representations of Cancer on Emotional Responses and Coping Strategies With Relation to Their Comfort Level Among Breast Cancer Women**

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#### ABSTRACT

Cancer remains a life-threatening situation and often has profound emotional impact even years after treatment has started. Emotional distress is considered a normal response around the time of cancer diagnosis. It is also common across the cancer trajectory with many patients in treatment or long-term follow-up reporting clinically significant levels of distress, including anxiety and depression.1 To evaluate the coping strategies used by the women having breast cancer .2. To identify the correlation between the stages of cancer and coping strategies among the women having breast cancer. 3. To identify the correlation between coping strategies among the women having breast cancer.4. To find out association between the coping strategies with selected demographical variables among the women having breast cancer. The nature and extent of coping strategies used by the participants showed that in the first interview 95.6% reported facing life threatening diagnosis which increased to 96.4% in the second and to 96.8% in the third interview. During the first interview 90.8% had their lines of communication open which increased to 95.2% in second interview and then slightly reduced to 94.4% in the third interview. In the first interview 95.6% anticipated physical changes which increased to 99.2% in the second interview and reduced to 98.4% in the third interview. Among the participants, 85.2% reported of maintaining a healthy lifestyle in the first interview which increased to 93.6% in the second interview but gradually reduced to 92.8% in third interview. 92.8% reported of getting help from their family and friends in the first interview which increased to 98.4% in the second interview and again came down to 97.6% in the third interview. Regarding psychological pain; 1.2% reported the pain of facing the stigma in first interview which remained constant in second interview with a minimal increase to 1.6% in the third interview. Self-blame was common with 73.6% reporting of blaming self in the first interview which reduced to 69.9% in the second interview and again increased to 72% in third interview. Among the study participants 30.4% had reported of being religious which remained constant in second interview but reduced to 27.2% in the third interview. During the second interview which was 1 month after the first interview the use of coping strategies had increased which reduced again in third interview which was again after 2 months after the first interview. This indicates that the use of coping strategies was fluctuating. The study participants used a wide range of coping strategies to a variable extent.

**KEY WORDS:** COGNITIVE REPRESENTATIONS, COPING STRATEGIES

#### **INTRODUCTION**

Newly diagnosed breast cancer patients display high levels of distress, and loss of effectiveness in key cognitive



activities, increasing concern over the psychological impact of being offered a role in decision making for treatment. The extent to which patients are affected by their emotional reaction to their diagnosis may be closely related to their ability to plan their medical care.

**Need of the Study:** Fear of uncertainty, intense emotional reactions to diagnosis and time pressures to take treatment, decision can leave women feeling overwhelmed. In such a mental state they are unable to process the information or take on the responsibility in decision making. To make an informed choice, patients have to digest a lot of



information, and the way in which it is presented may impact on the decision they make.

**Statement:** Influences of cognitive representations of cancer on emotional responses and coping strategies with relation to their comfort level among breast cancer women.

**AIM:** Evaluating the influences of cognitive representations of cancer on coping strategies at all stages of cancer that is first, second and third stage among breast cancer women (Lauver et al., 2007).

#### Objectives

- 1. To evaluate the coping strategies used by the women having breast cancer
- 2. To identify the correlation between the stages of cancer and coping strategies among the women having breast cancer.
- 3. To identify the correlation between coping strategies among the women having breast cancer.
- 4. To find out association between the coping strategies with selected demographical variables among the women having breast cancer.

**Sample Size:** The sample size in this study was 250 women suffering from various stages of breast cancer except fourth stage of cancer.

#### Variables

The variables under study were -

**Dependent variables:** Cognitive representations on coping strategies of women suffering from breast cancer.

#### Independent variable: Breast cancer

Review of Literture: Literature related to coping strategies used by breast cancer women A Research study conducted in Bangalore among the cancer patients who were receiving radiation therapy showed that ineffective coping mechanisms such as, helplessness and fatalism were leading to incomplete resolution. Interventions to minimize these concerns and handle the associated anxiety, depression would improve their quality of life. A variety of coping skills are required to adjust to and life successfully with cancer. One's ability to cope affects how one perceives or appraises the situation, how well one relates to others and how one can manage side effects of treatment, including pain. Patients who cope effectively are being able to accept a diagnosis, seek more information, talk with others to relieve stress and undertake some positive, constructive action.

A study reported that problem-focused coping strategies, such as cognitive acceptance, positive and constructive thinking, and using emotional support and religion were mostly considered as beneficial coping strategies. The results indicated that trying to be hopeful and trying to have a positive, optimistic perspective and cognitive acceptance have very important roles among young women who are married and having children with breast cancer (Lashbrook et al., 2018).

#### Methodology

- **Research Setting:** The study was conducted in the selected multidisciplinary hospitals of Wardha, Maharashtra.
- Study Design: Analytical Survey
- Participants: Adult women with breast cancer who had undergone chemotherapy and mastectomy in the age group of 20 years to 62 years and in between the diagnosis of any three stages, first, second and third.
- **Sampling Techniques:**Purposive Sampling technique.

**Material with their standardization:** The tools used for data collection were modified standardized tools. The tools used in this study includes

- 1. Demographic data sheet:
- 2. Cognitive assessment tool: It includes the cognition of breast cancer patient related to their experiences and suffering with the disease.
- 3. To assess the coping strategies of breast cancer women Brief Coping Orientations to Problems Experienced Inventory (Brief COPE) (Carver, 1997) was modified according to Indian setting and utilized.

#### **Eligibility Criteria:**

#### Inclusion Criteria includes:

- Women who have been diagnosed with I to III stage of breast cancer and are under treatment.
- Women aged 18 years and above.
- Who are willing to participate in the study
- Exclusion criteria includes
- Women with alteration of consciousness.
- Women who have previous history of other cancer.
- Women with mental illness.
- Breast cancer women who are at fourth stage (Metastasis).

#### **Analysis and Deliberations:**

Part I: Demographic distribution of the participants

Part II: Cognitive levels of study participants regarding breast cancer

Part III: Correlation between the nature of coping strategies by the participants.

Part IV: Correlation between the stages of cancer and their coping strategies among the women having breast cancer (Sharon et al., 2015).

Part V: Level of significance difference in the coping

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strategies of the participants in three different interviews (Susan 1997).

the demographic variables.

Part VI: Association of nature of	coping strategies with
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Part I: Demographic distribution of the study participants

Table 1. Distribution of Participants according to their Demographic Characteristics N=250							
S. N.	Demographic Characteristics	Categories	Freq.	0/0			
1	Age in Years	• 20 - 30	37	14.8			
		•31 - 40	48	19.2			
		•41 -50	94	37.6			
		•51 -60	70	28			
		•61 -70	01	0.4			
		•> 70	00	0			
2	Residence	●Urban	167	66.8			
		•Rural	51	20.4			
		•Semi-urban	32	12.8			
3	Education	•Illiterate	49	19.6			
		•Primary	55	22			
		<ul> <li>Secondary</li> </ul>	77	30.8			
		•Higher Secondary	44	17.6			
		<ul> <li>Graduation</li> </ul>	23	9.2			
		•PG or Other	2	0.8			
4	Occupation	•Farmers	52	20.8			
		•Homemakers	58	23.2			
		Private Service	111	44.4			
		•Govt. Service	25	10			
		•Students	4	1.6			
5	Monthly Family	•Less than 10000/-	32	12.8			
	Income in Rupees	a 10001 - 20000/	70	20.2			
		• 10001 - 20000/-	/3	29.2			
		•20001 - 30000/-	48	19.2			
6	Age of Menarche	•Note than 50001/-	97	0.00			
0	Age of Menarche	$\bullet 10 = 12 \text{ yrs}$	1	0.4			
		•13 -15 yrs	210	84			
		•More than 15 vrs	39	15.6			
7	Marital Status	•Unmarried	8	3.2			
·		•Married	197	78.8			
		•Widow/Separated/Divorced	45	18			
8	Years of marriage	Not Applicable	8	3.2			
		•Less than 10 yrs.	19	7.6			
		•10 – 20 yrs.	45	18			
		•21 – 30 yrs.	78	31.2			
		•More than 30 yrs.	100	40			
9	Number of children	<ul> <li>Not Applicable</li> </ul>	8	3.2			
		•No children	20	8			
		•One	48	19.2			
		•Two	78	31.2			
		•Three	57	22.8			
		•More than 3	39	15.6			
10	History of Breast Feeding	<ul> <li>Not applicable</li> </ul>	8	3.2			
		•No history of breast feeding	20	8			
		●Regular	211	84.4			

		<ul> <li>Irregular</li> </ul>	11	4.4
11	Type of Family	•Joint	127	50.8
		<ul> <li>Nuclear</li> </ul>	123	49.2
12	Health Insurance	•Yes	22	8.8
		•No	228	91.2
13	History of Breast Cancer in the family	•Yes	6	2.4
		•No	244	97.6
14	If yes, relationship with the patient	<ul> <li>Not Applicable</li> </ul>	244	97.6
		<ul> <li>Maternal Aunt</li> </ul>	1	0.4
		<ul> <li>Paternal Aunt</li> </ul>	2	0.8
		<ul> <li>Granddaughter</li> </ul>	2	0.8
		<ul> <li>Niece</li> </ul>	1	0.4
15	Duration of Diagnosis	<ul> <li>Less than one year</li> </ul>	185	74
		•1 – 5 yrs.	65	26
		•6 – 10 yrs.	0	0
		<ul> <li>More than 10 years</li> </ul>	0	0
16	Current stage of Breast Cancer	•Stage I	30	12
		•Stage II	188	75.2
		•Stage III	32	12.8
17	Line of Treatment& Management	<ul> <li>Just Diagnosed &amp; no</li> </ul>	20	8
		Treatment started		
		•Only Chemotherapy	128	51.2
		<ul> <li>Only Surgery</li> </ul>	65	26
		<ul> <li>Chemo + Surgery</li> </ul>	37	14.8
18	Source of information	•Mass media	193	77.2
		<ul> <li>Health professional</li> </ul>	42	16.8
		•Family and friends	15	6

This part of the study deals with the demographic variables of the samples of the study i.e. age in years, residence, education, occupation, monthly family income, age of menarche, marital status, age of marriage, number of children, history of breast feeding, type of family, health insurance status, family history of breast cancer, if yes, relationship with the patient, duration of diagnosis of breast cancer, current stage of breast cancer, line of treatment and management and source of information. The above table no. 1 reveals that 37(14.8%) participant were in the age group of 20-30 years, 48(19.2%) in the age group of 31-40 years, 94(37.6%) in the age group of 41-50 years, 70(28%) in the age group of 51-60 years and there was only 1 (0.4%) in the age group of 61-70 years. One sixty seven (66.8%) participant resides in the urban area, 51 (20.4%) resides in the rural area, whereas 32(12.8%) resides in semi urban area. Forty nine (19.6%) participants were illiterate, 55(22%) have primary education, 77(30.8%) up to secondary, 44 (17.6%) up to higher secondary, 23 (9.2%) upto graduation and only 2(0.8%) were upto the post-graduation education.

Fifty two (20.8 %) participants were farmer, 58(23.8%) were homemakers, 111 (44.4%) have private service, 25(10%) have government service, whereas only 4(1.6%) were students. Thirty two (12.8%) participants have less than 10,000 rupees monthly income, 73(29.2%) between 10001-20000 rupees,48(19.2%) between the 20001-30000 rupees and 97(38.8 %) were having more than 30001rupees. Only 1(0.4%) participant was between age group of 10-12 years old of menarche, 210 (84%) were

between age group of 13-15 years old and 39 (15.6%) were more than 15 years old at menarche. Eight (3.2%) participants were unmarried, 197(78.8%) were married and 45 (18%) were from the widow/separated/divorced. Participants who were under the category of less than 10 years of marriage were 19(7.6%), 45(18%) were between 10-20 years, 78(31.2%) were in between the 21-30 years and 100(40%) were more than 30 years. Eight(3.2%) participants were not applicable as they were unmarried, 20(8%) participants had no children, 48(19.2%) were having only one child, 78(31.2%) were having two children, 75(22.8%) were having three children and 39(15.6%) were having more than three children.

Eight (3.2 %) participants were not applicable as they were unmarried, 20(8 %) participants had no history of breast feeding, 211(84.4%) had given regular breast feeding and 11(4.4%) had given irregular breast feeding. One hundred twenty seven (50.8%) participants belongs to joint family and 123(49.2%) belongs to nuclear family. Twenty two (8.8%) participants were having health insurance and 228(91.2%) were not having any health insurance.

Six (2.4%) participants were having family history of cancer, whereas 244(97.6%) were not having any family history of cancer. Only 1(0.4%) participant's maternal aunt had history of cancer, 2(0.8%) participant's paternal aunt had history of cancer, 2(0.8%) participant's grand-daughter had history of cancer and 1 (0.4%) participant's niece had history of cancer. One hundred eighty five

(74%) participants were diagnosed within less than one year duration and 65(26%) participants were diagnosed between last 1 to 5 years. Thirty (12%) participants were at stage I, 188(75.2%) participants were at stage II and 32(12.8%) participants were at stage III. Twenty (8%) participants were just diagnosed and did not receive any treatment, 128(51.2%) participants were receiving only chemotherapy, 65(26%) participants have undergone surgery (Mastectomy) and 37 (14.8%) participants were receiving both chemotherapy and undergone surgery (Mastectomy). One hundred ninety three (77.2%) participants got the source of information from the mass media and 42 (16.8%) got from the health professional whereas 15(6%) got information from the family and friends.

## Part II: Cognitive levels of study participants regarding breast cancer

The above table no. 2shows the level of cognitive of study participants regarding breast cancer. It reveals that 17(6.8%) participants had poor cognitive level, 199(79.6%) had average cognitive level and only 34(13.6%) had good cognitive level regarding breast cancer.

## Part III: Correlation between the nature of coping strategies by the participants

The above table No. 3 shows that the nature and extent of coping strategies used by the participants. During the first interview 11(4.4%) participants reported that they did not feel that they are facing life threatening diagnosis, this number reduced to 9(3.6%) in second interview and further reduced to 8(3.2%) in the third interview. On the other hand, 239(95.6%) in the first interview reported that they were facing life threatening diagnosis which increased to 241(96.4%) in the second and to 242(96.8%) in the third interview. During the first interview 23(9.2%) they did not keep their line of communication open which were decreases in second 12(4.8%) and in third 14(5.6%). On the other hand, 227(90.8%) had their lines of communication open which increased to 238(95.2%) in second interview and reduced to 236(94.4%) in the third interview. During the first interview 11(4.4%) they did not anticipated possible physical changes which decreased in second 2(0.8%) and 4(1.6%) third interview. On the other hand, in the first interview 239(95.6%)participants anticipated physical changes which increased to 248(99.2%) in the second interview but reduced to 246(98.4%) in the third interview.

Table 2. Cognitive levels of study participants regarding breast cancer N=250									
Cognitive Levels	Cognitive Score range	nitive Score range Percentage range Freq. Percer							
Poor	0 - 3	0 - 30	17	6.8					
Average	4 - 6	40 - 60	199	79.6					
Good	7 - 10	70 - 100	34	13.6					

Table 3. Use of coping strategies by the participants N=250

Coping Strategy	Scores	%	Interview I		Interv	iew 2	Interview 3	
	Range	Range	Freq.	%	Freq.	%	Freq.	%
Facing a life-	1 - 22	<50	11	4.4	9	3.6	8	3.2
threatening diagnosis	23 - 44	>50	239	95.6	241	96.4	242	96.8
Keep the lines of	1 - 8	<50	23	9.2	12	4.8	14	5.6
communication open	9 - 16	>50	227	90.8	238	95.2	236	94.4
Anticipate possible	1 - 26	<50	11	4.4	2	0.8	4	1.6
physical changes	27 - 52	>50	239	95.6	248	99.2	246	98.4
Maintain a healthy	1 - 18	<50	37	14.8	16	6.4	18	7.2
lifestyle	19 - 36	>50	213	85.2	234	93.6	232	92.8
Friends and family	1 - 8	<50	18	7.2	4	1.6	6	2.4
help	9 - 16	>50	232	92.8	246	98.4	244	97.6
Tr. Let	1 - 14	<50	247	98.8	247	98.8	246	98.4
Fighting stigma	15 - 28	>50	03	1.2	03	1.2	4	1.6
Self-blame	1 - 20	<50	66	26.4	76	30.4	70	28
	21 - 40	>50	184	73.6	174	69.6	180	72
Religiosity	1 - 14	<50	174	69.6	174	69.6	182	72.8
	15 - 28	>50	76	30.4	76	30.4	68	27.2

During the first interview 37(14.8%) participants did not maintained their healthy lifestyle which decreased more in second interview 16(6.4%) but increase in third interview 18(7.2%). On the other hand, 213(85.2%)

participants were maintaining a healthy lifestyle in the first interview which increased in the second interview 234(93.6%)but reduced in third interview232(92.8%).

Table 4. Descriptive Statistics							
	Mean	Ν					
Coping Strategy in stage I	165.96	10.10	30				
Coping Strategy in stage II	159.65	13.33	188				
Coping Strategy in stage III	147.37	12.98	32				

Table 5. Level of significance difference in the coping strategies of the participants in three different interviews N=250

Variable	Interview	Mean	SD	'ť'	ʻp'
Coping Strategies	1	1.57	15.65	5.653	0.000 S, p<0.05
	2	1.60	13.92		
	1	1.57	15.65	4.325	0.000 S n<0.05
	3	1.59	12.87		5, p (0.05
	2	1.60	13.92	2.054	0.041 S, p<0.05

During the first interview 18(7.25) participants were not taking help from friends and family which decreased more in second 4(1.6%) but increased in third interview 6(2.4%). On the other hand, 232(92.8%) participants were taking help from family and friend in the first interview which increased to 246(98.4%) in the second interview but again decreased to 244(97.6%) in the third interview. During the first interview 247(98.8%) participants did not had stigma, which was same in second interview 247(98.8%) and decreased246 (98.4%) in third interview. On the other hand, 3(1.2%) participants were facing the pain of stigma in first interview, which remained constant in second interview with a minimal increase to 4(1.6%) in the third interview. During the first interview 66(26.4%) participants did not blame self for having breast cancer in first interview which increased in second interview 76(30.4%) and again decreased 70(28%) in 3rd interview. On the other hand, 184(73.6%) participants blamed themselves for having breast cancer in the first interview which reduced to 174(69.9%) in the second interview and again increased to 180(72%) in third interview.

During the first interview 174(69.6%) participants believed that religiosity will not help them in treatment of breast cancer, which was constant in second interview but increased 182(72.8%) in third interview. On the other hand, 76(30.4%) participants believe that being religious will help them in treatment of breast cancer, which remained constant in second interview but reduced to 68(27.2%) in the third interview. The above table no. 3 shows that during the second session of interview which was after 1 month of first interview, the use of coping strategies had increased which reduced again in third interview. This indicates that the use of coping strategies was fluctuating. It also reveals that participants used a wide range of coping strategies to variable extent. The pattern of nature and extent of use of coping strategies shows that during the first month there is maximum utilization of coping strategies as reported in the second interview and then the use of coping strategies starts reducing as reported in the third interview.

# Part IV: Correlation between the stages of cancer and their coping strategies among the women having breast cancer.

#### Correlation for stage I,II and III breast cancer patients

Table no. 4 shows that mean between the stage I, II and III breast cancer women's in coping strategy, comfort level score was 165.96, 159.65, 147.37 whereas Std. Deviation was 10.10, 13.33 and 12.98 respectively.

# Part V: Level of significance difference in the coping strategies of the participants in three different interviews

The difference in the coping strategies was significant between first, second and third interview with p=0.000. This reveals that the use of coping strategies was dropping over the course of disease as indicated by the reducing means values (15.65, 13.92 and 12.87 respectively for 1st, 2nd and 3rd interview). This is because of progression of disease condition and there emotion was not stable.

## Part VI: Association of nature of coping strategies with the demographic variables.

The above table No. 6 shows association of coping strategies with demographic variables of the study participants. It shows that coping strategies were significantly associated with age, residence, education, occupation, monthly family income, age at menarche, marital status, age of marriage, number of children, type of family health insurance, duration of cancer, current status of cancer and line of treatment and management given to the participant as p=0.05.Whereas history of breast cancer in the family was not significant. This indicates that coping strategies are influenced by almost all demographic characteristics of the participants.

#### **RESULTS AND DISCUSSION**

Coping strategies of the participants were decreased from first to second and then increased in third interview this indicates that this could be due to fast advancement of treatment they have received. Between the three interviews the coping strategies had been found inconsistent and in third interview the participants started adapting coping strategies positively for their disease and treatment. The coping strategies were found significantly associated with majority of demographic variables i.e. age, residence, education, occupation, monthly family income, age at menarche, marital status, age of marriage, number of children, type of family health insurance, duration of cancer, current status of cancer and treatment given to the participant as p<0.05. This indicates that coping strategies were influenced by almost all demographic variables of the participants. This shows that as the positive emotional status were influenced by the above demographic variables, indicating that they are good source for the coping strategies.

Table 6. Association of Coping Strategies with demographic variables N=250									
Demographic Characteristics	Categories	N	Mean	SD	"F'/"t"	р			
Age in Years	20 - 30	37	1.67	16.08	F=26.812	0.000 S. p<0.05			
	31 - 40	48	1.65	11.85		-, p			
	41 -50	94	1.59	12.00					
	51 -60	70	1.44	13.80					
	61 -70	1	1.52						
	> 70	0	1.67	16.08					
Residence	Urban	167	1.61	13.82	F=25.815	0.000 S,p<0.05			
	Rural	51	1.44	17.70					
	Semi-urban	32	1.59	9.99					
Education	Illiterate	49	1.42	12.97	F=25.392	0.000 S, p<0.05			
	Primary	55	1.51	15.46					
	Secondary	77	1.63	10.31					
	Higher Secondary	44	1.63	14.43					
	Graduation	23	1.68	9.55					
	PG Or Other	2	1.73	2.83					
Occupation	Farmer	52	1.47	16.66	F=15.135	0.000			
						S, p<0.05			
	Homemaker	58	1.41	12.18					
	Private Service	111	1.63	11.54					
	Govt. Service	25	1.67	9.92					
Monthly Fourily Income	Student	4	1.76	3.61	E 00 171	0.000			
in Rupees	Less than 10000/-	32	1.42	16.61	F=23.171	0.000 S, p<0.05			
	10000 - 20000/-	73	1.53	14.30					
	20001 - 30000/-	48	1.59	13.15					
	More than 30000/-	97	1.64	12.97					
Age at Menarche	Less than 10 yrs	0	0		F=9.706	0.000 S, p<0.05			
	10 - 12 vrs	1	1 5 2						
	13 - 15  yrs	210	1.55	14.84					
	More than 15 vrs	39	1.55	16.91					
Marital Status	Single	8	1.70	9.49	F=27.819	0.000			
					1 2/1013	S, p<0.05			
	Married	197	1.60	14.00					
Voors of mornings	widow/Separated/Divorced	45	1.43	15.66	E 22.200	0.000			
rears of marriage	Not Applicable	ð	1.70	9.49	r=23.389	0.000 S n<0.05			
	Less than 10 vrs	19	1.65	15.88		3, p<0.05			
	10 - 20  vrs	45	1.63	12.79					
	21 - 30  vrs	78	1.55	12.09					
	More than 30 vrs	100	1.44	14.27					
Number of children	NA	8	1.66	10.88	F=4.422	0.001			

						S, p<0.05
	Nil	20	1.54	19.33		
	One	48	1.62	18.98		
	Two	78	1.58	14.58		
	Three	57	1.54	13.76		
	More than 3	39	1.51	13.97		
History of Breast Feeding	Not applicable	8	1.66	10.47	F=3.263	0.022
						S, p<0.05
	No	20	1.69			
	Regular	211	1.56	16.10		
	Irregular	11	1.58	11.50		
Type of Family	Joint	127	1.58	13.54	t=8.200	0.000
						S, p<0.05
	Nuclear	123	1.58	16.69		
Health Insurance	Yes	22	1.72	8.51	t=22.615	0.000
						S, p<0.05
	No	228	1.56	15.45		
History of Breast Cancer	Yes	6	1.48	23.12	t=2.159	0.143
in the family						NS, p>0.05
	No	244	1.57	15.42		
If yes, relationship with the patient	Not Applicable	244	1.57	15.42	F=3.320	0.011
						S, p<0.05
	Maternal Aunt	1	1.69			
	Paternal Aunt	2	1.66	7.07		
	Granddaughter	2	1.21	3.54		
	Niece	1	1.45			
Duration of Diagnosis	Less than one year	185	1.59	14.74	F=13.465	0.000
						S, p<0.05
	1 – 5 yrs	65	1.51	16.71		
	6 – 10 yrs	0	0			
	More than 10 years	0	0			
Current stage of Cancer	Stage I	30	1.67	10.83	F=22.044	0.000
						S, p<0.05
	Stage II	188	1.58	14.81		
	Stage III	32	1.43	15.40		
Line of treatment and management	Just Diagnosed & no	20	1.60	12.37	F=6.505	0.000
	Treatment started					S, p<0.05
	Only Chemo	128	1.60	14.94		
	Only Surgery	65	1.54	14.74		
	Chemo + Surgery	37	1.49	18.14		
Source of information	Mass media	193	5.35	1.11	F=4.83	0.009
						S,p<0.05
	Health professional	42	4.78	1.11		
	Family and friends	15	5.00	1.19		

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## Effect of Ethanolic Extract of *Crataeva Nurvala* Bark on Iodothyronine Deiodinases Oxidative Stress and Thyroid Histology in 6-Propyl-2-Thiouracil Induced Hypothyroid Mice Model

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#### **ABSTRACT**

In Ayurveda, "Galaganda" (enlarged thyroid gland) occur due to disequilibrium among three doshas i.e. Vata, Pitta and Kapha leading to hormonal imbalance (Ojus). Levothyroxine ( $LT_4$ ) is the standard replacement therapy in hypothyroidism, clinically that offers a similar life quality, whereas the psychological adverse effects and its pharmacokinetic interactions questions its use. In ancient literature, *Crataeva nurvala* (CN) Buch-Ham, (family, Capparidaceae) or Varuna is known to regulate, tridoshas and other thyroid problems. A preclinical study confirms its thyrotropic and antihyper-chloesteronemic effects but its mechanism via iodothyronine deiodinases, effect on thyroid histopathology and physiological parameters need to be explored. The levels of Total thyroxine ( $T_4$ ), triidothyronine ( $T_3$ ),  $T_3/T_3$  ratio, oxidative stress (reduced glutathione (GSH) and lipid peroxidation) and physiological parameters were studied. The Swiss albino female adult mice were randomly divided into four groups (n=6) i.e. Group I to IV who were made hypothyroid using 6-propyl-2-thiouracil (PTU) for first 15 days and then treated with vehicle only,  $LT_4$  (14.56 µg/kg), CN 400 mg/kg and CN 600 mg/kg (p.o.) for another 15 days respectively. The variation in the biochemical parameters was recorded on Day 30<sup>th</sup>. Under hypothyroid conditions,  $T_3/T_4$  ratio in comparison with the standard i.e.  $LT_4$ , depicts significant iodothyronine deiodinases stimulatory activity of CN extract, with significant consumption of GSH for combating raised MDA levels thus possessing the thyroprotective effect, along with maintaining thyroid histoarchitecture.

**KEY WORDS:** HYPOTHYROIDISM, LEVOTHYROXINE, CRATAEVA NURVALA, IODOTHYRONINE DEIODINASES, THYROXINE.

#### **INTRODUCTION**

Levothyroxine (LT4) is the standard replacement therapy in hypothyroidism, clinically that offers a similar life quality, whereas the psychological well being is compromised (Garber et al., 2012; Petersen et al., 1990; Saravanan et al., 2002). Also, many physiological and pathological conditions can impair  $LT_4$  absorption such



as patient factors (compliance), certain foods (e.g. Grapes, coffee, soyabean, papaya etc.), age factor, drugs (e.g. Antacids containing aluminium, sucralfate, proton pump inhibitors, rifampicin, antiepileptics, etc.) gastrointestinal diseases (e.g. Helicobacter pylori infection, celiac disease). The overtreatment with  $LT_4$  results in TSH suppression, cardiovascular health risk, high risk of skeletal fracture, especially postmenopausal women, however, short administration of  $LT_4$  does not compromise bone density but possible affective disturbances are seen (Razvi et al., 2012; Schneider et al., 2012; Botella-Carretero et al., 2003).

In Ayurveda, thyroid disorders are discussed under the term "Galaganda" (enlarged thyroid gland). As per Ayurveda, Varuna leaves, stem bark and root bark



are reported to be used in maintaining equilibrium among three doshas (bodily humours) Vata, Pitta and Kapha, whose imbalance can lead to Ojus (hormonal imbalance), most commonly thyroid disorders (Kaur et al., 2016). *Crataeva nurvala* Buch-Ham (CN), belonging to the family, Capparidaceae, synonymously called as *C. magna* (Lour.) DC., *C. religiosa* Hook. F and Varuna (Khare, 2007). It is reported to possess analgesic, neuroprotective, antiarthiritic, anticancer, antidiabetic, cardioprotective, anti-inflammatory, antioxidant, hepatoprotective, nephroprotective activities (Khattar & Wal, 2012). Traditionally its use is reported in treating cancer, paralysis, thyroid problems etc. (Narayana & Subhose, 2005).

Pre-clinically it has been demonstrated that CN bark extract can elevate free thyroxine (FT4) and lower the raised cholesterol levels (Kaur et al. 2017). However the mechanism behind CN thyrotropic activity, mainly via iodothyronine deiodinases, effect on thyroid gland histology and physiological parameters in hypothyroid mice needs to be explored in comparison with its per se effects in normal healthy mice (Kaur et al. 2018). So, this study is aimed to evaluate the mechanism of thyroprotective activity and effects on thyroid histopathology and physiological parameters in hypothyroid mice, whose thyroid status was altered by using (6-propyl-2-thiouracil) PTU, as an inducing agent, that selectively inhibits iodothyronine deiodinases type I (DIO1) mediated thyroxine (T<sub>1</sub>) conversion to Triidothyronine (T<sub>2</sub>) at thyroid gland and at periphery over iodothyronine deiodinases type II (DIO<sub>2</sub>) and results in disruption of thyroid histology with physiological changes (Bianco et al. 2002; Moriyama et al., 2007).

#### MATERIAL AND METHODS

**Chemicals:** 6-Propyl-2-thiouracil (PTU) was procured from Sigma-Aldrich Chemie GmbH and Levothyroxine Sodium tablets (Eltroxin) were purchased from the local vendor. All other reagents used for analysis, extraction and phytochemical screening were of analytical grade.

**Animals:** Adult Swiss Albino female mice (3-5 months; 25-35 gm) were procured from Panacea Biotec Ltd, Lalru India and were housed in polypropylene cage under standard laboratory conditions as per CPCSEA guidelines. They were fed with standard pellet diet (Shree Jagdambey Feed Industries, Moga, Punjab) and water ad libitum. The experimental study was duly approved by the Institutional Animal Ethics Committee (IAEC) [IAEC-CTIPS/2015/VII/0042 (PCL-M)].

**Preparation and phytochemical screening of Crataeva nurvula plant extract:** The dried stem bark of Crataeva nurvula (3.5 Kg) was procured from Herbal Health Research Consortium Pvt. Ltd. Amritsar duly certified on basis of description and physico-chemical parameters (Lot No. VRN-024, Certificate of Analysis A. R. No. 06/2015/ IH/086, in compliance with Q.S.I.M.P. Volume 10, Page no. 106-108). It was further authenticated by Singh, Chief Scientist Herbology, Aimil Pharmaceuticals (India) Limited, New Delhi. A voucher (HHRC/RT/0416/15-16) and plant specimen was submitted to Pharmacology department of our college for future reference. The CN bark extract was prepared using repeated maceration technique and screened for presence of phytochemicals as per the method described in (Kaur et al. 2017).

**Experimental design:** The experimental hypothyroidism was induced in adult female Swiss Albino Mice (25-35 gms) using, 6-Propyl-3-thiouracil (PTU), an anti-thyroid drug (10 mg/kg/day by oral gavage for 15 days) (Panda and Kar, 2005). The experiment was of 37 days including 7 day acclimatization of animals to laboratory environment. Figure 1 shows that the protocol involved, induction of hypothyroidism for first 15 days using PTU and treatment for the next 15 days with vehicle (VEH) only, standard (STD) drug and test (CN 400 and CN 600) drug respectively).



Serum triidothyronine ( $T_3$ ) and thyroxine ( $T_4$ ) levels: Blood was withdrawn 24 hours after the last dose on day 30th via retro-orbital method. The blood samples were centrifuged for 20 min (2000 rpm) to separate the serum which was stored at -200C for further biochemical investigations. The serum  $T_3$  and  $T_4$  levels were determined using the commercially available ELISA thyrokit (ERBA Lachema s.r.o., Czech Republic) on Day 30th. The estimation was based on direct solid phase competitive enzyme immunoassay and the results were expressed in ng/ml.

**Thyroid gland oxidative stress parameters:** The thyroid gland was perfused with ice-cold 0.85% Sodium chloride solution was isolated, weighed and placed in 1.15% potassium chloride solution (in the ratio of 1 gm wet tissue to 9 ml of 1.15% potassium chloride). It was then homogenized in tissue homogenizer. An aliquot of 10 % w/v homogenate was preserved at -20oC for estimating MDA (TBARS) and reduced glutathione (GSH) levels. TBARS assay values were reported as malondialdehyde (MDA) equivalents, which is a secondary by product of lipid peroxidation. The reaction of a 2-thiobarbituric acid (TBA, chromogenic reagent), with MDA at 25°C at pH 4 gives rise to red colouration, which when extracted in organic layer was determined photometrically at 532 nm (Ohkawa et al. 1979).

To the 10% w/v homogenate, added 5% trichloroacetic acid (TCA), in order to precipitate the protein hydrolysates. The mixture was incubated for 10-15 min at 2-8 °C, and centrifuged (5000 rpm, 10 min). The supernatant was then added to potassium phosphate buffer, 0.1 M (pH 8.0) and 5,5'- dithiobis-2-nitrobenzoic acid (DTNB reagent; 4 mg/ ml in KPB, 0.1 M, pH 7.0). Reaction with DTNB reagent gave a yellow colored product that developed rapidly (2 min) and read at 412 nm (Ellman, 1959).

**Body weight, food intake and water intake:** Parameters like body weight, food intake, and water intake were recorded daily over the study duration and weekly average values were calculated.

**Histopathological studies:** The thyroid gland was excised, rinsed, and preserved in formaldehyde solution till histopathological studies of thyroid gland were done by hematoxylin and eosin staining (H&E) method (Sayaki and Azure, 1955). The histopathology images depicted the cell nuclei in blue color, blood vessels in red color, and other connective tissue with cytoplasm in shades of pink.

**Statistical analysis:** The values of biochemical estimation i.e. thyroid hormone (n=5) and oxidative stress parameters in thyroid tissue (n=3) are expressed as mean  $\pm$  SEM, analyzed using One-way ANOVA followed by Dunnett's Multiple Comparison Test. Physiological parameters are expressed as mean SEM (n=6), analyzed using Two-way RM ANOVA followed by Bonferroni post test to compare replicate means by row (\*p<0.05 vs VEH; #p<0.05 vs PTU+VEH; @p<0.05 vs PTU+STD).

#### **RESULTS AND DISCUSSION**

Serum triidothyronine ( $T_a$ ) and thyroxine ( $T_4$ ) levels: Table 1, shows that serum total  $T_4$  levels were significantly high in standard group in comparison with low and high dose treatment group, at Day 30th. Low dose treatment group had the significantly lower levels of  $T_4$  (#p<0.05). There were no significant changes in  $T_3$  levels, however, calculated  $T_3/T_4$  ratio was found to be highest in low dose treatment group followed by high dose treatment group in comparison with standard group.

Studies reveal that fraction of both  $T_4$  and  $T_5$  is bound to mainly two proteins i.e. Thyroxine binding protein (TBG), Thyroxine binding prealbumin (TBPA) and albumin. T4 is 99.95% bound to plasma proteins and its values are useful for diagnosis of hypothyriodism and hyperthyroidism (Wills & Harvard, 1983). Also, TBG levels are reported to be high in PTU-treated rats than LT4 treated rats that regulate levels of T $_4$  in serum (Savu et al. 1989). In our study, low levels of T $_4$  could be attributed to high levels of TBG in serum of treatment group mice. About 13% of T<sub>3</sub> is secreted at thyroidal level but majority is formed by peripheral monodeiodination via Type I 5'idothyronine monodeiodinase (DI01) (Bianco et al. 2002). However, any change in DI01, i.e., inhibition or stimulation alters T<sub>2</sub> concentration and T<sub>2</sub>/ T, ratio (Visser et al. 1978). So the results indicate that treatment groups showed significant DI01 stimulatory activity over standard group.

Table 1. Biochemical changes in thyroid hormones and oxidative stress parameters in thyroid tissue and serum of PTU induced hypothyroid and CN treated mice.								
Groups								
Parameters	PTU+VEH	PTU+STD	PTU+CN 400	PTU+CN 600				
Total thyroxine $(T_4)$ ng/ml	91.980±15.466	114.550±14.088 #@@@	36.860 <u>+</u> 4.738	69.675±11.454 @				
Total triidothyronine (T <sub>3</sub> ) ng/ml	3.0566±0.315	3.0514 <u>+</u> 0.112	3.558±0.432	3.343±0.124				
$T_3/T_4$ ratio	0.0359 <u>+</u> 0.004	0.0281±0.003	0.102±0.015 ###@@@@	0.0527 <u>+</u> 0.009				
Thyroid weight (gm)	0.210±0.020	0.160 <u>±</u> 0.010	0.170±0.020	0.140±0.010#				
TBARS (nmol of MDA formed/mg of thyroid tissue	6.723±1.480	5.120 <u>+</u> 0.435	8.173±0.880@	6.078±0.740				
GSH (Micromol/gram of thyroid tissue)	7.187±0.992	2.333±0.515##	2.707±0.405##	5.087±0.673				
				@				

For serum analysis the values are expressed as mean SEM, (n=5) analyzed using One-way ANOVA followed by Dunnett's Multiple Comparison Test. For tissue parameters the values are expressed as mean SEM, (n=3), analyzed using One-way ANOVA followed by Dunnett's Multiple Comparison Test (#p<0.05 vs PTU+VEH; @p<0.05 vs PTU+STD).

**Oxidative stress parameters:** Table 1 shows that the weight of thyroid gland was found to be significantly raised in disease control at Day 30<sup>th</sup>. the level of TBARS in thyroid gland was found to be raised in low dose treatment group

with significant decrease in GSH levels of standard and treatment groups in comparison with disease control (@ p<0.05). Previous studies in hypthyroid/hypometabolic state and hyperthyroid/hypermetabolic state concluded

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that both conditions raised malondialdehyde levels due to altered antioxidant status (generation of H<sub>2</sub>O<sub>2</sub> and ROS) and cholesterol profile (Torun et al. 2009; Halliwell and Gutteridge, 1990; Venditti & Di Meo, 2006). Hydrogen peroxide is the main element that is used by thyroid peroxidase (TPO) for thyroid hormone biosynthesis (Weber et al. 2013) whereas PTU significantly inhibit H<sub>2</sub>O<sub>2</sub> production and bring perturbances in cholesterol levels, thus acting as powerful antithyroid agent with strong antioxidant activity (Imamure et al. 1986; Kaur et al. 2017) but LT, therapy alone is not effective in reducing PTU induced oxidative stress associated with perturbation in lipid profile in preclinical rodent brain studies (Pan et al. 2013; Bhanja & Chainy, 2010). This is in correlation of our study in which disease control group showed lower MDA and raised GSH levels in contrast with standard and treatment groups due to its self antioxidant nature of PTU. Also, this must be discussed on the basis that with the increase in thyroid hormones, there is an increased GSH consumption to combat oxidative stress that can result in its lower levels as seen in treatment groups (Adali et al. 1999).

Figure 2: Physiological changes in PTU induced hypothyroid and CN treated mice.

Values are expressed as mean SEM (n=7), analyzed using Two-way RM ANOVA followed by Bonferroni post test to compare replicate means by row (\*p<0.05 vs VEH; #p<0.05 vs PTU+VEH; @p<0.05 vs PTU+STD).



**Body weight, food intake and water intake:** Figure 2 shows that the water intake in mice was found to be significantly less in disease control, as compared to standard and treatment groups whereas water intake improved significantly from second week after standard and treatment drug administration. No significant change in food intake was observed in treatment duration. Body weight significantly increased in disease control during two weeks treatment duration whereas it was significantly less in standard group.

Thyroid hormones and pattern of food consumption are interrelated. Higgs et al. 1979 demonstrated that the administration of  $LT_4$  improves the food consumption whereas decrease food intake is observed in hypothyroid conditions with increase in central obesity (unpublished data) (Decuypere et al. 1987; Singh et al. 1971; Bhaskar et al. 2009). However no change in appetite is seen in our two weeks treatment duration of study. Choi et al.

2002 reported that thyrotropin releasing hormone (TRH) that stimulate thyroid hormone secreation via stimulation of hypothalamic pitiutary axis (HPA), increase water consumption in rats whereas the reverse is true in absence of thyroid hormones i.e. hypothyroidism and improvement in water intake is seen in our results of treatment groups and standard group. Varied results are reported regarding body weight change and thyroid conditions i.e. body weight increase with increase in TSH and decreases vice versa (Bray et al. 1976; Fox et al. 2008) and this is evident from our study results.

**Histopathology:** Figure 3 shows that the disease control group, depicted the scattered appearance and reduction in number of follicles and follicular cells with formation of vacuoles. The epithelial structure was seen lost with reduced colloid volume, however the cluster of C-cells were visible. The standard group had the presence of uniformly distributed follicular cells with cuboidal epithelium, intact cluster of C-cells, capillaries with reduced but visible colloid volume and appearance of vacuolization. The low dose treatment group had the presence of epithelium around follicular cells with some follicles partially filled and some devoid of colloidal material. However, blood capillaries and C-cells are visible with adequate number of follicles. The thyroid gland of high dose treatment group had the bunch of follicles rich in colloidal material with abundant follicular cells, C-Cells and embedded capillaries. However, low degree of vacuolization is also observed.

Figure 3: Histpathological and structural changes in PTU induced hypothyroid and CN treated mice thyroid gland A) PTU+VEH; B) PTU+STD; C) PTU+CN 400 and D) PTU+CN 600 group.



Petrova et al. 2014, demonstrated that the administration of  $LT_4$  or increase in thyroid hormones is characterized by presence of large size follicles, availability of more colloid, reduction in resorptive vacuoles with flattened follicular epithelium. Also Rajab et al. 2015 demonstrated that the supranormal levels of thyroid hormones distort the morphology of gland characterized by distention of lumen of follicles, reduction in thyrocyte height, follicular remodelling (fusion) and thyrocyte death due to lack of trophic effect and cytoprotection offered by

thyroid stimulating hormone. This supports somewhat distorted structure observed in the histology of treatment groups. However, the improved cellular structure is seen in standard and treatment groups as compared to the disease control group.

#### CONCLUSION

The ethanolic extract of *Crataeva nurvala* is able to raise the thyroidal and extra-thyroidal conversion of T4 to T3 via enhanced activity of DIO1, improved water intake and thyroid gland histology as compared to the standard therapy i.e.  $LT_4$ . Genomic level study is required to understand the mechanistic intricacies of the *Crataeva nurvala* in treatment of thyroid disorders.

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## Analysis of Citizens' Opinions and Practices toward Individual Roles and Responsibilities in Environmental Protection

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#### ABSTRACT

The most serious issue of the present day is environmental degradation because of pollution, huge waste generation, unsafe environmental acts, fossil fuel deforestation and changing climate. Through this research, an attempt has been made to assess citizen's opinion in order to determine individual roles and responsibilities, to evaluate the citizen's individual practices oriented toward environmental protection and sustainable development and to study the factors behind the unhealthy behaviour of human towards environment and sustainable development. The present study was descriptive in nature. Random sampling was used to collect data from 165 respondents by using questionnaire method distributed online via, Google form link. The results showed that respondents (73.80%) were in the age group of 19-35 years were male (54.70%) and were qualified till (45.60%). It was reported that respondents (72.70%) considered 'we' human were extremely behind the environment degradation and assumed that individual's insignificant actions have a significant impact on the environment and sustainable development at high extent (74.50%). Respondents (42.20%) were agreed that resources must be properly used. Respondents (80.80%) flip the light switch off when they leave the rooms either in home or offices most of the times and keep their surrounding clean and hygienic most of the times (70.20%). It was identified that ignorance (48.40%) and laziness (45.30%) among the citizens were the key factors behind the unhealthy behaviour of citizens towards environment protection and sustainable development. Furthermore, the current study reinforces the dedication of Indian citizens to pull bull by the horns by ensuring that their small steps toward environmental protection result in significant changes toward the development of a more sustainable lifestyle.

**KEY WORDS:** ENVIRONMENT PROTECTION, CITIZEN, OPINION, PRACTICES, ROLES AND RESPONSIBILITY.

#### **INTRODUCTION**

Our planet Earth is currently dealing with several environmental issues. Global warming, acid rain, air pollution, urban sprawl, waste disposal, ozone layer depletion, water pollution, climate change, and other environmental issues affect every human, animal, and nation on the planet (Rinikesh 2020). These environmental problems decline in environmental quality results the loss of vegetation, biological diversity, excessive amounts of harmful chemicals in the ambient atmosphere and in food



grains, and rising risks of environmental accidents and threats to life support systems (Rai, 2016).

Environmental issues are referred to as a negative effects of human activity on the Earth and its natural systems. Climate change is one of the major environmental issue which affects everyone, and the consequences are visible in temperature fluctuations and an increase in severe natural disasters. It contributes to larger issues such as rising sea levels and biodiversity loss in our food systems. Another source of concern is pollution and its impact on public health. According to research, black carbon makes dangerous bacteria more difficult to kill and more resistant to antibiotics. Furthermore, air pollution raises the risk of heart attacks, strokes, and even lung cancer. In the past 100 years, extinction has been 100 times increased due to human interference, while sometimes a natural process, according to the Millennium Ecosystem Assessment. Disruptions to biodiversity would be detrimental not only to the environment, but also to human well-being.



Through this food and energy security at risk, as well as access to safe water and materials, and it becomes more vulnerable to natural disasters. The vast amount of untested chemicals released into the environment and found in our foods and household items endangers public health (Giving Compass LLC, 2021).

In Atharvaveda, it has been said that "Man's paradise is on earth; this living world is the beloved place of all; It has the blessings of nature's bounties; live in a lovely spirit". Earth is our paradise and it is our duty to protect our paradise. The constitution of India embodies the framework of protection and preservation of nature without which life cannot be enjoyed. The knowledge of constitutional provisions regarding environment protection is need of the day to bring greater public participation, environmental awareness, and environmental education and sensitize the people to preserve ecology and environment (Vardhan, 2021). Government of India included amended in Article 51 for environmental protection and improvement as a constitutional mandate. Article 51 A(g) particularly deals with fundamental duty with respect to the environment it says that "It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers, and wildlife and to have compassion for living creatures (Hemant 2019; Kulin 2019).

The fundamental duty imposed on every citizen is not only to 'protect' the environment from any kind of pollution but also to improve the environment quality if it has been polluted so it is the duty of every citizen to preserve the environment in the same way as nature has gifted it to all of us (Hemant 2019). Environmental policies should be supported by the public to the extent that citizens believe it is the government's responsibility to protect the environment as a general principle. As a result, people should be more likely to support government spending on the environment if they believe that environmental protection is the government's primary responsibility (Kulin and Seva, 2019). The solutions to issues affecting sustainability should not be exclusively limited to corporate policies, strategies and standards (Lolatovic 2020; Paul 2018).

Although our individual actions seem insignificant, they can make a significant and positive contribution towards sustainability, our dedication and our awareness to genuinely sustainable development are essential. Individual efforts can make a significant contribution to achieving the goals of sustainable development. It must be understood that the challenges affecting sustainability are not limited to large businesses, we all contribute in some way to our grain of sand (Torneire, 2020). Lolatovic (2020) believed that even small things like, avoiding littering, taking care of our gardens, or balconies, planting trees and flowers would make our surroundings a more pleasant and beautiful place to spend time and have a positive impact on the environment.

Moreover, some governmental initiatives, and support towards creating conditions for waste recycling, prohibition of plastic bags, or making them more expensive, would be meaningful steps in that regard. As a social structure, there is a need recognize and comprehend the negative impact of our actions on the natural environment (Roy, 2019). Every person has a part to play in preserving the Earth's environment. A positive change, no matter how small, has the potential to create a long-lasting ripple of change (Paul, 2018). With this framework, through this study an attempt has been made to analyze the citizen's opinion and practices toward individual roles and responsibilities in environmental protection and to determine the factors behind the unhealthy behaviour of human towards environment and sustainable development (Alas 2021).

**Statement of the Problem:** Considering the problems related to health and environment, the purpose of the study was to assess opinion of citizen towards their individual roles and responsibilities for environmental protection and to evaluate the practices citizen's individual practices oriented toward environmental protection and sustainable development. To study the factors behind the unhealthy behaviour of human towards environment and sustainable development.

#### **Objectives:**

- 1. To assess citizen's opinion in order to determine individual roles and responsibility towards environmental protection.
- 2. To evaluate the citizen's individual practices oriented toward environmental protection and sustainable development.
- 3. To study the factors behind the unhealthy behaviour of human towards environment and sustainable development.

#### MATERIAL AND METHODS

The study was descriptive in nature. The primary and secondary data has been used to conduct the research. Random sampling has been used to collect data from 165 respondents. The tool used to collect data was Questionnaire method via Google form link. The questionnaire was divided into 4 section, the section 1 deals with the demographic profile of respondents included age, gender, education qualification, employment status and their income. Section 2 consisted various statement regarding the opinions of respondents on citizen's individual roles and responsibility towards the environment protection and environmental issues. Section 3 comprised of statements related to citizen's individual practices oriented toward environmental protection and sustainable development and the responses where the response structure was 'Never', 'Sometimes' and 'Most of the times'. Section 4 consisted the several factors i.e. unawareness, laziness, Damn care attitude of citizens, unnecessary use of resources etc. behind the unhealthy behaviour of human towards environment where the response structure was 'Strongly Disagree', 'Disagree', 'Neutral', 'Agree' and 'Strongly Agree' (Rinikesh 2021).

#### **RESULTS AND DISCUSSION**

The results of the study obtained from the analysis of the data and their interpretations which are presented here (Torneire 2020).

**i. Demographic profile of respondents:** This section designated the demographic profile of respondents. This included age, gender, education qualification, employment status and their income. Data from figure 1 presents that less than three-fourth of the respondents (73.80%) were in the age group of 19-35 years. More than one-half (54.70%) of the respondents were male. Less than one-half (45.60%) of the respondents had bachelor's degree. More than two-fifth (42.10%) of the respondents were students. Nevertheless, less than two-fifth (39.30%) of respondents had no income (Vardhan 2021).



**ii. Opinions of respondents towards environment protection and sustainable development:** In this section probe was made to assess the opinion of the respondents that consisted different statement towards the environment protection and sustainable development.

a. Opinion on if 'we' (human) behind the environment degradation: this part deals with the opinion of respondents consider that there is 'we' (human) behind the degradation of environment where the response structure were "Extremely", "Moderately" and "Not at all".



Data from figure 2 which presents that less than threefourth of the respondents (72.70%) were retorted that 'we' human were extremely behind the environment degradation followed by one-fourth (25.40%) of respondents who considered that we humans are moderately behind the environment degradation. Moreover, only 1.90 per cent of the respondents did not believed that we humans behind environmental degradation (Tripathi 2003).



Figure 4: Opinion of citizenss on how changes can be made to protect the environment and sustainable development (n=165)



Figure 5: Citzen's Individual practices oriented towards environmental protection and sustainable development (n=165)



**b.** Opinion regarding individual's role and responsibility towards environment protection and sustainable development: this part deals with the opinions of

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respondents on individual role's and responsibility towards environment protection and sustainable development where the response structure was to "Great Extent", "Somewhat", "Very Little" and "Not at all".

Figure 3 shows that almost three-fourth (74.50%) of the respondents were assumed that individual's insignificant actions have a significant impact on the environment and sustainable development at high extent. More than one-half (55.30%) of the respondents supposed that need to focus on individual's environmentally-friendly behaviour is as important as to make environmentally-friendly products at high extent. Furthermore, less than one-half (45.30%) of the respondents somewhat implicit that protecting the environment is solely the responsibility of the government rather that individual responsibility of a citizen.

**c.** Opinion regarding how changes can be made to protect the environment and sustainable development: In this part, 'Likert' type scale encompassing 5 statements, which examined the respondents' opinions on the changes can be made to protect the environment and sustainable development where the responses were in the range of "Strongly Agree", "Agree", "Neutral", "Disagree" and "Strongly Disagree".



Lucid examination of data in figure 4 reveals that more than two-fifth (42.20%) of the respondents were agreed that by using resources properly while using any products and trades an individual can protect the environment at their own level and helps to achieve sustainable development goals. More than two-fifth (41.60%) of the respondents were strongly agreed that every individual should make environmental protection a part of their regular lifestyle which helps in to improve the environmental issues around the nation and sustainable development. Around two-fifth of the respondents (40.90%) were agreed that changing the consumption habits, i.e. buying eco-friendly products, appropriate use of products helps to makes changes and protect environment at an individual level. Less than two-fifth (39.50%) of the respondents were strongly agreed that changes can be made by increase in personal action towards environmental protection makes systematic change. Furthermore, less than one-fifth of respondents (39.20%) were strongly agreed that waste separation at the source helps to avoid mixing of different waste (biodegradable and non-biodegradable) so that it can be used for other purposes and ensures good coordination with waste management services.

iii. Respondent's individual practices oriented toward environmental protection and sustainable development: In this section, an attempt was made to elicit respondents' individual practices toward environmental protection and sustainable development where the responses were "Never", "Sometimes" and "Most of the times".

Eloquent analysis of the data from figure 5 shows that around four-fifth of the respondents (80.80%) reported that the flip the light switch off when they leave the rooms either in home or offices most of the times. More than two-third of the respondents (70. 20%) keep their surrounding clean and hygienic most of the times. Less than two-third of the respondents were using energy efficient light bulbs (LED) (65.90%), makes online payments against paper bills (65.80%), flip the running tap while brushing teeth (65.70%), cook food rather than take packages (64.60%) and respondents (62.10%) encourages others to take actions favoring to environment protection most of the times.

More than one-half of the respondents (54.10%) sometimes buys less plastic to protect the environment. Less than one half of the respondents (44. 10%) sometimes prefer walk or cycling rather than driving to avoid excessive use of fuel and save money to protect the environment and sustainability. More than one-third of the respondents sometimes plant trees (39.80%), avoid listening to music loudly (39.80%) to prevent noise pollution and occasionally using renewable source of energy (i.e. solar heaters, solar cookers) (38.50%) to prevent the pollution in environment. Furthermore, more than one-half of the respondents (57.80%) never smoke at public places to prevent air pollution and to make environment breathable for others. More than two-fifth of the respondents never used renewable source of energy (i.e. solar heaters, solar cookers) and less than one-fourth of the respondents (21.10%) never co-ordinate with waste collection services.

iv. Factors behind the unhealthy behaviour of human towards environment: This section comprised the ultimate factors which contribute to the unhealthy behaviour of human towards the environment protection and sustainable development. To scrutinize the statements "Strongly Agree", "Agree", "Neutral", "Disagree" and "Strongly Disagree".

Figure 6 elucidated that less than one-half of the respondents reported that ignorance (48.40%) and laziness (45.30%) among the citizens were the key factors behind the unhealthy behaviour of citizens towards environment protection and sustainable development. Less than two-fifth of the respondents reported that they strongly agreed with the factors like 'Damn care' attitude among citizens (39.70) were the one of the key factor affected unhealthy behavior of citizen towards environment. Less than two-fifth of the respondents reported agreed to the statements that citizen's afraid to take responsibilities (39.20%), changing lifestyles (38.50%) and embarrassment to pick waste (37.90%) and unnecessarily and improper use of resources like fuel (37.90%) by the citizen were the factors that contribute to unhealthy behavior that is harmful to the environment and a obstacles to achieve sustainable development goals.

Moreover, it was found that less than one-fourth of the respondent were disagreed that lack of awareness (22.50%), lack of resources or opportunities (21.80%) and lack of time to think about environment (11.80%) were the key factors to contribute unhealthy behaviour towards the environment and the obstacle to achieve sustainable development goals.

#### CONCLUSION

The present revealed that respondents were in the age group of 19-35 years and were male had minimum qualification of bachelor's degree. Respondents described that 'we' human were extremely behind the environment degradation, and assumed that individual's insignificant actions have a significant impact on the environment and sustainable. Respondents were agreed that by using resources properly while using any products and trades an individual can protect the environment at their own level. The present study identified that respondents flip the light switch off when they leave the rooms either in home or offices most of the times. Respondents sometimes buys plastic to protect and sometimes used renewable source of energy to show concern towards the environment. Moreover the study revealed that ignorance and laziness among the citizens were the key factors behind the unhealthy behaviour of citizens towards environment protection and sustainable development. It can be concluded that through the present study that environment protection is not solely responsibility of government, everyone is equally responsible for creating and destroying the environment and therefore sustainability must be guaranteed for individual actions and small environmental choices to safeguard the environment.

The present study encourages the change in citizen's pattern of actions and healthy attitude which helps to protect the environment and sustainable development of the nation. According to the report by Alas (2021) US news, top 10 countries like New Zealand, Norway, Sweden, finland, Denmark, Switzerland, Canada, Netherlands Australia and Austria seen as caring the

most for environment. It was evaluated by the strength of countries' "environmental protection laws" or "citizens attitudes and "actions" toward environment conservation. Like these countries, there is a need to understand our fundamental rights and fundamental duties towards environmental protection so that every citizen awake and helps in sustainable development. Furthermore, the current study reinforces the dedication of Indian citizens to pull bull by the horns by ensuring that their small steps toward environmental protection result in significant changes toward the development of a more sustainable lifestyle. The challenge is immense and to succeed, everyone should realize that while small actions may appear insignificant, they are actually critical.

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## Liver Cancer Detection Using Image Processing

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## ABSTRACT

Image processing is a processing technique with the help of mathematical operations. It uses any of the form of signal processing. Here the input is an image or video and the output is also an image or a set of images. This technique is also used in medical applications for various detection and treatment. In this project, it has been used to detect cancer cell of the liver. Here Otsu's method is used for enhancing the MRI image and Marker controlled watershed segmentation method is used to segment the cancer cell from the image. Active contour model was added to identify all the unique segments in the input MRI. Dice similarity score (Dice coefficient) were calculated for both segmented image and image after applying contour model and are compared.

KEY WORDS: IMAGE PROCESSING, OTSU'S, WATERSHED METHOD, MRI IMAGE, CONTOUR MODEL.

## **INTRODUCTION**

Worldwide cancer is the fifth reason for death therefore detection and treatment of cancer having great significance because of widespread episodes of diseases, recurrence after treatment and high death rate. There are different types of cancer in which liver cancer is at third position for death factor. This cancer is also known as hepatic cancer (Sharma & Kaur 2013).

**1.1 Problem Definition:** Liver cancer starts from the liver and then grows further if not diagnosed early. The cancer which is started from some other organ and travels to liver is not treated as liver cancer. Liver cancer is consisting of the malignant hepatic growths called tumors over liver or inside liver. Therefore, early detection of liver cancer is challenging task in practical radiology. There are number of computer aided diagnostic methods designed using image processing terminologies for early detection accurately. Early stage detection of liver cancer helps to prevent it completely through the proper treatment.

**1.2 Existing System:** There are some already existing models for Liver cancer detection using image processing.



But in every model, there is only some sort of segmentation technique being used for tumor identification in the liver which was giving less accuracy. Image enhancement must be done before segmentation to get rid of noises in the image. Superimposing the identified image must also be done to identify the tumor clearly.

**1.3 Proposed System:** Otsu's method is used for image enhancement i.e. to remove noises in the image. Marker controlled Watershed segmentation algorithm is used to segment the Liver MRI image. Active contour model is added to segmented image that finds all the unique segments in the input MRI and labels them with green circles. Dice similarity score is calculated for both the segmented image and image after applying contour model and are compared (Haluska et al., 2004).

The proposed system consists of the following advantages:

#### Advantages:

- It is easy to implement.
- It is easily interpretable.
- It is very efficient.
- Good accuracy and precision.
- Help doctors to detect liver cancer

## MATERIAL AND METHODS

Liver MRI image is taken as input. Image enhancement is done to remove the noise on the image using Otsu's method. Later, image segmentation is done using Marker



controlled watershed segmentation method to segment the image. Active contour model is used to improve the segmented image (Kaye et al., 2004).

**2.1 Otsu's method:** Otsu's method uses clustering based technique .In other words, it converts greyscale image into binary image. It assumes that the image contain two level of pixel which are foreground pixel and background pixel (bi-modal histogram). It calculates the optimum threshold by separating two classes. The result gives minimum combined-spread and maximum inter-class variance. The Otsu's method can roughly said to be one-dimensional method. The Otsu's method search for the threshold which minimizes the inter class variance.

**2.2 Image segmentation:** It is an important process for many tasks in image processing. Many of the important techniques like image description and image recognition are depend on the image segmentation. The process of segmentation divides an image into region or object. The objective of the process of segmentation is to make the image more useful by changing the representation and simplifying the image due to which it will be easier to analyze the image. This process is use for detecting the boundaries and objects of an image.

**2.2.1 Marker Controlled Watershed Segmentation:** Marker-Controlled Watershed Segmentation process enhances the region which indicates the presence of the required object. The locations which are extracted by this process are then set to the minimum position within the same topological surface. The watershed algorithm is applied afterwards. Separating objects of an image is one of the difficult methods which watershed segmentation makes it easier. Watershed Segmentation Approach is of two types: External associated with Background and Internal associated with the object of interest.

**2.3 Active contour model:** Active contour models are used in various image processing applications specifically in medical image processing. In medical imaging, active contours are used in segmentation of regions from different medical images such as Liver MRI images, MRI images of different organs, cardiac images and different images of regions in the human body. Active contour model is added is used to enhance the segmented image. Contour models describe the boundaries of shapes in an image. Features like area of liver tumor, shape of liver tumor etc are extracted from this. Here it finds all the unique segments and represents them with green circles (Mitha & Jayasree 2015).

**2.4 System Architecture:** The system basically uses Jupyter notebook which sets the path to take the image input. Image enhancement is done on the input image to remove noise using Otsu's method. Later, image is segmented using marker controlled watershed segmentation algorithm. Watershed algorithm is applied using Opencv and further MATLAB, to segment the image easily. This algorithm marks the boundaries of all objects using a red label. Active contour model is added to segmented image that finds all the unique segments

in the input MRI and labels them with green circles. Dice similarity score is calculated for both the segmented image and image after applying contour model and are compared (Kekre et al., 2016.



The above figure 2.1 shows the system architecture of liver cancer MRI showing the sequence of actions of image enhancement, image segmentation and active contour model applied. Dice similarity score is calculated as shown for the enhanced images and are compared.

## **RESULTS AND DISCUSSION**

**Dice Coefficient:** Dice similarity coefficient is a spatial overlap index and a reproducibility validation metric. It was also called the proportion of specific agreement by Fleiss. The value of a DSC ranges from 0, indicating no spatial overlap between two sets of binary segmentation results, to 1, indicating complete overlap.

Dice similarity Score= 2 \* the Area of Overlap divided by the total number of pixels in both images



Dice similarity score of contour model image with original image:

Dice similarity score=0.00019607138058098448

# Dice similarity score of contour model image with original image:

Dice similarity score= 0.0002464599353843849

**Output Screens:** The following are the screenshots of proposed system:

The above figure 3.1 shows the graph drawn between pixel count on x-axis and pixel intensity on y-axis. It gives optimal threshold value that is used to divide the image into two classes of foreground and background.



Figure 3.3: watershed segmentation for Liver cancer detection using image processing.



The above figure 3.2 shows the Otsu's transformation of Liver MRI with two classes foreground and background shown with two different colors. Otsu's method is applied for image enhancement to remove the noise in the image (Nelofar et al., 2016)

The above figure 3.3 shows the boundaries drawn with red line for each object in the foreground image. On comparing with the healthy liver MRI, the white part in the liver are detected as cancer cells .Other white colored cells even though they appear to be cancer cell, they are actually fatty cells at the borders. The white cell outside of the liver is actually a body part and not our region of interest since it is outside of liver. The above figure 3.4 shows the healthy liver MRI which is having the fatty cells at the boundaries of foreground image and also the larger white part outside of the liver which is common in all Liver MRI's. So it can be clearly known that in the image 3.3, the cancer cell is white part in the Liver (Namrata et al., 2017).

Figure 3.4: Healthy Liver MRI for Liver cancer detection using image processing



Figure 3.5: Liver MRI after applying active contour model for Liver cancer detection using image processing [INF0] 29 unique segments found



The above figure 3.5 shows the MRI image after applying active contour model. It finds all the unique segments and represents them with green circles. Here it finds 29 unique segments represented with green circles.

The above figure 3.6 shows the output screen of dice similarity score of segmented image related to original image which gives 0.00196071 (Anisha 2015; Saranya 2016).

The above figure 3.7 shows the output screen of dice similarity score after applying active contour model related with original image which gives 0.0002464599353843849 (Yamini 2014).

On comparing the dice similarity scores, active contour model increases the dice similarity score from 0.00019607138058098448 to 0.0002464599353843849.

```
Figure 3.6: Dice similarity score of segmented image for
liver cancer detection using image processing
import numpy as np
import cv2
from PIL import Image
k=1
# segmentation
seg = Image.open('../Result/Test/segmentation.jpg').convert("L")
seg = np.asarray(seg)
# ground truth
gt = Image.open('../Dataset/Test/gt.jpg').convert("L")
gt = np.asarray(seg)
dice = np.sum(seg[gt==k])*2.0 / (np.sum(seg) + np.sum(gt))
print("Dice similarity score is {}".format(dice))
Dice similarity score is 0.00019607138058098448
```

Figure 3.7: Dice similarity score of contour model image for liver cancer detection using image processing

```
import numpy as np
import cv2
from PIL import Image
k=1
# segmentation
seg = Image.open('../Result/Test/contour.jpg').convert("L")
seg = np.asarray(seg)
# ground truth
gt = Image.open('../Dataset/Test/gt.jpg').convert("L")
gt = np.asarray(seg)
dice = np.sum(seg[gt==k])*2.0 / (np.sum(seg) + np.sum(gt))
print("Dice similarity score is {}".format(dice))
Dice similarity score is 0.0002464599353843849
```

## CONCLUSION

Different MRI Images were acquired from the internet; basic Otsu preprocessing technique was used for preprocessing the input MRI image for image enhancement and denoising. For segmentation, Marker-Controlled Watershed segmentation was used and it was observed that segmentation was done properly and the areas were identified accurately for most of the images. Dice similarity score was nearly 0.19 for segmented image with original image .In Accuracy viewpoint, for the base paper, the accuracy obtained comes out to be 74.93 % .On adding the active contour model in which all unique segments were found, the accuracy comes out to be 85.99% and also dice similarity score increased to 0.24 .

**Future Scope:** The current project can be converted into a proper GUI based application. It can be either an android or a web application, so that it is handy for any normal user to detect liver cancers. So that the human expertise of finding the tumor region in liver MRI image can be

changed to automatic detection of liver cancer saying yes or no when a particular MRI image is given as input to the application.

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## Assessment of the Patient's Perception Regarding Triple Vessel Disease and its Management

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#### ABSTRACT

Triple vessel disease is a type of coronary artery disease that is very severe. Coronary artery disease develops when the major blood arteries become damaged. To determine the patient's perception of living with triple vessel disease and its management. To associate the demographic variable with patient's perception regarding triple vessel disease and its management. A descriptive research approach were used. A cross-sectional study design was applied. Samples comprised of 45 subjects including both males and females. The research was carried out in a hospital in Sawangi (M), Wardha. A structure demographic sheet revealing age, gender, education, monthly family income, bad habits, any disease along with structured perception scale was used. Descriptive and inferential statistics were used in the analysis. The findings of the study revealed that 22.22% of the patients were disagreed about perception about triple vessel disease, 37.78% were agreed and 60% strongly agreed for perception about triple vessel disease. That means none of the patients (0%) had strongly negative perception. Also, the study found out the statistical association of perception score with age, education, monthly family income and any diseases. The majority of patients had positive and good perception regarding triple vessel disease but not aware about the management of triple vessel disease. Age, education, occupation and history of any disease had positive effect on perception.

KEY WORDS: ASSESS, TRIPLE VESSEL DISEASE, PERCEPTION, MANAGEMENT.

#### INTRODUCTION

In most age groups, heart disease is the main cause of death, accounting for one out of every four deaths. Coronary artery disease is the leading cause of death in both men and women around the world. Coronary artery disease (also known as ischemic heart disease) is described as "Impairment of cardiac function caused by obstructive alterations in the coronary circulation to the heart, resulting in insufficient blood flow to the heart relative to its needs." Coronary artery disease affects an estimated 4.5 million persons in India. coronary artery



disease (CAD) is the most common type of heart disease, affecting around 6.7 percent of people over the age of 20. Within CAD lies an extreme form, Triple Vessel Disease that affects a smaller number of patients. It is an extreme form of coronary artery disease. When the major blood vessels become damage that time coronary artery disease developed (Al Khayyal et al., 2016).

There is main two causes of coronary artery disease that are Plaque (cholesterol deposits) and inflammation. While minor plaque deposits may not obstruct blood flow to the heart, bigger plaque deposits might reduce or even restrict blood flow to the heart. These blockages can result in chest discomfort, shortness of breath, or even a heart attack. While most CAD affects only one of the major coronary arteries, triple vascular disease affects all three major blood vessels that supply blood to the heart (left anterior descending, left circumflex, right coronary artery). The left ventricle's contractile activity is likewise impaired. According to several research, around 26-33



percent of all CAD patients will develop triple vessel disease. This means that one out of every eight males and one out of every twelve women will develop TVD over their lives (Umuerri 2020).

The recent statistics shows that Around 50 percent of the three-vessel disease patients died before the completion of the study. The rate of 5-year survival was 88%. Sometimes motivated by insufficient compliance, HF hospitalizations and readmissions continue to increase. We explored the idea that compliance and outcome could be influenced by the understanding of the patient of their illness. The blood supply to the heart comes from the Right Coronary Artery (RCA) and the Left Coronary Artery - the first two branches of the aorta in the Sinus of Valsalva. The Left Coronary Artery is quite short (often called the Left Main Stem) and divides into the Left Anterior Descending artery (LAD) and the Circumflex artery (LCx). Triple vessel disease is the term used for atherosclerotic narrowing of the three major blood vessels of the heart (RCA, LAD and LCx). Severe triple vessel disease and Left Main Stem stenosis are both associated with imminent myocardial infarction, and so if present surgical (or percutaneous) intervention is recommended. In the proximal or middle section of all three arteries, a 70 per cent reduction in luminal diameter is needed to classify as a three-vessel disease.

Triple vessel disease can be prevented by focusing on how the patients perceived. The main objective of the lifestyle modification is to return the patient to an optimal level of physiological, psychological and vocational functioning as to prevent the progression of ischemic heart disease. A combination of exercise, education in psychological rehabilitation seems to be the most important improvement in life style and requires longterm maintenance of modified habits. There is substantial evidence that correct information guidance during their recovery in wards is one of the most important aspects of nursing and it can be continued even after discharged.

## The Study's Objectives

- 1. To determine the patient's perception of living with triple vessel disease and its management.
- 2. To associate the demographic variable with patient's perception regarding triple vessel disease and its management.

## MATERIAL AND METHODS

A descriptive research approach was used. A crosssectional study design was applied. Samples comprised of 45 subjects including both males and females. Setting of the study was patients with triple vessel disease from selected hospital Sawangi (Meghe), Wardha. The target group of this study was triple-vessel disease patients. Triple vessel disease patients who meet the inclusion and exclusion criteria were sampled in this study. In this study sample size was 45 patients were selected purposively to suit the study. The Non-Probability Purposive Sampling Methodology was the sampling method used in the analysis. Inclusion criteria of the study was 1. Patients who are diagnosed with triple vessel disease 2. Patients who are willing to engage in the research. 3. Patients who are present during the data collection process. Exclusion criteria of study was 1. Patients who have already attended a similar type of study. 2. Patients who are critically ill. The following tools developed for the study. a) Structured response sheet for Demographic data, which gives baseline information such as, Age, Gender, Education, Monthly Family Income, Bad habits, any disease etc. b) 5- point Likert scale related to patient' perception regarding triple vessel disease and its management.

Table 1. Percentage wise distribution of patients accordingto their demographic characteristicsn=45			
Demographic Variables	No. of patients	Percentage (%)	
Age(yrs)			
51-60 yrs	26	57.8	
61-70 yrs	15	33.3	
71-80 yrs	4	08.9	
Gender			
Male	28	62.2	
Female	17	37.8	
Education			
Illiterate	2	04.5	
Primary	20	44.4	
Secondary	15	33.3	
Graduate and above	8	17.8	
Monthly family income			
≤5000 Rs	7	15.6	
5001-10000 Rs	16	35.6	
10001-15000 Rs	10	22.1	
15001-20000 Rs	12	26.7	
>20000 Rs	0	00.0	
Bad Habits			
Smoking	0	00.0	
Drinking	5	11.1	
Tobacco Chewing	16	35.6	
Others	9	20.0	
No Any	15	33.3	
Any Disease			
Diabetes	4	08.9	
High BP	18	40.0	
High blood cholesterol	6	13.3	
Both A and B	16	35.6	
Others	1	02.2	

## **RESULTS AND DISCUSSION**

The findings of the study revealed that given in the following.

The above table no.1 shows that the frequency of patients 26(57.8%) were in the age group of 51-60 years, 15(33.3%) were in the age group of 61-70 years and 4(08.9%) of them were in the age group of 71-80 years. The frequency of patients 28(62.2%) were males and 17(37.8%) of them were females. The frequency of patients 2(04.5%) were illiterate, 20(44.4%) were educated up to primary, 15(33.3%) were educated up to secondary and 8(17.8%) of them were graduates and above. the frequency of patients 7(15.6%) had monthly family income of less

than 5000 Rs, 16(35.6%) had between 5001-10000 Rs, 10(22.1%) had between 10001-15000 Rs, 12(26.7%) of them had monthly family income of 15001-20000 Rs, and 0(0%) of them had more than 20,000 Rs. The frequency of patients5(11.1%) had habits of drinking, 16(35.6%) had habits of tobacco chewing, 9(20%) had other habit and 15(33.30%) of them had no habit. frequency of patients 4(08.9%) had history of diabetes, 18(40%) had history of high blood cholesterol, 16(35.6%) had history of diabetes and high blood pressure and 1(02.2%) had other history.

Table 2. Assessment with level of perception score			
Level of perception		Level of perce	ption Score
	Score Range	No of patients	Percentage
Neutral	0	0	00.00
Strongly Disagree	0-25%	0	00.00
Disagree	26-50%	10	22.22
Agree	51-75%	17	37.78
Strongly Agree	76-100%	18	40.00
Minimum score		38	
Maximum score		89	)
Mean perception score		63.20 <u>+</u>	17.36



The above table no.2 and figure no.1 shows that the frequency of patients 10(22.22%) of were disagreed about perception regarding triple vessel disease and its management, 17(37.78%) were agreed and 189(40%) strongly agreed for perception regarding triple vessel disease and its management. Minimum perception score was 38 and maximum perception score was 89. Mean perception score was  $63.20\pm17.36$ .

The above table no.3 depicts the association of perception score with age in years of patients regarding triple vessel disease and its management. The calculated 'F,' i.e., 4.58 at a 5% level of significance, was substantially lower than the tabulated 'F,' which was 3.15(df=2,42). Also, the calculated 'p'=0.016, which was much lower than the acceptable level of significance of 'p'=0.05. As a result,

it's assumed that a patient's age in years is statistically related to their perception score.

The relationship between a patient's perception score and their gender when it comes to triple vascular disease and its treatment. The calculated 't' was 1.25 at a 5% level of significance, however the tabulated 't' values were 2.02(df=33), which is substantially higher than the calculated 't' of 1.25. Furthermore, the calculated 'p'=0.21 was much greater than the allowed level of significance, which was 'p'=0.05. As a result, it's assumed that a patient's gender has no statistical bearing on their perception score. The relationship between a patient's perception score and their level of education when it comes to triple vascular disease and its treatment. The calculated 'F,' i.e., 49.61 at a 5% level of significance, was substantially lower than the tabulated 'F,' which was 2.76(df=3,41). Furthermore, the calculated 'p'=0.0001 was significantly below than the accepted level of significance, which was 'p'=0.05. As a result, it's assumed that a patient's educational level is statistically related to their perception score.

The association between a patient's perception score and their monthly family income (Rs) when it comes to triple vascular disease and its treatment. The computed 'F,' i.e., 83.79 at a 5% level of significance, was substantially lower than the tabulated 'F,' which was 2.76(df=3,41). Furthermore, the computed 'p'=0.0001 was much lower

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than the accepted level of significance, i.e. 'p'=0.05. As a result, it's assumed that patients' monthly family income (Rs) is statistically related to their perception score.

The association between a patient's perception score and their bad habits when it comes to triple vascular disease and its treatment. The estimated 'F,' i.e. 2.77 at a 5% level of significance, was substantially higher than the tabulated 'F,' i.e. 2.76(df=3,41). Furthermore, the determined 'p'=0.054 was significantly greater than the permissible level of significance, which was 'p'=0.05. As a result, it is determined that patients' bad habits are statistically unrelated to their perception score.

Table 3. Association of perception score regarding triple vessel disease and it's management in relation to age n=45					
Demographic Variables	No. of Patients	Mean <u>+</u> SD	df	F-value/ t- value	p-value
Age(yrs)					
51-60 yrs	26	66.38±14.95	2,42	4.58	0.016 S, p<0.05
61-70 yrs	15	63.80±19.42			
71-80 yrs	4	40.25±2.06			
Gender					
Male	28	65.71±15.81	33	1.25	0.21 NS, p>0.05
Female	17	59.05 <u>+</u> 19.43			
Education					
Illiterate	2	38±0	3,41	49.61	0.0001 S, p<0.05
Primary	20	48.85 <u>+</u> 8.94			
Secondary	15	76.66 <u>+</u> 8.39			
Graduate and above	8	80.12 <u>+</u> 7.14			
Monthly Family income					
≤5000 Rs	7	38.57 <u>+</u> 0.97	3,41	83.79	0.0001 S, p<0.05
5001-10000 Rs	16	52.87 <u>+</u> 7.74			
10001-15000 Rs	10	74.70 <u>+</u> 9.05			
15001-20000 Rs	12	81.75 <u>+</u> 4.43			
>20000 Rs	0	0±0			
Bad habits					
Smoking	0	0±0	3,41	2.77	0.054 NS, p>0.05
Drinking	5	50.80±17.52			
Tobacco Chewing	16	68.81 <u>+</u> 12.60			
Others	9	54±17.22			
No Any	15	66.86±18.97			
Any disease					
Diabetes	4	70.25±12.17	4,41	15.30	0.0001
					S, p<0.05
High BP	18	47.50±7.60			
High blood cholesterol	6	76.16±10.92			
Both A and B	16	75 <u>+</u> 14.64			
Others	1	51 <u>±</u> 0			

The association between a patient's perception score and the types of disease they have in terms of triple vascular disease and how it is managed. The calculated 'F,' i.e., 15.30 at a 5% level of significance, was substantially lower than the tabulated 'F,' i.e., 2.61(df=4,41).

Furthermore, the computed 'p'=0.0001 was much lower than the accepted level of significance, i.e., 'p'=0.05. As a result, it's assumed that a patient's habit is statistically linked to their perception score.

#### DISCUSSION

The study's findings were reviewed in relation to the aims, theoretical foundation, and hypothesis, as well as the findings of other research in this section. The purpose of this study was to determine how patients felt about triple vessel disease and how it was managed.

The table no.2 shows that patient's perception score regarding triple vessel disease and its management was 22.22% of the patients were disagreed about perception regarding triple vessel disease and its management, 37.78% were agreed and 40% strongly agreed for perception regarding triple vessel disease and its management. Minimum perception score was 38 and maximum perception score was 89. Mean perception score was  $63.20\pm17.36$ . The present study indicated that patients had good means positive perception regarding triple vessel disease except management.

One similar study conducted on "Perception and behavior in patients with coronary heart disease about risk factors and life style modification in tertiary care hospital, Bhavnagar" Among Patients of coronary heart disease attending OPD in tertiary care hospital, Bhavnagar. 174 samples are included in the study, the researcher used a cross-sectional study design with a questionnaire that included personal details, BMI, history of risk factors, behaviour improvement, and medical counselling. Epi info evaluated the data and applied the appropriate statistical tests. The results showed that a total of 73 patients were addicted to either tobacco or alcohol. Addiction lasted an average of 22.43 years. Doctors gave therapy to 94 percent of patients at the time of their illness. Counselling about illness, risk factors, and lifestyle change had a positive effect on 96 percent of patients, with just 4% needing more counselling in the future. In this study indicated that patients had good perception about all risk factors except stress and sedentary life style. In my study also patients are strongly agreed about the perception of triple vessel disease but they are not aware about the management of triple vessel disease.

A study conducted on "Public knowledge and perception of heart disease: A cross- sectional study of two communities in Delta State, Nigeria" The study questionnaire was adapted from the heart disease fact questionnaire (HDFQ). Respondents with knowledge scores <50%, 50–69.9%, and  $\geq$ 70% were assigned poor, moderate, and good knowledge, respectively. Eight hundred and sixty-six adults with a mean age of 42.6 years were recruited for the study. Majority (56.0%) of the respondents were females and urban dwellers. Knowledge score ranged between 0.0% and 95.7% with a mean score of 39.8( $\pm$ 22.5) %. Majority (65.1%) had poor knowledge of heart disease. Knowledge of heart disease was significantly associated with place of residence [OR (95%CI) = 0.544 (0.408–0.727); P<0.001], age group [OR (95%CI) = 0.437 (0.314–0.607); P<0.001], duration of formal education [OR (95%CI) = 3.805 (2.755–5.255); P < 0.001] but not sex (P = 0.871). Majority (75.2%) perceived heart disease to be an extremely serious condition. However, 74.7% of the respondents were not concerned at all about getting heart disease. The association between knowledge of heart disease and place of residence, age group, sex, duration of formal education, and marital status is as shown in Table. The associations were statistically significant, except for sex where there were no observed differences in knowledge. In present study also age is statistically associated with perception but not with gender.

A study conducted on "Elders' Knowledge About Risk Factors of Coronary Heart Disease, Their Perceived Risk, and Adopted Preventive Behaviors" a researcher uses a descriptive research design. The research study was conducted in four governmental and two private elderly homes in Alexandria, Egypt, which were chosen at random by ballot out of all the elderly homes in Alexandria. There were 150 participants in the sample. The findings revealed a correlation between educational level and mean scores on CHD risk factors, risk perception, and preventive behaviors adoption. The elders' educational level was found to have a substantial relationship with their awareness of CHD risk factors, risk perception, and adopted preventive behaviors, with  $p=0.000^*$ ,  $p=0.017^*$ , and  $p=0.000^*$ , respectively.

The higher the educational level, the greater the increase in knowledge of CHD risk factors, risk perception, and adopted preventive behaviors. The degree of education was found to be positively and substantially linked to the perception of CHD risk in the report. As a result, they conclude that having a high level of education and knowing someone who has CHD has a positive influence on awareness, risk perception, and preventive behaviors adoption. In this study education was statistically associated with perception score and in present study also the education was statistically associated.

From May 2015 to February 2016, a cross-sectional study was done on a population with three-vessel coronary artery disease. There were 100 patients in the study, 75 of whom were male (mean age 639) and 25 of whom were female (mean age 699) years old. Diabetes (58 percent), hypertension (86 percent), smoking (68 percent), dyslipidemia (100 percent), metabolic syndrome (71 percent), and obesity/overweight were all found to be coronary risk factors (75 percent). Women had a higher prevalence of diabetes and metabolic syndrome (p=0.03), but men had a higher prevalence of smoking (76 percent, p=0.003).

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In 58 percent of patients, the Ankle-Brachial Index was abnormal, the mean Syntax score was 36.911.5, and the prevalence of left main coronary heart disease was 36 percent. The significant incidence of coronary risk factors in this group of individuals with complicated coronary lesions could indicate a worse prognosis. Because hypertension, diabetes, and high blood cholesterol are major risk factors for triple vascular disease, the presence of any disease history, such as hypertension, diabetes, and high blood cholesterol, is associated with perception score in this study.

## CONCLUSION

The researcher, conducted a descriptive research on the topic assess the patient's perception regarding triple vessel disease and its management. The researcher aimed to improve the level of perception of triple vessel disease patients she predetermined certain objectives, to precede the study. Those objectives were adequate to reach into the findings. A particular time period has been allocated for each step. Investigator had presented her hypothetical views about the study in its beginning. And finally, the researcher reached into her findings. The result of this study shows that, 22.22% of the patients were disagreed about perception about triple vessel disease.

To assess the patient's perception regarding triple vessel disease and its management "s test was applied and "t value was calculated, Minimum perception score was 38 and maximum perception score was 89. Mean perception score was  $63.20\pm17.36$ . That means 0% patients are having strongly negative perception, 22.22% are having negative perception, 37.78% of patient are having positive perception and 40% patients are having strongly positive perception. Thus, it concludes that patient had

good and positive perception regarding triple vessel disease but not aware about the management of triple vessel disease. Age, education, occupation and history of any disease had positive effect on perception.

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## Hot Flashes and their Association with Carotid Intima Media Thickness in Midlife and Beyond

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#### ABSTRACT

Recent evidence suggests that there is an association between menopausal hot flashes and cardiovascular risk. Higher Carotid Intima Media thickness (CIMT) associated with subclinical atherosclerosis Subclinical atherosclerosis is predictive of later coronary vascular disease. To study the association of hot flashes in perimenopause and postmenpause women with carotid intima media thickness. Cross sectional prospective observational study was conducted among women aged 40-55 at Saveetha Medical College Gynecology Department. After ethical clearance and informed consent was obtained, 120 participants were recruited. Perimenopause and menopause women with intact uterus with both ovaries were included. Exclusion criteria were, chronic medical diseases, cancer women on long term medication, and use of hormonal/hormone-like supplements. After routine examination, anthropometric measurement, fasting blood sample for serum estradiol on 2-5 days of a spontaneous menstrual cycle was taken. CIMT of left and right carotid artery at four locations was assessed with B mode USG Philips affinity 30 with 4-12mhz frequency transducer. To assess hot flashes, a questionnaire was given. Women were divided into one of three groups according to hot-flash status over the past three months, namely mild, moderate, and severe. Statistical analysis was done to correlate hot flashes with CIMT. Average age of women screened was 50.7 years. Perimenopausal women were 42.5%, 32.5% early post-menopausal women and 25% late postmenopausal women. Mild hot flash in 55.8%, moderate in 25.8% and severe in 18.33% Mean CIMT in mild hot flash group 0.61mm +-0.08, in moderate hot flash group 0.63+-0.11 and in severe hot flash group 0.67+-0.12 mm with p value of 0.001 Seventy-five percentage of women who had severe hot flash were among BMI >30 and in 31.4% among perimenopause women. There is a positive correlation with severe hot flushers in obese and in perimenopausal women. The present study suggest that severe hot flashes are associated with increased CIMT in perimenopause and obese women. This findings may be a useful marker to provide risk stratification and can guide clinical care.

# **KEY WORDS:** PERIMENOPAUSE, HOT FLASH, CARDIOVASCULAR, MENOPAUSE, CIMT, SUBCLINICAL ATHEROSCLEROSIS

## INTRODUCTION

Hot flashes and night sweats are troublesome symptom which occur among perimenopause & postmenopausal women. Hot flashes and night sweats are known as Vasomotor symptoms (VMS). Carotid intima-media thickness (CIMT) is high among postmenopausal women with vasomotor symptoms. Evidence is conflicting regarding increased risk of cardiovascular disease among



postmenopausal women with hot flashes. Hot flashes and night sweats are surrogate markers of cardiovascular disease. Hot flashes and night sweats are associated with poor quality of life and one quarter of menopause women suffer from this. Though etiology of vasomotor symptoms has not been fully understood, it may be associated with changes in several organ and it may be a marker of coronary artery disease. There is an association with hot flashes and carotid artery with higher carotid intima media thickness (Rebecca et al., 2016).

Higher carotid intima media thickness associated with subclinical atherosclerosis which can be assessed by carotid ultrasound. Subclinical atherosclerosis is predictive of later coronary vascular disease. Carotid Intima Media thickness, plaque and calcification are indicator of later clinical CVD. Mostly hot flashes



occurrence peaks in late perimenopause and early post menopause. Hypoestrogenic state associated with menopause involved in the physiology of hot flashes and associated with endothelial dysfunction (Kalantaridou et al., 2004).

Estrogen receptors ERs though stimulate endothelial cell growth but vascular smooth muscle proliferation inhibited (Koledova & Khalil 2007) Though Hypoestrogenic state associated with hot flash there is no well documented evidence its response to hormone therapy (Barnabei et al., 2002) Effect of EPT on risk of CVD events among older postmenopausal women with significant hot flashes may increase risk of CVD event (Alison et., al 2009) When hormone therapy initiated to recent menopause women had reduced risk of CVD (Jacques et al., 2007) Several indices namely flow medicated dilation, coronary artery calcification and aortic calcification are associated with hot flashes and cardiovascular events were higher in subjects with flow mediated dilation (Joseph et al., 2007) Early atherosclerosis is a marker of endothelial dysfunction. Endothelial dysfunction is a cardiovascular risk factor (Michael et al., 2003). Hot flashes may be surrogate marker for underlying vascular changes in midlife women (Thurston RC et al., 2008).

Table 1.	CIMT Measuremen	ts in Various Group		
CIMT	Mild Hot Flash (n – 67)	Moderate Hot Flash. (n - 31)	Severe Hot Flash (n – 22)	p value
Mean	0.61mm ± 0.08 55.83%	0.63 mm ± 0.11 25.83%	0.67 mm ± 0.12 18.33%	0.001
Higher IMT seen in severe Hot Flash women				

Table 2. Presence of Plaque in Carotid Vessel in VariousGroups (Cross tab & Chi square Tests)

			L	Group		
			Mild Hot flush	Moderate Hot flush	Severe Hot flush	Total
Plaque None Count % within Plaque	Count	67	27	15	109	
	61.5%	24.8%	13.8%	100.0%		
	Moderate	Count	0	4	7	11
		% within Plaque	.0%	36.4%	63.6%	100.0%
Total Count		67	31	22	120	
		% within Plaque	55.8%	25.8%	18.3%	100.0%

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20.838ª	2	.000
Likelihood Ratio	22.167	2	.000
Linear-by-Linear Association	20.437	1	.000
N of Valid Cases	120		

Moderate plaque was seen in moderate and severe Hot Flash women & it is statistically significant.

## MATERIAL AND METHODS

This is a cross sectional prospective observational study comprised of 120 perimenopause and post menopause women. Women aged 40-55 years attending gynaec outpatient were included after ethical clearance and informed consent. Demographic details were collected. BMI was calculated for all women, and Blood pressure was taken in a sitting position after 10 minutes rest. Participants were nonsmoker women with intact uterus with both ovaries who are in transition from perimenopause period to menopause and had at least 3 menstrual periods in the last 12 months and menopause more than 12 months amenorrhea. Women with chronic medical disease like diabetes, hypertension renal disease, pregnancy, hyperlipidemia, cancer, on long term medication, and use of hormonal/hormone-like supplements were excluded from studies. After routine examination anthropometric measurement, fasting blood sample for hormone assays on 2-5 days of a spontaneous menstrual cycle was taken.

Carotid Intima media Thickness of left and right carotid artery at four locations was assessed by certified sonographer with B mode USG Philips affinity 30 with 4-12 MHz frequency transducer. CIMT was measured at lumen interface and the media interface for 1cm. segments. When there is a distinct focal area protruding into vessel lumen >50% thicker than adjacent IMT it is considered as plaque. Hot flashes were assessed by questionnaire. Women were divided into one of three groups according to hot-flash status over the past three months. Namely mild (Group A) moderate (Group B) and severe (Group C). Hot flash was graded as mild if women felt feeling of heat without sweating, moderate if women felt feeling of heat with sweating and severe if women felt feeling of heat with sweating, palpitation that disrupts usual activity. Object of the study is to evaluate association of hot flashes with subclinical atherosclerosis which is assessed by carotid intima media thickness.

## **RESULTS AND DISCUSSION**

In this study the average age of the women screened was 50.7 and ranged between 40 to 55 years. Perimenopause

women were 42.5%(n - 51) and 32.5% (n - 39) early menopause women (menopause within 1-5 years) and 25% (n-30) late menopause women (menopause 5-10 years) were included in the study. BMI among women recruited were 57.5%(n- 69) of them had BMI< 25, twenty seven women – 22.5% had BMI 26-29 and twenty-four women - 20% had BMI >30. In this study mean oestriol was 28 pg. Sixty seven- 55.83% had mild hot flashes, 5.83% (n-31) had moderate hot flashes and 18.33% (n-22) had severe hot flashes. All analyses were performed using SPSS windows version 17. Associations between hot flash and carotid artery intimal thickness, Plaque, BMI and Menopausal status were evaluated using chi-square tests. Table 1 shows mean carotid artery intimal thickness among 67 mild hot flashes women was 0.61±0.08 thirtyone moderate hot flashes women CIMT was 0.63±0.11 and in twenty-two severe hot flashes women CIMT was  $0.67\pm0.12$  with p value 0.001. Moderate Plaque was seen in 36.4% in moderate hot flash women, and in 63.6% in severe hot flash women.

Cni	square	TestsJ				
BMI * Group Crosstabulation						
1				Group		
			Mild Hot flush	Moderate Hot flush	Severe Hot flush	Total
BMI	<25	Count	59	9	1	69
		% within BMI	85.5%	13.0%	1.4%	100.0%
	28-<30	Count	7	17	3	27
		% within BMI	25.9%	63.0%	11.1%	100.0%
	>30	Count	1	5	18	24
		% within BMI	4.2%	20.8%	75.0%	100.0%
Total		Count	67	31	22	120
		% within BMI	55.8%	25.8%	18.3%	100.0%

Table 3. Correlation of Hot flash with BMI- (Cross tab &

Chi-Square Tests Asymp. Sig. Value đf (2-sided) Pearson Chi-Square 99,226 000 4 Likelihood Ratio 92,839 4 000 Linear-by-Linear 73.225 000 Association N of Valid Cases 120 a. 2 cells (22.2%) have expected count less than 5. The minimum expected count is 4.40.

Severe hot flash is seen in women BMI>30 and it is

statistically significant.

Table 2 shows distribution of Plaque. There is significant statistical association with severe hot flash and Plaque at p value less than <0.001. Table 3 shows distribution of hot flash among different BMI group women. Seventy-five percentage of women who had severe hot flash were BMI >30. Table 3 show distribution hot flash among various Menopausal status. The correlation was done using chi –square tests. Statistical analysis revealed that severe hot flash was seen in 31.4% perimenopause women when compared with early and late menopause women with p value less than < 0.001. interest systems. With the low misfit cost of power hydroelectric, the problem of minimizing the transition cost of a hydrothermal system basically reduces to that of minimize the fuel

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cost for thermal plants user the divers constraints on the hydraulic and power system grid.

 Table 4. Correlation of Menopausal status and Hot Flash 

 (Cross tab & Chi square Tests)

			Seve	rity of Hot flue	sh	
			Mild Hot flush	Moderate Hot flush	Severe Hot flush	Total
Menopausal	Perimenopause	Count	14	21	16	51
Early Menopause	% within Menopausal status	27.5%	41.2%	31.4%	100.0%	
	Count	27	7	5	39	
	% within Menopausal status	69.2%	17.9%	12.8%	100.0%	
	Count	26	3	- (1)	30	
		% within Menopausal status	88.7%	10.0%	3.3%	100.0%
Total		Count	67	31	22	120
% within Menopausal status		55.8%	25.8%	18.3%	100.0%	

	Value	df	Asymp. Sig (2-sided)
Pearson Chi-Squ	31.276ª	4	.000
Likelihood Ratio	33.592	4	.000
Linear-by-Linear Association	25.952	٦	.000
N of Valid Cases	120		· · · · · · ·
a.0 cells (.0%) minimum exp	have expected court	ted cour nt is 5.50	nt less than ).

Recent evidence suggest there is a link between hot flashes and CVD risk indicators About 70% of midlife women experience hot flashes. Hot flashes has impact on quality of women's life. Few trials suggest that women having moderate to severe hot flashes has CVD risk.( Thurston RC et al ). Women with Hot flashes may have an accelerated vasculature changes but it is due to aging or menopause is not yet explained. Since estrogen alters vasomotor stability Hot flashes and night sweats are considered as cardiovascular risk markers. Carotid intima thickness and plaque assessment predict changes in sub clinical atherosclerosis. Changes in subclinical atherosclerosis may be used as surrogate marker for cardiovascular risk. Hence this study aimed at association of hot flashes with subclinical atherosclerosis which is assessed by carotid intima media thickness.

Study by (Siobán & Harlow 2020) 20% of women reported hot flashes and night sweats while ~40% reported sleep disturbances 5- 10 years prior to FMP. In the study 31.4% perimenopause women had severe hot flashes. Hot flashes ranged from 22 to 55% in the study by (Bastin et al., 2003) Study by concluded that Post-menopausal women with hot flashes had higher CIMT. In the study perimenopause women those who had severe hot flashes associated with increased CIMT and plaque which highlights its association with subclinical atherosclerosis. Hence midlife vasomotor symptoms may be marker for cardiovascular risk and it is a critical window for cardiovascular prevention in women. SWAN

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study by Nanette Santoro et al reported that elevated subclinical CVD and increased IMT, diminished flow mediated dilation, aortic calcification were among every day hot flashes women. In the study hot flashes were severe among women with BMI >30 and study by (Rebecca C et al., 2011) there is a correlation between hot flashes and overweight and obese women. Study by GailA concluded that women may be benefitted from vasomotor symptoms if they maintain ideal body weight Lifestyle modification may reduce vasomotor symptoms.

## **CONCLUSION**

In the study increased Carotid artery intimal thickness were seen in perimenopause women with severe hot flashes and women with BMI >30. Hot flashes may be a marker for adverse cardiovascular changes and it gives window of opportunity to counsel them regarding life style modification and assess the other risk factors for CVS and prevent before clinical events.

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## **Implementation of Autonomous Sensor-Based E-Waste Monitoring System**

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#### ABSTRACT

Air quality of the environment we are living in is reducing day by day due to increased human activities like; biomass burning, automobiles, landfilling, illegal burning of Electronic waste (E-waste), urbanisation and industrialisation. Illegal burning of electronic waste (E-waste) releases many air pollutants along with toxic heavy metals (Pb, Hg, Ni, Cr and Cd) into the surrounding environment which poses high risk to the environment and human health. Therefore to address the problem of air pollutants concentration by categorising air pollutants particles size falling under 2.5 u/m3 and 2.5 u/m3 to 10 u/m3 by using PM2.5 and PM10 particulate matter laser sensors. After measuring the air pollutants concentration at any selected site, the measured data was uploaded to the Internet of Things (IoT) Cloud for storage and remote monitoring for further risk assessment. User-friendly mobile application was developed to access the air quality information from the IoT cloud of the selected E-waste burning site and health risk assessment is done according to the standard regulatory guidelines set by Environmental protection agency(EPA) and ACGIH. Based on the measured air pollutants concentration, the application predicts the Air quality index (AQI) category and alerts the users about associated health symptoms and precautionary measures.

**KEY WORDS:** PARTICULATE MATTER, PM2.5, PM10, AIR QUALITY, AQI, IOT AND USER-FRIENDLY MOBILE APPLICATION.

## **INTRODUCTION**

According to the World Health Organization (WHO), around 7 million people dies of due to air pollution worldwide every year and due to outdoor air pollution approximately 3.4 million people died prematurely in 2017 (WHO). WHO data shows that 9 out of 10 people breathe air that exceeds WHO guideline limits containing higher concentrations of air pollutants and most of the deaths occurred in the developing countries (World Health Organization, 2014) like India, china etc. suffering from the highest exposure to ambient air pollution. Following tobacco smoking and household air pollution from solid fuels, ambient air particle pollution became the third



leading environmental health risk to premature death in the developing countries (about 45 deaths per 100,000 people) (Sengupta & 2019 & Chen et al., 2015).

India is been considered as one of the fast growing economy in the world since last decade, but this extensive growth has come at a substantial cost to the environment and public health in India. Nowadays, India has become one of the largest producer of major air pollutants in the world, and serious air pollution has risen a concern of people and the authorities with the consideration of public health damage and economic loss. As we know, various kinds of air pollutants release from different kinds of sources, such as industry, vehicle, waste combustion, power plant, cooking and so on. In addition, many of the released pollutants would make a series of reactions with each other in the mix air family under different conditions (Hong et al., 2018).

Therefore, they defer in chemical property, physical characteristics, transportation ability, as well as human toxicity and so on. However, based on their some



similarities and the major air pollution styles, they are grouped into four categories (Kampa and Castanas, 2008): (1) particulate matter (PM); (2) gaseous (air) pollutants; (3) heavy metals; (4) persistent organic pollutants (POPs) (Hemalatha et al., 2019).

Gaseous or air pollutants refer to Ammonia(NH3), sulphur dioxide (SO2), nitrogen oxide (NOx), Hydrogen Sulphide(H2S), carbon monoxide (CO), ozone (O3), volatile organic compounds (VOCs) in most of the time. Due to their great contribution to the polluted air and prevalently found in different kinds of emission sources, this group of pollutants was firstly in regulations in the world. They were listed as Criteria Air Pollutants in the first US EPA Clean Air Act in 1997 except for VOCs, which had been listed in regulation since 2003. They are mostly the products of combustion of fossil fuels, various industrial processes, and motor vehicles (Katsouyanni, 2003; Sager 2019).

Particulate matter (PM) is the generic term used for the suspended particles varying in size and composition and could be produced by various natural and anthropogenic activities. In the US EPA Clean Air Act, particles less than 10 micrometres in diameter (PM10) and 2.5 micrometres in diameter (PM2.5) are in the list of Criteria Air Pollutants. It was proposed that PM10 can get deep into human lungs and thus will cause greater problems than the coarse one. Fine particles (PM2.5) are proved the major cause of visibility reduction thus cause haze days (Tsai, 2005). Moreover, due to the smaller size of fine particles, they can go deeper into human lungs and cause short-term irritation, affect lung function and result in asthma and heart diseases (Panjagal et al., 2021).

Fine particle pollution is now identified as a major risk globally. The air quality has to be maintained for protecting human health, the World Health Organization (WHO) provides the threshold pollutant concentration levels to limit harmful effects on human mortality. The daily and annual limits of fine PM (PM2.5, which has a diameter less than or equal to 2.5  $\mu$ m) do not exceed 25 and 50  $\mu$ g/m3, respectively. However, there is no specific recommendation for safe PM limits concerning cognition and mental health (Sebastien et al., 2011).

Air pollution causes premature death of human being and it is a significant risk factor for the number of pollutionrelated diseases including heart disease, respiratory infections, stroke and lung cancer. The health problem caused by air pollution includes coughing, difficulty in breathing, wheezing, asthma, and worsening of existing respiratory and cardiac conditions. These may result in increased medication use, more hospital admissions and premature death (Shehab & Pope 2019).

Air quality monitoring is essential for major public and private industrial sectors to prevent air pollution and measure emission sources to impose more stringent measures in order to mitigate outdoor air pollution especially from illegal e-Waste burning in waste dumping yards. So to address the issues associated with indoor and outdoor air pollution, in this research work we proposed to design an autonomous sensing system for E-waste monitoring to measure the air quality at the waste dumbing sites and other general places. The system measures the air quality at selected site in real-time and then stores the data on IoT cloud for remote monitoring and further assessment in mobile application.

## **MATERIAL AND METHODS**

**2.1. Study Area:** The municipal and electronic waste dumping site at Chittoor Town, Andhra Pradesh, India has been selected for studying the outdoor ambient air pollution, air quality in surrounding sites and Risk assessment based on standard guidelines formulated by Environmental Protect Agency (EPA), American Conference of Governmental Industrial Hygienists (ACGIH) etc.,. Apart from measuring the air quality at E-Waste, we proposed to measure the air quality at most common places like Organizations, carpentry/wood working sites, public places etc.

**2.2. Methodology:** Our proposed research work involves following methodologies;

- Design of Air Quality (e-Waste) monitoring System
- Mathematical modelling of Sensors
- Data Processing, Storage & Assessment

2.2 Design of Air Quality (e-Waste) monitoring System: In this research work, we designed an autonomous sensing system for E-waste monitoring to measure the air quality at the waste dumbing sites and other general places. This air quality monitoring system incorporates industrial sensors like; SDS011 (PM2.5 and PM10) optical dust particle sensor, and TGS2602 senor for measuring air pollutants ammonia (NH3), Iso-butane or benzene, H2S, and Volatile organic Compounds(VOC's) including smoke. The local processor (NodeMCU) measures the concentration of air pollutants, particulate matter (PM) particle size up to 2.5 ug//m3 and particle sizes ranging above 2.5 ug/m3 up to 10 2.5 ug/m3 concentration and displays on OLED display for real-time monitoring. Then whole data was uploaded on to Internet of Things (IoT) cloud for storage and further assessment through remote access via mobile applications. The figure 2.1 shows the E-Waste monitoring system block diagram.

**2.2 Mathematical modelling of Sensors:** As we used industrial gas sensors for real-time measurement of airpollutants and Particulate matter concentrations, these sensors needs to be calibrated, and then output voltage of the sensor has been converted into parts per million (ppm) units by developing the mathematical model using power regression analysis. The sensitivity curve of TGS2602 sensor was used to find the coefficients A and B using either straight-line method or power regression analysis. Figure 1.2 shows the basic measurement circuit of TGS2602 gas sensor (Swati et al., 2019).



The sensor resistance Rs can be determined using Ohm's Law:  $V = I \times R$  ----(1)

from basic measuring circuit is output current is equal to: I = VC / (Rs+RL) ---(2)

Ro: sensor resistance in the clean air.

Rs: sensor resistance at various concentrations of gases.

Then; Rs = [(Vc x RL) / VRL] - RL -----(3)

The output resistance Ro was calculated by calibrating the sensor in clean air and under standard test conditions. After measuring Sensor resistance Rs, the ratio of Rs/ Ro calculated to determine the gas concentration in ppm using coefficients obtained from power regression analysis. The following equation (4) is used to calculate the gas concentrations in ppm (Xu & Yang 2019).

X ppm = Coefficient (A)\*(Rs/Ro)<sup>coefficient</sup> (B) ----(4)

The conversion of air pollutants PM2.5 and PM10 particles size in parts per million to micrograms per cubic meters is given below equation (5),

Concentration (ug/m<sup>3</sup>) = concentration (ppm)\*{molecular mass(g/mol)/molar volume(L)}-----(5)

The AQI provides an indication of the quality of the air and its health effects. The index value for pollutant can be calculated as given in equation (6);

$$I_p = \frac{I_{Hi} - I_{Lo}}{BP_{Hi} - BP_{Lo}} (C_p - BP_{Lo}) + I_{Lo}$$
(6)

Where;

Cp is the truncated concentration of pollutant (p)

 ${\rm BP}_{\rm Hi}$  is the breakpoint that is greater than or equal to Cp

 $BP_{Lo}$  is the breakpoint that is less than or equal to Cp  $I_{Hi}$  is the AQI value corresponding to  $BP_{Hi}$ 

 $I_{Lo}$  is the AQI value corresponding to  $BP_{Lo}$ 

**2.3 Data Processing, Storage & Assessment:** As the entire system involves air pollutants measurement and monitoring, hence the measured data needs to be processed at various stages of the research development. The local processor reads concentration of air pollutants in ppm and their particulate matter concentration in ug/m3 using sensors, hence the data processing done by applying mathematical modelling algorithms to convert the output voltage levels into air pollutant gas concentration in parts per million (ppm) and particulate matter (PM) concentration in ug/m3. After data processing, measured concentration data was uploaded to IoT cloud for storage and further studies.



Figure 3.2: Air pollutants concentration in normal air and PM concentration in indoors





Figure 3.3: Pollutants Concentration when device was

The data stored onto the IoT cloud helps us to further assess the data using user-friendly user interfaces like mobile/web applications or remote monitoring and

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decision making purposes. A health impact of particle pollution has been performed using risk assessment at the end user mobile application. In this assessment, the measured air pollutant and particulate matter concentration was compared against the standard safety guidelines provided by the Environmental Protect Agency (EPA), American Conference of Governmental Industrial Hygienists (ACGIH), NIOSH, OSHA etc.,. If the measured concentration exceeds threshold limit or safety value, the application will alert the user about the possible health effects/symptoms based on air quality category for 8-hour or 24-hour long exposure.

#### **RESULTS AND DISCUSSION**

In this proposed work, we developed an autonomous sensing device for e-Waste monitoring and assessment of air quality at the surrounding of selected study site as shown in figure 3.1

The device was tested against various environments like, clean air, indoors, laboratories, manual exposure for pollutants and selected sites. The Figure 1.7 shows the air pollutants concentration when the device was exposed to air pollutants.

Apart from displaying the measured real-time data on OLED, the data was uploaded to ThingSpeak IoT cloud for storage and real-time monitoring through remote access. Different fields are used to store and show the sensor data graphically. The field1 and Field2 are used to draw PM2.5 and PM10 data as shown in figure 3.4.



The field3 to Field5 are used to draw Ammonia (NH3), Iso-Butane and Smoke data as shown in figure 3.5

To perform the risk assessment and allow the users to know real-time information about the air quality at measured sites, the data stored on IoT was accessed on user-friendly mobile applications using read API keys as shown in figure 1.10 (Zeba et al., 2018).



Figure 3.6: Real-time data of air pollutants, air quality and their health symptoms alert IoT Mobile Application



After reading the data from IoT, the mobile application perform risk assessment, the measured air pollutant and particulate matter concentration was compared against the standard safety guidelines provided by the Environmental Protect Agency (EPA), American Conference of Governmental Industrial Hygienists (ACGIH), NIOSH, OSHA etc.,. If the measured concentration exceeds threshold limit or safety value, the application will alert the user about the possible health effects/ symptoms based on air quality category for 8-hour or 24-hour long exposure.

#### **CONCLUSION**

The development of Autonomous sensing device for monitoring air quality at e-waste dumping site, shown satisfactory performance in terms of sensing air pollutants and particulate matter with good accuracy and

measurement. The air quality measurement was done at various outdoor and indoor places apart from e-Waste dumping sites and uploaded to IoT cloud for storage, further assessment and remote access at end user mobile application for monitoring and alerting. The IoT mobile application provides real-time data of measurement and performs risk assessment by comparing real-time air pollutants concentration against the standard guidelines on threshold limit values and safety values formulated by EPA, ACGIC, NIOSH and OSHA. After comparing if any air pollutant concentration exceeds threshold limit or safety value, the application will alert the user about the possible health effects/symptoms based on air quality category for 8-hour or 24-hour long exposure. Hence the real-time implementation of this system at various outdoor public places will be very useful for alerting air quality index and their symptoms to the public, which in turn reminds the public to take necessary measures to mitigate inhaling of unhealthy air.

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## A New Validated Method for the Estimation of Amisulpride in Bulk and Pharmaceutical Dosage Form by Using Reverse Phase Liquid Chromatographic Method

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#### ABSTRACT

New validated method for the estimation of Amisulpride In Bulk and Pharmaceutical Dosage Form By Using Reverse Phase Liquid Chromatographic Method Chromatographic separation was achieved on a inertsil ODS column (150x4.6mm, 3.5 µ) using isocratic elution with a mobile phase containing buffer and acetonitrile within the ratio of 30:70 as mobile phase with a flow of 1 ml/min at ambient temperature and UV detection was carried at 257 nm. Analysis was achieved within 5 min over an honest linearity within the concentration range from 1-15 µg/ml of Amisulpride. By injecting the standard six times, system suitability parameters were studied and the outcomes were well under the acceptance criteria. Precision and recovery study results were found to be within the limit. By using the above technique assay of marketed formulation was performed and found to be within the limit. Degradation studies were carried out on Amisulpride, with a purity threshold greater than purity angle in all conditions and within the acceptable range. The above mentioned technique was validated according to ICH guidelines.

KEY WORDS: HPLC, AMISULPRIDE, DEVELOPMENT, VALIDATION, DEGRADATION STUDIES.

## INTRODUCTION

Amisulpride is an antiemetic and antipsychotic medication used at lower doses intravenously to prevent and treat postoperative nausea and vomiting; and at higher doses orally and intramuscularly to treat schizophrenia and acute psychotic episodes. It is sold under the brand names Barhemsys (as an antiemetic) and Solian, Socian, Deniban and others (as an antipsychotic). It is also used to treat dysthymia. It is usually classed with the atypical antipsychotics. Chemically it is a benzamide and like other benzamide antipsychotics, such as sulpiride, it is associated with a high risk of elevating blood levels of the lactation hormone, prolactin (thereby potentially causing the absence of the menstrual cycle, breast enlargement, even in males, breast milk secretion not related to breastfeeding, impaired fertility, impotence, breast pain, etc.), and a low risk, relative to the typical antipsychotics,



of causing movement disorders. Amisulpride is believed to work by blocking, or antagonizing, the dopamine D2 receptor, reducing its signalling. The effectiveness of amisulpride in treating dysthymia and the negative symptoms of schizophrenia is believed to stem from its blockade of the presynaptic dopamine D2 receptors. These presynaptic receptors regulate the release of dopamine into the synapse, so by blocking them amisulpride increases dopamine concentrations in the synapse. This increased dopamine concentration is theorized to act on dopamine D1 receptors to relieve depressive symptoms (in dysthymia) and the negative symptoms of schizophrenia (Agarwal et al., 2016).





## MATERIAL AND METHODS

**2.1 Materials:** Acetonitrile and Tri fluoro acetic acid, water (HPLC grade) were purchased from Merck (India) Ltd, Worli, Mumbai, India. API of Amisulpride as reference standard was procured from Laurus Labs Pvt. Ltd., Hyderabad (Capuco & Akers 2009).

**2.2 Tools:** An HPLC system (Waters alliance e2695 model) consisting of quaternary pump, PDA detector-2998 was used. Data processing was performed with Empower 2.0 software (Carmichael et al., 2021).

**2.3 Chromatographic conditions:** Chromatographic separation was carried out in isocratic mode at room temperature using inestsil ODS column (150x4.6 mm,  $3.5 \mu$ ). A mixture of acetonitrile and 0.1% tri fluoro acid (TFA) in 70:30 v/v at a flow of 1 ml/min was used as mobile phase. The injection volume was 10 µl and the run time was 5.0 min (Frederick et al., 2014).

**2.4 Preparation of buffer:** 1 ml of tri fluoro acetic acid is dissolved in 1 lt of HPLC grade water and filtered through 0.45 µ filter paper (Gerlo et al., 2006).

2.5 Diluent: Acetonitrile was used as diluent.

**2.6 Preparation of standard and quality control samples:** Accurately weigh and transfer 10 mg of Amisulpride in 100 ml volumetric flask and add app. 70 ml of diluent, sonicate to dissolve it for 30 min. and made up to the mark with diluent. Furthur dilute 5 ml of the above solution to 50 ml with diluents.

**2.7 Preparation of sample solution:** Accurately weigh and transfer weight equivalent to 10 mg of Amisulpride sample in 100 ml of volumetric flask and add 70 ml of diluent. Sonicate to dissolve and dilute up to the mark with diluent. Take 5 ml of the above solution and diluted to 50 ml and filtered through 0.45  $\mu$  nylon syringe filter (Giardina et al., 2006).

#### 2.8 Method Validation

**2.8.1 System suitability:** System suitability parameters were measured to verify the system performance. The parameters including USP plate count, USP tailing and % of RSD are calculated and found to be within the limit.

**2.8.2 Specificity:** Specificity is the ability to assess unequivocally the analyte in the presence of other components, which may be expected to be present in the sample and standard solution. It was checked by examining the chromatograms of blank samples and samples spiked with Amisulpride.

**2.8.3 Accuracy:**Accuracy is the closeness of the test results obtained by the method to the true value. It was assessed by the recovery studies at three different concentration levels. In each level a minimum of three injections were given and amount of the drug present,

percentage recovery and related standard deviation were calculated.

**2.8.4 Precision:** Precision of the analytical method is the degree of agreement among individual test results. It was studied by analysis of multiple sampling of homogeneous sample. The precision of the present method was assessed in terms of repeatability, intraday and inter-day variations. It was checked by analyzing the samples at different time intervals of the same day as well as on different days.

**2.8.5 Linearity:** Linearity of an analytical method is its ability to obtain results directly proportional to the concentration of the analyte in the sample within a definite range. The six series of standard solutions were selected for assessing linearity range. The calibration curve was plotted using peak area versus concentration of the standard solution and the regression equations were calculated. The least squares method was used to calculate the slope, intercept and correlation coefficient.

**2.8.6 Stress degradation:** Stress degradation should be no interference between the peaks obtained for the chromatogram of forced degradation preparations. Stress degradation studies were performed as per ICH guidelines Q1 (A) R2. The degradation peaks should be well separated from each other and the resolution between the peaks should be at least 1.0 and the peak purity of the principle peaks shall pass. Forced degradation studies were performed by different types of stress conditions to obtain the degradation of about 20%.

**2.8.7 Robustness:** Robustness of an analytical procedure is a measure of its ability to remain unaffected by small but deliberate variations in method parameters and provides an indication of its reliability during normal usage. Robustness study was performed by injecting standard solution into the HPLC system and altered chromatographic conditions such as flow rate ( $\pm 0.2$  ml/min), organic content in the mobile phase ( $\pm 10\%$ ). The separation factor, retention time and peak asymmetry were calculated by determining the effect of the modified parameters (Goikolea et al., 2013).

#### **RESULTS AND DISCUSSION**

The current study was designed to develop a simple, precise and rapid analytical RP-HPLC method, which can be used for the analysis of assay method for the estimation of Amisulpride in bulk and pharmaceutical dosage form. The chromatographic conditions were optimized in order to provide a good performance of the assay. To optimize mobile phase, various combinations were tried for Amisulpride. The final working mobile phase is 0.1% tri fluoro acetic acid and acetonitrile in the composition of 30:70 v/v. Detection was carried out in several wavelengths in order to obtain enough sensitivity for the two APIs in smaller proportion (Amisulpride). At last the wave length 257 nm was selected at which the drug showed good absorbance. The flow rate was 1.0 ml/min. The retention time for Amisulpride was 2.423

min respectively. The proposed method is validated in accordance with the ICH guidelines with all of the results within the limits. The detection was carried out with a total runtime of 5.0 min. Optimized chromatographic conditions were shown in table 1.

Table 1. Optimized chromatographic conditions			
Parameter	Condition		
Stationary phase	Inertsil ODS (150x4.6 mm, 3.5 μ)		
Mobile phase	0.1% TFA: Acetonitrile (30:70)		
Injection volume	10 µl		
Flow rate	1.0 ml/min		
Column temperature	25°C		
Wave length	257 nm		
Run time	5.0 min		
Retention time of	2.423 min		
Amisulpride			
*TFA : Tri fluoro acetic acid nm: Nanometer			

**System suitability:** The system suitability was performed by injecting standard solution containing 10  $\mu$ g/ml of Amisulpride in six replicates. The results indicate that the system suitability parameter is within the limit. The standard chromatogram was shown in figure 2.





**Specificity:** There was no interference from blank at the retention time of Amisulpride. Figure 3 represents the blank chromatogram (Honarmand et al., 2016).

**Linearity:** Linearity was determined by plotting a calibration curve of peak area against their respective

concentration. From this calibration curve it was found that the curve was linear in the range of  $1-15 \mu g/ml$  of Amisulpride. The regression equation for calibration curve of Amisulpride was Y= 371398.70x + 16090.61 (R2-0.9998), the results were shown in table 2 and the calibration plot was shown in figure 4.

Table 2. Results of linearity			
S. No	Amis	ulpride	
	Concentration (µg/ml)	Area	
1	2.50	954872	
2	5.00	1835648	
3	7.50	2835698	
4	10.00	3789542	
5	12.50	4632159	
6	15.00	5563147	





#### Table 3. Results of method precision S. No. Area of Amisulpride 1 3766548 2 3721548 3 3742156 4 3785451 5 3706541 6 3726854 Mean 3741516 Std. dev 29645.3731 % RSD 0.79

Table 4. Results of Intermediate precision

Area of Amisulpride	Relative standard deviation
3785214	0.67
3735648	
3752445	
3776892	
3720158	
3768501	

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**Precision:** Precision of this method was assessed in terms of intraday (repeatability) and (intermediate precision) variations. The intraday studies were determined by performing six repeated analysis of the sample solution of Amisulpride on the same day under the same experimental conditions (Lyo et al., 2002). The intermediate precision of the method was carried out in the same laboratory by studying the analysis with different analyst and different instrument. The method is highly precise as %RSD values were found to be <2%. Good recoveries of the drug were obtained at each added concentration, indicating that the method was accurate. Table 3 gives the method precision results (Katch et al., 1980; Madras 2013).

Accuracy: The accuracy of the method was performed by calculating the recovery experiments at three levels (50%, 100% and 150%). APIs with concentration 5, 10, 15 µg/ml of Amisulpride was prepared. The test solution was injected three times for each spike level and assay was performed as per the test method. The recovery results were close to 100% and also the RSD values were less than  $\pm 2\%$ . The percentage recovery, mean and relative standard deviation were calculated. Recovery values demonstrated that the method was accurate within desired range. Accuracy results were shown in table 5.

Table 5. Results of accuracy				
Accuracy Amount of Amisulpride % Recovery				
50	5	99.1		
100	10	100.2		
150	15	99.6		

**Robustness:** Robustness of the chromatographic method was determined by varying flow rate and mobile phase composition. % RSD was found to be within the acceptable limit. Robustness results were shown in table 6 (Leucht et al., 2013).

Table 6. Results of robustness				
Parameter % RSD of Amisulpride				
Flow (0.8 ml/min)	0.50			
Flow (1.2 ml/min)	0.15			
Organic phase (63:37)	0.06			
Organic phase (77:23)	0.31			

**Forced degradation:** The proposed method can be used for release and stability studies for effective evaluations and can be considered as stability indicating method. The forced degradation study was carried out according to the ICH requirements include acid, base, oxidation, reduction, photo, thermal, hydrolysis degradation. From the chromatograms it is evident that the selected drugs were stable under the applied stress conditions though the degraded peaks were observed. Forced degradation study results were shown in table 7.

Table 7. Results of forced degradation			
Stress parameter	% degradation Amisulpride		
Acid degradation	13.6		
(1N HCl+ reflux+ 24 hrs)			
Alkali degradation	12.6		
(1N NaOH+ reflux+ 24 hrs)			
Peroxide degradation	15.4		
(30% Peroxide+ reflux+ 24 hrs)			
Reduction degradation	16.5		
(30% sodium bi sulphate+ 24 hrs)			
Photo degradation (UV light (200 W h/m2)	12		
and fluorescent light (1.2 million lux-hrs))			
Thermal degradation (Sample + heat	12.2		
for 6 hrs)			
Hydrolysis degradation	10.3		
(1 ml HPLC water + reflux + 24 hrs)			

The devised approach was validated in accordance with ICH requirements and found to be very precise, quick, simple, cost-effective, and sensitive to the specific pharmaceutical dosage form (Oftedal 2002; Owen 2016; Pani 2002; Perea 2009).

## **CONCLUSION**

In this study a novel, rapid, economical, sensitive and easily available HPLC method was developed for the determination of Amisulpride in bulk and pharmaceutical dosage form. In this method shorter run time, low price, accessibility, sensitivity, reliability and reproducibility. These properties are important when a large number of samples are to be analyzed. The validation of all the parameters like linearity, accuracy, specificity, robustness, method precision were done and found to be within the acceptable limit. The RSD values for all the parameters were found to be less than 2%, which indicates the validity of the method and the results obtained by this method are in fair agreement. So the proposed method could be easily applied for the routine analysis and the pharmaceutical formulations of Amisulpride in quality control laboratories without any preliminary separation.

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**Competing Interests:** There is no competing of interests

**Authors' Contributions:** Autor 1 designed the study, performed the statistical analysis, wrote the protocol, and wrote the manuscript. Autor 2 to check the work and review the manuscript.

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## Synthesis and Characterization of Zinc Oxide Doped Mesoporous Silica SBA-16 and Anti-bacterial Property

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#### ABSTRACT

In this research, article SBA-16 was synthesized by using hydrothermal process and ZnO nanoparticles by using sol-gel method. ZnO nanoparticles were introduced further into the mesopores of SBA-16 through post impregnation method. The doping of ZnO nanoparticles into SBA-16 was confirmed by their Fourier Transformed Infrared Spectroscopy (FTIR) analysis, X-ray diffraction (XRD), and small-angle X-ray Scattering graph (SAXS). The morphological analysis of the prepared sample was done by Scanning Electron Microscopy (SEM), and their lattice cell parameter with symmetry was be analyzed by performing Transmission Electron Microscope (TEM). The anti-bacterial property of SBA-16-ZnO nanocomposite was examined against *E. coli* and *S. aureus* bacteria.

KEY WORDS: ZNO, SBA-16, SBA-16-ZNO NANOCOMPOSITE, ANTI-BACTERIAL PROPERTY, ETC.

## **INTRODUCTION**

SBA-16 is a modern mesoporous, large cage, Im3m silicium substance with large pores and high hydrothermal stability. The SBA-16 also exhibits high thermal and mechanical stability and is environment friendly, making it a suitable material for a wide range of applications. It can be applied as a support material of catalysts and planning for the production of orderly mesoporous carbon in environmental treatment for adsorption and separation. Its practical uses, including catalysts, absorbents, and sensors, have been extensively published. However, the study has not been published thoroughly on many morphologies of mesoporous SBA-16 materials. The synthesis of mesoporous materials with other materials changes in synthetic sources, stirrings, and reaction temperatures may achieve morphologies.

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The Zinc Oxide Nanoparticle (ZnO) is a wideband semiconductor that attracts considerable attention to fundamental studies and possible applications in different research areas. ZnO is a versatile, functional material, with its superior qualities being applied potentially in catalysts, transducers, semiconductors, microelectronics, textiles, cosmetics, water treatment, and others. In addition to antibiotics and bactericides, ZnO displays antimicrobial activity and anti-inflammatory characteristics that provide more efficient, less expensive, and less toxic alternatives. In recent years, several groups have produced the preparation of nano-size ZnO particles through sol-gel methods (Kumar et al., 2020).

Antibacterial activity against Gram-Positive gramnegative bacteria is shown by nanoparticles of zinc oxide. Nanoparticles with zinc oxide are thought to be non-toxic, bio-safe, and biocompatible. SBA-16-ZnO nanocomposite's antibacterial activity has not previously been investigated against *E.coli* and *S. aureus*. Although specific assertions were suggested, such as hydrogen peroxide development, the critical factor of the antibacterial activity or the attachment of ZnO particles on the Bacterial Surface could be a mechanism. The mechanisms of ZnO's antibacterial activity are not fully known. This work, therefore, tries to manufacture



nanocomposites SBA-16-ZnO and verify their vigorous antibacterial activity for bacteria of E.coli and *S. aureus* (Sirelkhatim et al., 2015).

In this research, article SBA-16 was synthesized by using hydrothermal process and ZnO nanoparticles by using sol-gel method. ZnO nanoparticles were introduced further into the mesopores of SBA-16 through post impregnation method. The doping of ZnO nanoparticles into SBA-16 was confirmed by their Fourier Transformed Infrared Spectroscopy (FTIR) analysis X-ray diffraction (XRD) and small-angle X-ray Scattering graph (SAXS). The morphological analysis of the prepared sample was done by Scanning Electron Microscopy (SEM), and their lattice cell parameter with symmetry was be analyzed by performing Transmission Electron Microscope (TEM). The research work shows successful preparation of ZnO doped SBA-16, which can be significantly applicable in several industrial applications such as catalyst, antibiofilm industries, targeted drug delivery, etc. The results will assist in discovering an appropriate alternative for controlling E.coli and S. aureus infection.

#### 2. Experimentation

**2.1. Synthesis of SBA-16:** SBA-16 was synthesized to retain the pH of solution 5.94 gm 2M HCL in the solution by dissolving 3gm Pluronic P127 in 144 gm distilled water. 9gm n-butanol was applied carefully into the solution and stirred the solution for the next 3 hours to prepare a clear solution. After 3 hrs of stirring, 14.2gm TEOS dropwise applied to the earlier stirring solution and stirred at a temperature of 38°C for another 24 hours. The processed hydrothermal solutions were applied to an autoclave with Teflon and placed in the microwave autoclave at 100°C for 24 hours. The final stage was washed three times with water purified and calcinated for 5 hours at 550°C (Praseptiangga et al., 2020).

**2.2. Synthesis of SBA-16/ZnO Nanocomposite:** SBA-16/ZnO2 nanocomposite has been prepared by impregnation of zinc acetate solution into SBA-16. The synthesis process was performed by adding 0.901g zinc acetate into 42 ml ethanol and stirred for 2 hours at 70°C. The solution was cooled to room temperature, which resulted in a heavy stirring of 0.5 g of SBA-16. In order to extract the contaminant, the resulting blend has been dried for 24 hours at 80°C. Samples were consequently calcinated in the air by rising ambient temperature over 1 hour and keeping 550 °C for 1 hour from room temperature to 550 °C (González-Rodríguez et al., 2020).

**2.3. Anti-bacterial Evaluation:** The antibacterial effect of SBA-16-ZnO nanocomposite against E.coli and S. aureus bacteria was evaluate using the previously mentioned procedure. Discs of SBA-16-ZnO nanocomposite and SBA-16 were prepared, and distilled water disks were employed as control. The culture was kept for overnight incubation at 37°C. The measurement of inhibition-zone diameter was used to assess antibacterial activity.

#### 3. Characterization:

**3.1. Ftir:** At a prominent peak at 3500 cm-1, FTIR pattern, the O-H-bond of the silanol groups and the water molecules were reflected in the samples. The C-H vibration should be present at a low peak at 2890 cm-1 and suggest that virtually all of the tensile material has been extracted. A wavenumber 1635, cm-1 is the bending vibration of the C-H. Siloxane (-Si-O-Si-) is distinguished by its elevated height at 1082 cm-1. The vibration of the silanol groups' Si-OH bond extending is observed at 961 cm-1, and the 490 cm-1 Si-0 bond rocking vibration was observed. These functional classes fit TEOS's SBA-16 FTIR pattern. The drop in Si-OH group strength in the graph SBA-16-ZnO nanocomposite implies that ZnO alters the inner surface. SBA-16-ZnO nanocomposite spectrum FTIR exhibits wavelength propagation peaks at 961.64 cm-1 and 474 cm-1, respectively, for Si-O-Zn and ZnO. The peak position of ZnO has been marginally modified due to the rise in ZnO mass as the frequency of vibration is inversely proportional to the mass of the vibrating molecule (Cao et al., 2019).







**3.3. Saxs:** Their long-range order is detected by smallangle X-ray dispersion (SAXS 0.5° - 5°). Non-crystalline materials are not at a higher angle. Pure SBA-16 and SBA-16-ZnO nanocomposite are represented in Figure3. The pure SAXS pattern of the SBA-16 includes two 0.96° and 1.30° reflections, representing respectively (110) and (211) planes. The formation of the SBA-16 cubic structure Im3M is verified. SBA-16 ZnO nanocomposite also represented SAXS data with a single peak at a frequency of 0.99° but with (111) relatively low amplitude. The second highest peak in this pattern resolved due to the introduction of nanoparticles of ZnO into the pores of SBA-16 (Bruckner et al., 2021).







**3.4. Sem:** Figure 3 shows the ZnO doped SBA-16 nanocomposite SEM image. The appearance of spherical-shaped particles is seen in SEM images of SBA-16-ZnO nanocomposite. For the sample, the smaller particle size is about 100 nm. It should be noticed that as a result of particle agglomerations, the particles can merge and that poly-crystallinity is increasing. The picture above indicates that there are also smaller crystals around the particles in addition to spherical spheres.

**3.5. Tem:** The TEM experiments have been used to research the mesoporous properties of the SBA-16-ZnO nanocomposite. The TEM micrographs of the SBA-16-ZnO nanocomposite appear in figure 4. The SBA-16-ZnO nanocomposite has a three-dimensional mesoporous

hexagonal form that is similar to SBA-16. The unit cell parameter is roughly 11.6 nm, and this correlates well to 12.5 nm. Through TEM analysis, the ZnO clusters can be significantly seen on canals. This may be because, like the ZnO clusters encapsulated within the mesopores, the picture contrast between the silica frame and the ZnO cluster is high.

Figure 5: SEM Image of SBA-16 and SBA-16-ZnO nanocomposite







**3.6. Anti-Bacterial Activity:** Disc diffusion testing of SBA-16-ZnO nanocomposite inhibitions was done. Antibacterial action is shown by both SBA-16 and SBA-16-ZnO nanocomposite. The nanoparticles inhibit the development of both bacteria, as seen in Figure 6. In the present, E. coli and S. aureus were shown activity by SBA-16 and SBA-16-ZnO nanocomposites nanoparticles. The findings demonstrate that the inhibitory zone width is greatest compared with SBA-16 alone for chemically synthesized nanocomposite SBA-16-ZnO (Siddiqi 2018; Johar et al., 2015; Verma et al., 2020; Khanh Nguyen et al., 2020; Narayan et al., 2018).

## CONCLUSION

Zinc Oxide nanoparticles were successfully synthesized and doped into mesoporous SBA-16. ZnO nanoparticles have been applied to the mesopores of SBA-16 by the process of post-impregnation. ZnO Nanoparticles have been doped into SBA-16 by studying Fourier Transformed Infrared Spectroscopy XRD and the small X-ray Scattering Graph. The morphological analysis for the sample was performed scanning electron microscopy, and the lattice cell parameter with symmetry was studied with the transmission electron microscope. The result indicated that SBA-16-ZnO nanocomposite exhibit

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significant anti-bacterial properties.

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## A New Validated Method for the Estimation of Olanzapine and Samidorphan Using High Performance Liquid Chromatography and of its Degradation

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#### ABSTRACT

New validated method for the estimation of Olanzapine and Samidorphan using HPLC and study of its degradation. Chromatographic separation was achieved on a symmetry C18 column (150x4.6mm, 3.5  $\mu$ ) using isocratic elution with a mobile phase containing buffer and acetonitrile within the ratio of 60:40 as mobile phase with a flow of 1 ml/min at ambient temperature and UV detection was carried at 261 nm. Analysis was achieved within 15 min over an honest linearity within the concentration range from 2-30  $\mu$ g/ml of Olanzapine and 1-15  $\mu$ g/ml of Samidorphan. By injecting the standard six times, system suitability parameters were studied and the outcomes were well under the acceptance criteria. Precision and recovery study results were found to be within the limit. By using the above technique assay of marketed formulation was performed and found to be within the limit. Degradation studies were carried out on Olanzapine and Samidorphan, with a purity threshold greater than purity angle in all conditions and within the acceptable range. The above mentioned technique was validated according to ICH guidelines.

KEY WORDS: HPLC, OLANZAPINE, SAMIDORPHAN, DEVELOPMENT, VALIDATION, DEGRADATION STUDIES.

## **INTRODUCTION**

Olanzapine, sold under the trade name Zyprexa among others, is an atypical antipsychotic primarily used to treat schizophrenia and bipolar disorder. For schizophrenia, it can be used for both new-onset disease and longterm maintenance. It is taken by mouth or by injection into a muscle. Common side effects include weight gain, movement disorders, dizziness, feeling tired, constipation, and dry mouth. Other side effects include low blood pressure with standing, allergic reactions, neuroleptic malignant syndrome, high blood sugar, seizures, gynecomastia, erectile dysfunction, and tardive dyskinesia. In older people with dementia, its use increases the risk of death. Use in the later part of pregnancy may result in a movement disorder in the baby for some time after birth. Although how it works is not entirely clear, it blocks dopamine and serotonin receptors. The chemical structure of Olanzapine was shown in figure 1.

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Samidorphan (INN, USAN) (developmental code names ALKS-33, RDC-0313), also known as 3-carboxamido-4-hydroxynaltrexone is an opioid antagonist that preferentially acts as an antagonist of the µ-opioid receptor (MOR). It is under development by Alkermes for the treatment of major depressive disorder and possibly other psychiatric conditions. Samidorphan has been investigated for the treatment of alcoholism and cocaine addiction by its developer, Alkermes, showing similar efficacy to naltrexone but possibly with reduced side effects. However, it has attracted much more attention as part of the combination product ALKS-5461 (buprenorphine/samidorphan), where samidorphan is combined with the mixed MOR weak partial agonist and  $\kappa$ -opioid receptor (KOR) antagonist buprenorphine, as an antidepressant. Buprenorphine has shown antidepressant effects in some human studies, thought to be because of its antagonist effects at the KOR, but has not been further developed for this application because of its MOR agonist effects and consequent abuse potential.

By combining buprenorphine with samidorphan to block the MOR agonist effects, the combination acts more like a selective KOR antagonist, and produces only antidepressant effects, without typical MOR effects such as euphoria or substance dependence being evident. Samidorphan is also being studied in combination with olanzapine, as ALKS-3831 (olanzapine/samidorphan),





for use in schizophrenia. A Phase 3 study found that the addition of samidorphan to olanzapine significantly reduced weight gain compared to olanzapine alone. The combination is now under review for approval by the US Food and Drug Administration. Figure 2 shows the structure of Samidorphan (Anderson & Becker 2017).





## MATERIAL AND METHODS

**2.1 Materials:** Acetonitrile and ortho phosphoric acid, water (HPLC grade) were purchased from Merck (India) Ltd, Worli, Mumbai, India. All APIs of Olanzapine and Samidorphan as reference standards were procured from Laurus Labs Pvt. Ltd., Hyderabad.

**2.2 Tools:** An HPLC system (Waters alliance e2695 model) consisting of quaternary pump, PDA detector-2998 was used. Data processing was performed with Empower 2.0 software (Chatterjee et al., 2014).

**2.3 Chromatographic conditions:** Chromatographic separation was carried out in isocratic mode at room temperature using symmetry C18 column (150x4.6 mm, 3.5  $\mu$ ). A mixture of acetonitrile and 0.1% ortho phosphoric acid (OPA) in 40:60 v/v at a flow of 1 ml/min was used as mobile phase. The injection volume was 10  $\mu$ l and the run time was 10.0 min (Correll et al., 2020).

**2.4 Preparation of buffer:** 1 ml of ortho phosphoric acid is dissolved in 1 lt of HPLC grade water and filtered through 0.45  $\mu$  filter paper.

**2.5 Diluent:** Mobile phase was used as diluent.

2.6 Preparation of standard and quality control samples:

Accurately weigh and transfer 20 mg of Olanzapine and 10 mg of Samidorphan in 100 ml volumetric flask and add app. 70 ml of diluent, sonicate to dissolve it for 30 min. and made up to the mark with diluent. Furthur dilute 5 ml of the above solution to 50 ml with diluents.

**2.7 Preparation of sample solution:** Accurately weigh and transfer weight equivalent to 20 mg of Olanzapine and 10 mg of Samidorphan sample in 100 ml of volumetric flask and add 70 ml of diluent. Sonicate to dissolve and dilute up to the mark with diluent. Take 5 ml of the above solution and diluted to 50 ml and filtered through 0.45 µ nylon syringe filter (Baizabal & Jankovic 2012).

## 2.8 Method Validation

**2.8.1 System suitability:** System suitability parameters were measured to verify the system performance. The parameters including USP plate count, USP tailing and % of RSD are calculated and found to be within the limit.

**2.8.2 Specificity:** Specificity is the ability to assess unequivocally the analyte in the presence of other components, which may be expected to be present in the sample and standard solution. It was checked by examining the chromatograms of blank samples and samples spiked with Olanzapine and Samidorphan.

**2.8.3 Accuracy:** Accuracy is the closeness of the test results obtained by the method to the true value. It was assessed by the recovery studies at three different concentration levels. In each level a minimum of three injections were given and amount of the drug present, percentage recovery and related standard deviation were calculated (Carbon et al., 2017).

**2.8.4 Precision:** Precision of the analytical method is the degree of agreement among individual test results. It was studied by analysis of multiple sampling of homogeneous sample. The precision of the present method was assessed in terms of repeatability, intraday and inter-day variations. It was checked by analyzing the samples at different time intervals of the same day as well as on different days (Chisholm & Mahesan 2017).

**2.8.5 Linearity:** Linearity of an analytical method is its ability to obtain results directly proportional to the concentration of the analyte in the sample within a definite range. The six series of standard solutions were selected for assessing linearity range. The calibration curve was plotted using peak area versus concentration of the standard solution and the regression equations were calculated. The least squares method was used to calculate the slope, intercept and correlation coefficient.

**2.8.6 Stress degradation:** Stress degradation should be no interference between the peaks obtained for the chromatogram of forced degradation preparations. Stress degradation studies were performed as per ICH guidelines Q1 (A) R2. The degradation peaks should be well separated from each other and the resolution between the peaks should be at least 1.0 and the peak purity of

the principle peaks shall pass. Forced degradation studies were performed by different types of stress conditions to obtain the degradation of about 20%.

**2.8.7 Robustness:** Robustness of an analytical procedure is a measure of its ability to remain unaffected by small but deliberate variations in method parameters and provides an indication of its reliability during normal usage. Robustness study was performed by injecting standard solution into the HPLC system and altered chromatographic conditions such as flow rate ( $\pm$ 0.2 ml/min), organic content in the mobile phase ( $\pm$ 10%). The separation factor, retention time and peak asymmetry were calculated by determining the effect of the modified parameters (Healy et al., 2018).

## **RESULTS AND DISCUSSION**

The current study was designed to develop a simple, precise and rapid analytical RP-HPLC method, which can be used for the analysis of assay method for simultaneous estimation of Olanzapine and Samidorphan in bulk and pharmaceutical dosage form. The chromatographic conditions were optimized in order to provide a good performance of the assay. To optimize mobile phase, various combinations were tried for Olanzapine and Samidorphan. The final working mobile phase is 0.1% tri ethyl amine and acetonitrile in the composition of 60:40 v/v. Mobile phase for each drug was selected based on its polarity. Detection was carried out in several wavelengths in order to obtain enough sensitivity for the two APIs in smaller proportion (Olanzapine and Samidorphan).

At last the wave length 261 nm was selected at which the two drugs showed good absorbance. The flow rate was 1.0 ml/min. The retention time for Olanzapine and Samidorphan were 4.363 min, 7.732 min respectively. The proposed method is validated in accordance with the ICH guidelines with all of the results within the limits. The detection was carried out with a total runtime of 10.0 min. Optimized chromatographic conditions were shown in table 1 (Hillemacher et al., 2011).

Table 1. Optimized chromatographic conditions			
Parameter	Condition		
Stationary phase	Symmetry C18 (150x4.6 mm, 3.5 μ)		
Mobile phase	0.1% OPA: Acetonitrile (60:40)		
Injection volume	10 µl		
Flow rate	1.0 ml/min		
Column temperature 25°C			
Wave length	261 nm		
Run time	10.0 min		
Retention time of Olanzapine	4.363 min		
Retention time of Samidorphan7.732 min			

**System suitability:** The system suitability was performed by injecting standard solution containing 20  $\mu$ g/ml of Olanzapine and 10  $\mu$ g/ml of Samidorphan in six replicates. The results indicate that the system suitability parameter is within the limit. System suitability results were shown in table 2 and the standard chromatogram was shown in figure 3 (Fellner 2017).



Figure 4: Chromatogram of blank



**Specificity:** There was no interference from blank at the retention time of Olanzapine and Samidorphan. Figure 4 represents the blank chromatogram.

**Linearity:** Linearity was determined by plotting a calibration curve of peak area against their respective concentration. From this calibration curve it was found that the curve was linear in the range of 2-30 µg/ml of Olanzapine and 1-15 µg/ml of Samidorphan. The regression equations for calibration curve of Olanzapine was Y = 174856x + 33364 (R2-0.9998) and Y = 229090x + 35323 (R2-0.9992) for Samidorphan respectively, the results were shown in table 3 and the calibration plots were shown in figure 5 (Kress 2009; Lee 2019).

**Precision:** Precision of this method was assessed in terms of intraday (repeatability) and (intermediate precision) variations. The intraday studies were determined by performing six repeated analysis of the sample solution of Olanzapine and Samidorphan on the same day under the same experimental conditions. The intermediate precision of the method was carried out in the same laboratory by studying the analysis with different analyst and different instrument. The method is highly precise as %RSD values were found to be <2%. Good recoveries of the drug were obtained at each added concentration, indicating that the method was accurate. Table 4 gives

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the method precision results and the table 5 gives the intermediate precision results (Maric et al., 2016).

**Accuracy:** The accuracy of the method was performed by calculating the recovery experiments at three levels (50%, 100% and 150%). APIs with concentration 10, 20, 30  $\mu$ g/ml of Olanzapine and 5, 10, 15  $\mu$ g/ml of Samidorphan

were prepared. The test solution was injected three times for each spike level and assay was performed as per the test method. The recovery results were close to 100% and also the RSD values were less than  $\pm 2\%$ . The percentage recovery, mean and relative standard deviation were calculated. Recovery values demonstrated that the method was accurate within desired range. Accuracy results were shown in table 6 (Sahai & Devanna 2021).

Table 3. Results of linearity				
S. No	Olanzapine		Samidorphan	
	Concentration (µg/ml)	Area	Concentration (µg/ml)	Area
1	2.00	355342	1.00	212053
2	5.00	942105	2.50	635013
3	10.00	1802635	5.00	1252468
4	20.00	3600412	10.00	2354785
5	25.00	4365329	12.50	2925436
6	30.00	5254521	15.00	3405684

#### Figure 5: Calibration plots of (A) Olanzapine and (B) Samidorphan



**Robustness:** Robustness of the chromatographic method was determined by varying flow rate and mobile phase composition. % RSD was found to be within the acceptable limit. Robustness results were shown in table 7 (Mulhall et al., 2016; Shalini & Ilango 2021).

Table 4. Results of method precision				
S. No.	Area of Olanzapine	Area of Samidorphan		
1	3635245	2365021		
2	3501269	2345017		
3	3542815	2315026		
4	3546251	2385697		
5	3536215	2345726		
6	3524864	2311004		
Mean	3656043	2344582		
Std. dev	26195.038	28673.099		
% RSD	0.72	1.22		

Table 5. Results of Intermediate precision				
Area of Olanzapine	Relative standard deviation	Area of Samidorphan	Relative standard deviation	
3652130	0.68	2365201	1.16	
3647518		2345187		
3652894		2365294		
3621457		2301546		
3695821		2359612		
3636259		2316325		

**Forced degradation:** The proposed method can be used for release and stability studies for effective evaluations and can be considered as stability indicating method. The forced degradation study was carried out according to the ICH requirements include acid, base, oxidation, photo degradation. From the chromatograms it is evident that the selected drugs were stable under the applied stress conditions though the degraded peaks were observed. Forced degradation study results were shown in table 8 and the degradation chromatograms were shown in figure 6, 7, 8 and 9 respectively (Narula et al., 2014).

However, the study of forced degradation had never been done or published in any journal, it was the first stabilising LC technique for Olanzapine and Samidorphan quality control. The devised approach was validated in accordance with ICH requirements and found to be very

precise, quick, simple, cost-effective, and sensitive to the specific pharmaceutical dosage form (Seeman 2002).

Table 6. Results of accuracy				
Accuracy	Amount of Olanzapine	% Recovery	Amount of Samidorphan	% Recovery
50	10	99.8	5	98.9
100	20	99.5	10	99.6
150	30	99.9	15	100.2

Table 7. Results of robustness				
Parameter % RSD of % RSD of Olanzapine Samidorpha				
Flow (0.8 ml/min)	0.62	1.05		
Flow (1.2 ml/min)	0.34	0.67		
Organic phase (36:64)	0.98	0.86		
Organic phase (44:56)	0.52	0.39		

Stress parameter	% of degradation		
	Olanzapine	Samidorphan	
Acid degradation	13.3	14.5	
(1N HCl+ reflux+ 24 hrs)			
Alkali degradation	12.8	14.0	
(1N NaOH+ reflux+ 24 hrs)			
Peroxide degradation	13.7	13.2	
(30% Peroxide+ reflux+ 24 hrs)			
Photo degradation	11.2	11.8	
(UV light (200 W h/m2) and			
fluorescent light			
(1.2 million lux-hrs))			

Table 8. Results of forced degradation



## CONCLUSION

In this study a novel, rapid, economical, sensitive and easily available HPLC method was developed for







the simultaneous determination of Olanzapine and Samidorphan in bulk and pharmaceutical dosage form. The main advantages of this method are no HPLC methods were reported. In this method shorter run time, low price, accessibility, sensitivity, reliability and reproducibility. These properties are important when a large number of samples are to be analyzed. The validation of all the parameters like linearity, accuracy,

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specificity, robustness, method precision were done and found to be within the acceptable limit. The RSD values for all the parameters were found to be less than 2%, which indicates the validity of the method and the results obtained by this method are in fair agreement. So the proposed method could be easily applied for the routine analysis and the pharmaceutical formulations of Olanzapine and Samidorphan in quality control laboratories without any preliminary separation.

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**Competing Interests:** There is no competing of interests

**Authors' Contributions:** Autor 1 designed the study, performed the statistical analysis, wrote the protocol, and wrote the manuscript. Autor 2 to check the work and review the manuscript.

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# **Biotechnology: A Boon Against COVID-19 Pandemic**

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## ABSTRACT

Biotechnology Industry has emerged as one of the key technologies for the transition to a carbon free society, providing health protection, food and energy, and solving important social issues such as environmental protection. In addition, in recent months, biotechnology has been fighting of global COVID-19 pandemic to help and understand how the body's protection against infectious pathogens work. The purpose of this study is to know that how Biotechnology plays an important role in contributing to the current state of the coronavirus. Like this, much effort has been made to develop therapeutic responses to the virus. This paper helps to identify that Biotechnology is one of the modules by which covid-19 can be understood properly, treated and prevention can be taken by vaccines. Biotechnology will play an important role in future societies to prevent and contain potential pathogens. COVID-19 is thus highlighting the importance of the biotechnology field. Today, leaders from across the globe are leaning on biotechnology and pharmaceutical companies with hopes of possible solutions for the COVID-19 pandemic that range from diagnostic analyses and therapeutics to preventive vaccines. India is becoming more autonomous and trying to develop better and more unique technologies because India is a young country full of highly skilled resources and "Make in India" can also offer great opportunities for biotech companies and the tech industry. Indian Biotechnologists, researchers and manufacturers have accepted this challenge and have already made major progress against the COVID-19 attack. This paper can easily conclude that the biotechnology profession is very promising, biotechnology scholars not only achieve their research and innovation goals, but also contribute to the country, especially humanity. Biotechnology has proven its importance as the savior of mankind in the 21st century. Thus, we can say that Biotech Industry act as a Boon against Covid-19 Pandemic.

**KEY WORDS:** BIOTECHNOLOGY, COVID-19, DRUGS, VACCINES, TREATMENT, RESEARCH, PHARMACEUTICAL INDUSTRIES.

## **INTRODUCTION**

Biotechnology has grown exponentially without new research and many areas of application in our daily lives from food production to drug development to pollution waste disposal. The COVID-19 pandemic provides a unique opportunity for biotechnologists around the world to face that this challenge head-on. The world is now working in the field of biotechnology to create solutions that help people cope and overcome the current crisis. Diseases the biotechnology industry, including governments research institute and pharmaceutical companies, is fighting this battle by working together to



develop diagnostic tools, drugs and vaccines. In this way biotechnology has evolved into a pioneering technology in the fight against COVID-19. Indian research institute and the biotechnology industry are in control of the proceedings. The highly contagious novel corona virus COVID-19 originated in China but has spread to most countries around the world. It is growing rapidly in a country that threatens the lives of millions of people.

Most people infected with the COVID-19 virus have mild to moderate respiratory illness and recover without special treatment. The elderly and those with underlying medical conditions such as cardiovascular disease, diabetes, chronic respiratory disease and cancer are more likely to develop serious illness. Almost everyone has been directly or indirectly affected by this epidemic. Central and state government, healthcare workers, nurses, paramedics, police basic necessities providers and pharmacists continue to work to greatly support humanity. But the question many people are thinking right now is when and how to end it. All other service providers support this behaviour from the beginning but a group of people are



working 24 hours a day to develop suitable demo tools and vaccines for COVID-19. This epidemic has shed light on other areas of scientific research. From diagnosis and treatment to vaccine development everything is in the field of biotechnology (Donald et al., 2021).

#### Main Body Of Paper:

What Is Biotechnology?: Biotechnology consists of applying the biological Systems present in living things developing technologies using living organisms themselves and transforming these technologies into other. This includes use in a variety of fields, from agriculture to medical. It includes not only areas related to Life, but all areas where information obtained from biological aspects of living things can be applied. Biotechnology is a field the develops technologies in various fields using living humans for the sustainable development of humanity. All these inspirational stock exchange like Wall Street, one of the most successful sectors of the 2019 NASDAQ Composite Index.

What Was Covid-19 Pandemic?: On 31st December 2019, WHO was informed of cases of pneumonia of unknown cause in Wuhan City, China. A novel Coronavirus was recognized as the cause by Chinese authorities on 7th January, 2020 and was provisionally named "2019nCov". First Covid-19 case distinguished on 27th January, 2020. Many people were affected. As communities started to reopen bars, restaurants and stores during the spring and summer of 2020, people were reasonably eager to be able to go out and restart some of their regular activities. There are two more reasons why the second wave spreads like wildfire (Maria 2010).

People's indifference to Covid-19 prevention measures, such as not wearing masks, washing hands, and not using disinfectants. Large congregations, especially during elections and certain events. This new SARS-COV mutation has learned to evade highly contagious antibodies, so the second wave of coronavirus was curious. Even 18-45 years old, who are thought to have strong immunity, are susceptible. This group is classified as a COVID-19 super expander. They are the people who should get out the most. And when they go home with the infection, they soon spread the disease to others in the house/building/housing company. This new strain of COVID-19 has also infected children. The biotechnology and pharmaceutical industries must play an important role in addressing this global crisis.

**Uses And Applications Of Biotehnology:** Biotechnology innovations are already part of our daily lives and can be found in many places, including pharmacies and supermarkets. In addition, in recent months, biotechnology has been fighting of global COVID-19 pandemic to help decipher the viral genome and understand how the body's defense against infectious pathogens work. Standing at the forefront of Therefore, biotechnology will play an important role in future societies to prevent and contain potential pathogens. Figure 1.1 Applications of Biotechnology Source: Environmental Biotechnology: Achievements, Opportunities and Challenges < Maria Gavrilescu (2010), Dynamic Biochemistry, Process Biotechnology and Molecular Biology 4 (1), 1-36 ©2010 Global Science Books >



Biotechnologists & Covid 19 Pandemic: Role Of The Biotech Industry: Biotechnology is a front runner in the encounter in contradiction of covid-19 in India. India's biotechnology industry is anticipated to attain USD 63 billion in 2019 and USD 150 billion in 2025 at a CAGR of 16.4% by 2025, the contribution of the Indian biotechnology industry to the global biotechnology market is anticipated to increase from 3% in 2017 to 19%. The Government of India is expanding its assistance to young researchers and entrenched businesses and institutions to find potential solutions. The Central Government Science and Technology Council (DST-SERB), the Faculty of Biotechnology and the Biotechnology sector Research support Committee (DBT-BIRAC) have solicited applications for the COVID-19 Research Consortium. In addition, Asian Institute of Gastroenterology, Hyderabad is witnessing what could be a milestone in treatment of coronavirus disease and they found single-dose drug cocktail of monoclonal antibodies for Covid-patients and after 1 week, the virus disappeared when they did RT-PCR-said by Dr, Reddy (Chair person.)

Recent investment and developments of Biotechnology Industry in Covid-19:

o In September 2020, Aurobindo Pharma announced it would partner with BIRAC to develop a vaccine for COVID-19. The company is developing the vaccine through its US subsidiary Auro Vaccines.

o In November 2020, a trilateral memorandum of understanding was signed between the Serum Institute of India and the pharmaceutical company Beximco Pharmaceuticals. Oxford/ AstraZeneca is based in Bangladesh and the Government of Bangladesh for the purchase of a COVID-19 vaccine.

o In January 2021, ZyCoV-D, the first DNA vaccine candidate developed by Zydus Cadila for COVID-19

in india, underwent a three-phase clinical trial with approval from Zydus Cadila (DCGI). The applicants have been supported by the National Biopharma Mission (NBM) under the auspices of BIRAC and the Department of Life Engineering of the Government of India. Bharat Biotech plans to produce 700 million times COVID-19 vaccine by 2021 in January 2021. The company announced that it plans to set up four facilities and manufacture 200 million times in Hyderabad and 500 million times including Hyderabad.

o In March, 2021, global science company Cytiva and the Telangana government collaborated to open 10,000 square feet. Fast Trak Labs speeds up and drives the need to extend the local BIOS.

o In March, 2021 Gland Pharma Ltd, announced that it would produce 225 million volumes of the Sputnik V COVID-19 vaccine by the third quarter of 2021. In February 2021, the Indian government announced a number of initiatives, including the creation of biotechnology, a study of 10 public universities. Umbrella structures have been formed in nine cities for better coordination between the common industrial pole (URJIT) and the RandD institutions, with an emphasis on priority promotion regions by country (NRF) confirmed by the Research Foundation in January 2021, Biocon Biologics, the biosimilars division of Biocon, was Rs from ADQ an Abu Dhabi sovereign wealth fund. Received an investment of 555 crore (\$75million).

o Bharat Biotech plans to produce 10 vaccines, including malaria and COVID-19 and the next unit plans to invest 300 million rupees (\$45.4 million) in Bhubaneswar in Odisha. In September 2020, the Sree Chitra Trinal Institute of Medical Science in Thiruvananthapuram announced that it would work with the Kerala state government to build a 260 million yuan (US\$35.42 million) medical equipment park in Tonnakar (Thivananthapuram).

Figure 1.2: Biotechnology Research in World Source: A brief overview of global biotechnology, Donald K. Martin, Oscar Vicente, Tommaso Beccari, Miklós Kellermayer, Martin Koller, Ratnesh Lal, Robert S. Marks, Ivana Marova, Adam Mechler, Dana Tapaloaga, Polona Žnidaršic-Plazl & Munis Dundar (2021), Biotechnology & Biotechnological Equipment, ISSN: (Print) (Online) Journal homepage: <a href="https://www.tandfonline.com/loi/tbeq20">https://www.tandfonline.com/loi/tbeq20</a>>



Biotechnology is an innovative, interdisciplinary discipline that covers a variety of disciplines, including agriculture, Covid-19 Pandemic Demonstrates The Power Of Biotech: The outbreak of the highly contagious coronavirus (now known as COVID 19) has started in the Chinese city of Wuhan. It then spread across the world, affecting several countries and endangering the lives of millions of people. The coronavirus (COVID 19) mainly causes respiratory infections SARS (severe respiratory syndrome) and MERS (Middle East respiratory syndrome). The World Health Organization (WHO) named the COVID-19 virus as the official name of the infection caused by this novel Coronavirus. The proposed name is based on the letters in the word "co" for aura, "vi" for virus and "d" for disease. While the COVID-19 pandemic has highlighted the importance of biotechnology and its industry, it is proving to be a huge challenge for the medical device industry. Scientists and researchers in the biotechnology industry were working with computer science to develop fast and intelligent test suites. Start-ups also have a great opportunity to develop / produce these rapid volume test suits.

Coping with a pandemic situation requires many doctors, nurses and paramedics. Frontline soldiers and biotechnology experts fighting COVID-19 are constantly working to develop vaccines that need protection before they can work in the lab. This outbreak shows a global shortage of personal protective equipment (PPE) such as face shields, scarves, gowns, goggles, gloves and masks. PPE is of paramount importance in preventing the spread of highly contagious viruses, especially in treatment centers such as hospitals and laboratories. The biotechnology and pharmaceutical industries must play an important role in addressing this global crisis. We also need government support.

According to India's biotech queen Kiran Mazumdar Shaw, "This is an opportunity to truly strengthen India's biotech industry. It is very important to move forward with vaccine production during the pandemic. In a larger way. Obviously, a lot of virus research Required". With the spotlight, the biotech industry is now starting to get attention. These impacts are felt, recognized and appreciated by all of us. There is no way to become a bioengineer. The term biotechnology is derived primarily from the Greek "bios" meaning "everything" that threatens life" and "technicos" meaning "human knowledge and skills". The main goal of the work undertaken by biotechnology or biotechnology researchers is to use new ideas and research methods to produce drugs, pharmaceuticals and vaccines with human therapeutic properties. Biotechnology has proven its importance as the savior of mankind in the 21st century.

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Hydroxychloro quine	Approved as a treatment in mild cases and as prophylactic
Favipiravir	An oral antiviral drug, fast-tracked by Drug Controller General of India Received Emergency Use Authorization for treatment of mild or moderate infections. The drug not approved in the EU or US.
Remdesivir	Gilead Sciences patented anti-viral drug, earlier tried on Ebola. Hospital-only, Injectable drug. Has Emergency Use Authorization for treatment of moderate to severe COVID-19 patients.
Tocilizumab	Hospital only, Injectable drug originally used in patients with rheumatoid arthritis. Approved as an "off-label" drug for the treatment of moderate to severe COVID-19 patients. Works to counter the severe inflammation (Cytokine storm) that occurs in some Covid-19 patients. Clinical trials have shown reduced immune in inflammation. Tocilizumab works when the immune response is already inflamed and helps to arrest the impending cytokine storm, which affects other organ functions. Manufactured by Roche Pharma, marketed by Cipla under brand name Acterna
Itolizumab (only preliminary results available)	Biocon's Hospital- only, Injectable drug earlier approved for the treatment of Psoriasis. Itolizumab works best when given to patients on non-invasive ventilator support—before the immune response is hyperactivated and works to delay or slow down cytokine storm. Itolizumab & Tocilizumab both work on controlling hyperactive immune response and cytokine storm but differ in this timing.
Steroids Dexamethasone	The only drug too far to show striking impact on mortality. Clinical trial on going—UK's RECOVERY Trials showed dexamethasone can reduce death by one-third in patients with severe Covid-19 infection who need oxygen therapy or are on ventilations.
Methylpredniso lone	For use as an anti-inflammatory drug.
Low molecular weight Heparin	To prevent blood clots & thrombogenic response.
Antibiotics- Azithromycin,	To deal with infections.
Ivermectin	
Convalescent Plasma Therapy	Approved as an "off-label" therapy and works best when given early on in the treatment cycle.
	Upcoming/New Drugs
DRDO (In use)	As the public results of 2-DG medicine efficacy are not yet available, we trust the fact that DRDO had developed it and DGCI has approved it. On 8 <sup>th</sup> May 2021, DRDO gave a statement about the efficacy of DRDO Covid drug. The statement is as follows: The patient who was given 2-DG medicine showed better and faster improvement than the Standard of Care (SoC). DRDO Anti Covid drug comes in powdered form and can easily be taken by dissolving in the water. It treats the cells which are infected by the virus and avoids the growth of virus
Virafin	Virafin is an antiviral drug that is injected under the skin. Significant clinical and virological improvements were observed in moderate cases when the drug was administered to Covid patients at an early stage. Patients treated with Virafin were negative within 7 days, according to the drug company. Virafin has also been shown to reduce the amount of time patients need supplemental oxygen. The pharmaceutical company states that pegylated interferon alpha-2b (PegIFN) Virafin is only available by prescription from a healthcare professional and is designed for use in institutions or hospitals. Zydus Cadila's new drug 'Virafin', which is considered successful in the treatment of Covid patients, will soon be available in three districts of Uttar Pradesh, namely Lucknow, Varanasi and Prayagraj.
Baricitinib	Eli Lilly, a US pharmaceutical company, granted additional voluntary, royalty-free, non-exclusive licenses on May 13 to three other Indian pharmaceutical companies – Reddy, MSN Laboratories and Torrent Pharmaceuticals – Manufacture and distribution of baritinib in United States. Rheumatoid arthritis treatments are used to treat patients with Covid-19. Lily states that Emergency Use Restriction by the Central Drug Standards Control Organizations (CDSCO) of the Ministry of Health for the use of varishichinibu and in combination with remdesivir for the treatment of hospitalized patients with suspected Covid-19 or adults confirmed to need oxygen for testing, invasive mechanical ventilation or extra corporeal membrane oxygenation (ECMO).

This happened most of the time after the biotech industry no longer had to deal with it. Lack of funds, shortage of manpower, unprocessed work etc. Now is the time to wake up and help make the world a better place to live in light that meets the expectations of ordinary people.

How Biotechnology Is Contributing To The Fight Against Covid-19?: Biotechnology plays an important role in contributing to the current state of the coronavirus. Much effort has been made to develop therapeutic responses to the virus. Bioengineers are using human cells and genetic mechanisms to study genetics and transfer this information to knowledge and vaccine discovery tools to advance their understanding of the mechanism virus.

o Diseases Testing, Treatment And Role Of Prevention By Vaccine: Basically, Contribution of Biotech Industry against covid-19 is an under: Covid-19 -control with the help of biotechnology-how?

### o COVID Tests:

**Diagnostic tests/RT-PCR (Reverse Transcription polymerase chain reaction)-:** Diagnostic test or PCR or Reverse Transcription polymerase chain reaction is an innovative method based on DNA polymerase, an enzyme discovered by Western scientist, Spain Margarita Salas. This enzyme is capable of synthesizing DNA in vitro from short fragments of template genes, in this care from the viral genome. If diagnostic testing is performed by PCR, fragments of the pathogen's genetic material can be found. Analysis of respiratory samples from an infected person matches short viral gene fragments in vivo with PCR gene fragments. Thus, DNA polymerase starts to react and make multiple copies of that DNA fragment which can be taken back in this case, the result is positive, indicating that this patient has COVID-19.

**Rapid test:** The rapid COVID test is a type of diagnostic test. Rapid scans typically measure a viral antigen, a substance that directs the body to produce an immune response against an infection. Antigens, unlike antibodies, are produced by the immune system in response to signals from antigens. Staff trained in a variety of settings can perform COVID antigen testing rapidly.

**o** New Medicines: India has been the generics pharmacy to the world. But the coronavirus pandemic has unprotected deep responsibility lines in India's healthcare volume to pleasure people. These inadequacies originate from the usually poor status of public health substructure in India Participants therefore emphasized that in addition to emerging safe and effective drugs, India needs to invest in manufacturing personal protective equipment, scaling up oxygen supply, emerging new medical infrastructure and building a cohort of healthcare workers to ensure availability and resilience in the system. COVID second wave affects trial of some new drugs like following.

India likely to get at least 4 new Covid-19 vaccines by end of 2021: Table 1.2 List Of Covid-19 Vaccines

Name of Vaccine	Specifications
Covavax	The Pune based Serum Institute of India (SII) manufactures the Oxford AstraZeneca vaccine as "Covishield". However, it also produces a Covid-19 vaccine based on the NVX-CoV2373 protein under the brand name "covavax". The vaccine was developed American biotechnology company. SII will do the same in India after Novavax obtains the necessary approvals for efficacy trials abroad.
Hgc019	Not far from SII, Gennova Biopharmaceuticals is another company based in pune. The company has developed India's first Covid-19 mRNA vaccine, named HGC019.
Nasal vaccine	Bharat Biotech's nasal vaccine candidate is currently in Phase I trials. According to the manufacture, the BBV154 intranasal vaccine elicits an immune response at the site of infection (nasal mucosa).
ZyCoV-D	Zydus Cadila in Gujarat is producing an intradermal Covid-19 vaccine called ZyCoV-D it is India's first locally developed DNA vaccine candidate and is currently being tested in children.
Corbevax	Biological E, based in Hyderabad has developed a vaccine candidate called Corbevax, which is currently in phase 3 clinical practice.
PTX- COVID19-B	Biological E also manufactures mRNA vaccine. The company has signed a licensing agreement with Providence Therapeutics Holdings to manufacture a Covid-19 mRNA vaccine from a Canadian company in India. A vaccine called PTX-COVID19-B is currently being developed in Canada.
Janssen	Biological E is also bringing Johnson & Johnson's Covid-19 vaccine to India. An Indian company has a contract to manufacture around 600 million doses of a vaccine called Janssen. Janssen is specifically approved for use in the United States, European Union, Thailand and south Africa.
Sputnik v	In India, six companies will produce the Russian Covid Sputnik V vaccine.
Moderna	The UN agency Strategic consultive cluster of consultants (SAGE) on immunization has issued Interim recommendations to be used of the Moderna mRNA-1273 vaccinium against COVID-19 in individuals aged eighteen years and older.
Pfizer- BioNTech	The Pfizer-BioNTech COVID-19 immunogen has not been approved or licensed by the U.S. Food and Drug Administration (FDA).

Source: Covid-19 vaccines by end of 2021< India likely to get at least 4 new Covid-19 vaccines by end of 2021 | Details - Coronavirus Outbreak News (indiatoday.in)>

**Development of vaccine:** The coronavirus pandemic has transported to the front the possible of the scientific community and the private sector to develop and manufacture vaccines is a limited time frame.

Participants deliberated that during the initial stages of the pandemic. Indian vaccine companies were trying to import vaccine development technology and only product clinical development in india. But within a year,

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India has advanced a few vaccines indigenously. A few participants however emphasized that the regulatory system in India, in light of the pandemic, is not fully favorable for smaller firms to fast-track possible candidates, given lack of resources and a clarity of path, thereby constricting the scope of vaccine manufacturing and delivery in India.

They therefor e suggested that whenever the pandemic is controlled, Indian researchers, industry and government should assess the impediments to original discoveries, production and distribution and create approaches to overwhelmed them. India started vaccination against COVID-19 on January 16,2021 (143 days ago). As of 7June 2021, India had established a total of 236,198,726 doses, including primary and secondary doses of currently accepted vaccines. Both vaccines were accepted for emergency use in India at the beginning of the program. Oxford –AstraZeneca vaccine brand manufactured by Covishield- Serum institute of India and nosevacin developed by Bharat Biotech.

In April 2021, the Government of India accepted the Russian vaccine Sputnik V (locally distributed by Dr. Reddy's Laboratories) as a third vaccine and began use in May 2021. Everyone has heard of Covishield, Covaxin and Sputnik V. However, there are many other Covid-19 vaccine candidate currently being installed in India. People are talking about Covishield, Covaxin, Sputnik V. Three Covid-19 vaccine have been managed in India. But in fact, there are many other Covid-19 vaccines currently available in India by the end of this year, there will undoubtedly be six dozen vaccines in India. This narrows the gap between supply and demand and lowers prices.

# CONCLUSION IN TERMS OF POST COVID ERA

**Necessity and Opportunity For Biotech Sector:** Biotechnology is one of the modules by which covid-19 can be understood properly, treated and prevention can be taken by vaccines. Regarding the impact of COVID-19, biotechnology icon Kiran Mazumdar Shaw believes it is both necessary and an opportunity for the biotechnology industry to start seriously investigating this type of viral disease. The current situation shows the importance of preparing for unexpected epidemics such as the possibility of an outbreak. Kiran Mazumdar Shaw said the following factors are expected to further accelerate the development of the biotechnology field.

o Increasing interest in health and personal hygiene Promotion of production and research and development will inevitably increase the demand for reagents, media and serum. More laboratory drugs are needed due to growing concerns about environment and related regulations.

o Pandemics can shrink supply chain systems, especially because they are more dependent on other countries. India is becoming more autonomous and trying to develop better and more unique technologies. o India is a young country full of highly skilled resources and "Make in India" can also offer great opportunities for biotech companies and the tech industry.

o The biotechnology profession is very promising, biotechnology scholars not only achieve their research and innovation goals, but also contribute to the country, especially humanity.

o Thus, we can say that Biotech Industry act as a Boon against Covid-19 Pandemic.

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# Analysis of Soil Erosion Causative Factors and Susceptibility in Anambra State, Southeastern, Nigeria

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## ABSTRACT

Soil erodibility depends on the texture, aggregate stability, shear strength, infiltration capacity, organic and chemical contents of the soil. This study considers other factors of soil erosion both static and dynamic which include slope, land use/land cover, soil erodibility and dynamic factors such as land surface temperature (LST), Soil Moisture Index (SMI) and rainfall erosivity are the variables for this research. The study area is Anambra State Southeastern Nigeria. This research used both primary and secondary data. Secondary data include Satellite images, aerial photo, topographic maps, meteorological and population data collected from different governmental and non-governmental organizations. The primary data involved field survey and observations using Global Positioning System (GPS) for ground truth verification and collection of soil samples for extraction of soil properties. Eight (8) prominent Causative Factors (CFs), factors were identified, which include drainage density, Lineament Density, Slope Length and Soil Erodibility as static factors, and Land Surface Temperature, Soil Moisture Index, Normalized Difference Vegetation Index and Rainfall Erosivity as dynamic factors. These Causative Factors (CFs), were analyzed and tested with Hierarchical Regression Model using SPSS version 20 software. Conclusively, the research showed that the dynamic causative factors influences soil susceptibility and triggers erosion hazards in Anambra State, Southeastern Nigeria. The approach employed is very important to sustainable land-use management and erosion prevention. Therefore, appropriate selections of the vital causative factors are required in order to achieve accurate estimate and sustainable mediation.

**KEY WORDS:** SOIL ERODIBILITY, CAUSATIVE FACTORS, ANAMBRA STATE, EROSION, SUSCEPTIBILITY.

# INTRODUCTION

**Background of the Study:** Soil susceptibility is proneness of soil to be eroded by running water. Erodibility on the other hand is a measure of a soil's susceptibility to particle detachment and transport by agents of erosion. Therefore, soil erosion is termed erodibility. Erodibility is strictly attributed to soils while erosivity is a rainfall attribute. The two terms are used interchangeably and one cannot discuss susceptibility of soils without talking about erodibility. Soil erodibility is usually regarded as the susceptibility of a soil to erode. In a fundamental sense, it should be defined as the amount of soil loss per unit exogenic force or erosivity such as rainfall, surface flow



and seepage. Knowledge of soil erodibility has been useful in soil loss predictions (Wischmeier, 1960; Ayadiuno, Ndulue, Mozie & Ndichie, 2021).

Soil erosion process involves interaction of different complex biophysical and anthropogenic factors including soil properties, topography, climatic condition, land use, population and management practices. These factors vary both spatially and temporally from one location to the other (Shi et al., 2013), (Shakirudeen et al., 2018) had it that soil erosion creates serious implication on water quality and downstream siltation with great consequences on biodiversity and ecosystem services including domestic and industrial usage. The study of soil susceptibility to erosion will consider the factors of soil erosion both static and dynamic factors including slope, land use/land cover, soil erodibility and dynamic factors such as land surface temperature (LST), Stream Moisture Index (SMI) and rainfall erosivity all of which are the variables for this research.

Soil erodibility is a function of soil texture, infiltration capacity, shear strength, aggregate stability, organic matter, vegetation and chemical contents of the soil



(Nwunonwo, 2013); (Ndukwe et al., 2013) (Jafar-Zadeh, et al.,2014); (Ayadiuno & Ndulue 2021). Unsustainable land use practices leads to an addition of environmental challenges of soil erosion which is caused by anthropogenic activities especially in developing countries (Shakirudeen, et. al, 2018) (Igwe & Egbueri, 2018) (Emeh & Igwe, 2018). Land use and land management practices have serious impacts on natural resources including water, soil nutrients; other effects on land include urban sprawl, land degradation, salinization and desertification (Igbokw & Ejikeme, 2013). Research findings by (Igwe & Egbueri 2018) revealed that poor geotechnical properties and anthropogenic activities predispose these soils to be susceptible to erosion.

The rate of operation of erosion hazards in Anambra is high and variations in their intensity could be due to differences in Causative factors and type of geologic formation (Egbueri & Igwe, 2020). Anambra State has more of the youngest and friable sedimentary deposit hence the highest number of erosion sites (over 700) (Ifejiofor, 2019), (Orji & Nwankwoala, 2019), while Ebonyi State with the least or fewest number of erosion sites (over 250) (Orji & Nwankwoala, 2019) has more of the oldest and well consolidated sediments (Nwajide 2013), hence the need for a research such as this in Anambra state.

## MATERIAL AND METHODS

**Study Area:** Anambra state lies between latitudes and longitudes 6000' and 7000'' North, and 6045' and 7020'East with a land mass of about 4844km2 (figure 1). It is located within the humid tropical rainforest zone of West Africa. There is increased human activity in the area of urbanization, development of infrastructure such as road construction, expansion of existing ones and other primary extractive activities like deforestation and quarrying that have exposed the bare and led to the loss of the original ecosystem and biodiversity (Igwe & Egbueri 2018) (Ayadiuno & Ndulue, 2021).

There are two distinct seasons in study area and they are the rainy season which starts from April and ends in October and the dry season which starts from November and ends in March respectively. The effect of Climate change has exacerbated more, the problems and menace of soil erosion in addition to already anthropogenic inflicted problems on land use in the study area (Farauta, et. al., 2012) (Igwe & Egbueri 2018) (Ayadiuno & Ndulue, 2021).

This research used both primary and secondary data. The primary data are measurements taken from frequent geo-physical field visit, surveys and observations. Global Positioning System (GPS) was used for ground truth verification. Secondary data consulted and used are Satellite images, aerial photo, topographic maps, meteorological and population data collected from different governmental and non-governmental organizations, and other published and non published literatures. The identified causative factors - Drainage Density (DD), Erosion Density (ED), Lineament Density (LD), Slope Length (LS), Land Surface Temperature (LST), Normalized Difference Vegetation Index (NDVI), Rainfall and Soil Moisture Index (SMI), were subjected to statistical analysis (Hierarchical Regression) using the statistical package for the social sciences (SPSS) soft ware version 20 to determine and predict the contribution of the various identified causative factors that can induce, initiate and or trigger soil erosion in the study area. The equation is stated thus:



Source: USGS, Modified by the Authors, (2021) (GPS) was used for ground truth verification. Secondary data consulted and used are Satellite images, aerial photo, topographic maps, meteorological and population data collected from different governmental and nongovernmental organizations, and other published and non published literatures. The identified causative factors - Drainage Density (DD), Erosion Density (ED), Lineament Density (LD), Slope Length (LS), Land Surface Temperature (LST), Normalized Difference Vegetation Index (NDVI), Rainfall and Soil Moisture Index (SMI), were subjected to statistical analysis (Hierarchical Regression) using the statistical package for the social sciences (SPSS) soft ware version 20 to determine and predict the contribution of the various identified causative factors that can induce, initiate and or trigger soil erosion in the study area. The equation is stated thus:

$$Y_1 = \beta_0 + \beta_1 \alpha_1 + \epsilon_1 \tag{1}$$

where

 $Y_1 = Dependent variable$ 

- $\beta_o = Intercept$
- $\beta_1 = Beta \ coefficient$
- $x_1 = Independent variable$
- $\epsilon_1$  = Random Error term

Analysis of variation (ANOVA) was also carried out and F-ratio was evaluated to assess the improvement of the

model by addition of the dynamic CFs. F-ratio represents the ratio of improvement in the model prediction to the residual errors present in the model. ANOVA is given by the formula.

$$SS = \sum \frac{(x - \bar{x})^2}{N - 1}$$
<sup>(2)</sup>

$$MS = \sum \frac{(x - \bar{x})^2}{df}$$
<sup>(3)</sup>

Where

x = Variables $\bar{x} = Mean$ N = Number of observationdf = Degree of freedom**RESULTS AND DISCUSSION** 

**Determination of the Influence of the Studied Variables on the K-Factor:** A hierarchical regression model was applied to evaluate the influence of the variables in the model. All the assumptions of multiple regression which guides Hierarchical regression were examined - Normality test (Shapiro-wilk test), Independence, multicollinearity test (residual analysis) and outliers check using Z-Score statistic. HR was carried out on all the variables and 'not significant model' was obtained. An exploratory data analysis was then done and the variables were divided into blocks and grouped based on the k-factor. Each of the blocks was then analyzed and the results are shown below.

Six (6) blocks were considered and grouped together starting from Block 1 with just one variable LST. This block explains only 39% of the variation in the k-factor as determined by the adjusted  $R^2$  in Table 28. In Block 2, LD was combined with R, which led to an increase in the value of  $R^2$  to 70.7%. In Block 3, DD, LD and NDVI were considered and they increased the value of adjusted  $R^2$  to 82.6%. In Block 4, when four variables ED, LD, NDVI and R were considered, the block explained 89.5%. The variables in block 5 are DD, ED, LD, LST and R which explained 98.0%. When more variables DD, ED, LD, LS, LST and R were considered in blocks 6, there was an increase in adjusted  $R^2$  to 97.6%.

The model summary in the table above shows the variability in soil loss occurrence that can be accounted for by the individual as well as all the CFs in the model blocks. This was evaluated by analyzing the changes in the coefficient of the determination  $(R^2)$  values for each Block in the model. The coefficient of the determination  $(R^2)$ , explains the percentage prediction made by the independent variables to the dependent variable. The independent variables predicted 46.7% (NDVI) in Block 1; 78% (LD and R) in Block 2; 89.1% (DD, LD and NDVI) in Block 3; 94.8% (DD, ED, LD, LST and R) in Block 4; 99.3% (DD, ED, LD, LST and R) in Block 5 and 99.4% (DD, ED, LD, LS, LST and R) in Block 6 respectively as causative factors of soil erosion (k-factor). In other words - DD, ED, LD, LS, LST and R contributed 99.4% to soil erosion hazards in the study area. This implies that the combination contributed the highest out of all the causative factors examined in this study, leaving the rest with only 0.6%

Table 1. Model Summary of the Variables							
Block	Variables	R <sup>2</sup>	Adjusted R <sup>2</sup>	R <sup>2</sup> (pred)	Durbin-Watson		
1	NDVI	46.7	39	0.00	1.17908		
2	LD, R	78.0	70.7	0.00	1.22525		
3	DD, LD, NDVI	89.1	82.6	21.07	1.11047		
4	ED, LD, NDVI, R	94.8	89.5	33.79	1.36101		
5	DD, ED, LD, LST, R	99.3	98.0	69.15	2.93702		
6	6 DD, ED, LD, LS, LST, R 99.4 97.6 46.39 3.13247						
Source	Source: SPSS Output, (2020)						

The Model of Summary table also shows that the Durbin-Watson levels ranged from 1.11047 in block 3 to 3.13247 in block 6. The levels are within 0 - 4, even though the levels tended towards 1.1 - 3.1 which indicates that blocks 1, 2, 3 and 4 have very weak negative correlation, while blocks 5 and 6 have very weak positive correlation, but are all significant since there is no general rule to what is acceptable or not, outside the critical value. However, between 1.5 and 2.5 generally would have been better. The implication is that the model is significant.

Table 2 above shows the Analysis of Variance table for the group which contain the F-value and p-values for testing of the significance of each model in each block. Block 1 is significant with an F-value of 6.12 and P-value of 0.043, since the P-value is less than 0.05. In Blocks 2, F-value is 10.65 and P-value is 0.011, and is significant since the P-value is less than 0.05. In Block 3, F-value is 13.63 and P-value is 0.008, and is not significant since the P-value is greater than 0.05; likewise in block 4, F-value is 18.06 and P-value is 0.008, and is significant since the P-value is greater than 0.05. In Block 5, F-value

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is 79.50 and P-value is 0.002, and is significant since the P-value is less than 0.05, and in Block 6, F-value is 55.32 and P-value is 0.018, and is also significant since the P-value is less than 0.05. The results show that all the blocks are significant and therefore considered as the best group depending on the variables of interest.

Block		Anal	ysis of Variance	e (ANOVA)		
1	Source	DF	SS	MS	F	Р
	Regression	1	0.0015397	0.0015397	6.12	0.043
	Residual Error	7	0.0017597	0.0002514		
	Total	8	0.0032995			
2	Source	DF	SS	MS	F	Р
	Regression	2	0.0025746	0.0012873	10.65	0.011
	Residual Error	6	0.0007249	0.0001208		
	Total	8	0.0032995			
3	Source	DF	SS	MS	F	Р
	Regression	3	0.00294003	0.00098001	13.63	0.008
	Residual Error	5	0.00035946	0.00007189		
	Total	8	0.00329949			
4	Source	DF	SS	MS	F	Р
	Regression	4	0.00312637	0.00078159	18.06	0.008
	Residual Error	4	0.00017312	0.00004328		
	Total	8	0.00329949			
5	Source	DF	SS	MS	F	Р
	Regression	5	0.00327477	0.00065495	79.50	0.002
	Residual Error	3	0.00002471	0.00000824		
	Total	8	0.00329949			
6	Source	DF	SS	MS	F	P
	Regression	6	0.00327973	0.00054662	55.32	0.018
	Residual Error	2	0.00001976	0.00000988		
	Total	8	0.00329949			

Table 3 above shows the coefficient(s) estimate as well as the p-values for testing of the significance level at 0.05 for each block. The coefficient(s) table above shows the individual contribution of the predictor(s) variables to the response or dependent variable and is used to explain the multiple linear regression equation which is thus:

$$Y_1 = \beta_0 + \beta_1 \alpha_1 + \epsilon_1$$

In Block 1,  $Y_1 = 0.06541 + 0.4628$ (NDVI). This means that the value 0.06541 is the base constant; that is, the value of K - factor before the effect of changes in the predictor variable is noticed. The equation means that every unit increase in NDVI, will increase K - factor by 0.4628.

In Block 2,  $Y_1 = -1.0364 + 0.07789(LD) + 0.00013733(R)$ . This means that the value -1.0364 is the base constant; that is, the value of K - factor before the effect of change in the predictor variables is noticed. The equation means that every unit increase in LD will increase K - factor by 0.07789, while every unit increase in R will increase K - factor by 0.00013733. In Block 3,  $Y_1 = 0.00753 + 0.5974(ED) + 0.12172(LD) + 0.5032(NDVI)$ . This means that the value 0.00753 is the base constant; that is, the value of K - factor before the effect of change in the predictor variables is noticed. The equation means that every unit increase in ED will increase K - factor by 0.5974, while every unit increase in LD and NDVI will increase K - also by 0.12172 and 0.5032 respectively.

In Block 4,  $Y_1 = -0.4672 + 0.4233(ED) + 0.11499(LD) + 0.3477(NDVI) + 0.00005993(R). This means that the value -0.4672 is the base constant; that is, the value of K - factor before the effect of change in the predictor variables is noticed. The equation means that every unit increase in ED, LD, NDVI and R will increase K - factor by 0.4233, 0.11499, and 0.00001569, while every unit increase in ED and LD will increase K - factor by 0.3157 0.3477 and 0.00005993 respectively.$ 

In Block 5,  $Y_1 = -0.3397 + 0.11055(DD) + 0.6357(ED) + 0.102061(LD) - 0.0065177(LST) + 0.00007163(R)$ . This means that the value -0.3397 is the base constant; that

is, the value of K - factor before the effect of change in the predictor variables is noticed. The equation means that every unit increase in DD, ED, LD and R will increase K - factor by 0.11055, 0.6357, 0.102061 and 0.00007163 respectively, while every unit increase in LST will decrease K - factor by 0.0065177.

In Block 6,  $Y_1 = -0.2854 + 0.10827(DD) + 0.6249(ED) + 0.10002(LD) - 0.002909(LS) - 0.007465(LST) + 0.00006857(R).$  This means that the value -0.2854 is the base constant; that is, the value of K - factor before the

effect of change in the predictor variables is noticed. The equation means that every unit increase in DD, ED, LD and R will increase K - factor by 0.10827, 0.6249, 0.10002 and 0.00006857 respectively, while increase in LS and LST will decrease K - factor by 0.002909 and 0.007465 respectively.

The table above shows that the variables have moderate correlation among each other except for few, and is explained thus:

Block		Coeffic	vient(s) for each	Block		
1	Predictor	Coef (β)	SE Coef	T	Р	VIF
	<b>G</b>	0.06541	0.02005	1.64	0.145	
	Constant	0.06541	0.03985	1.64	0.145	1.00
2		0.4628	0.1870	2.47	0.043	1.00
2	Predictor	Coef	SE Coef	1	P	VIP
	Constant	-1.0364	0.2759	-3.76	0.009	
	LD	0.07789	0.02291	3.40	0.015	1.24
	R	0.00013733	0.00003184	4.31	0.005	1.24
3	Predictor	Coef	SE Coef	Т	P	VIF
	Constant	0.00753	0.02502	0.30	0.776	
	ED	0.5974	0.2118	2.82	0.037	3.36
	LD	0.12172	0.02862	4.25	0.008	3.27
	NDVI	0.5032	0.1046	4.81	0.005	1.09
4	Predictor	Coef	SE Coef	Т	Р	VIF
	Constant	-0.4672	0.2296	-2.03	0.112	
	ED	0.4233	0.1845	2.29	0.083	4.23
	LD	0.11499	0.02244	5.12	0.007	3.34
	NDVI	0.3477	0.1105	3.15	0.035	2.02
	R	0.00005993	0.00002888	2.07	0.107	2.87
5	Predictor	Coef	SE Coef	Т	Р	VIF
	Constant	-0.3397	0.1052	-3.23	0.048	
	DD	0.11055	0.02096	5.27	0.013	2.45
	ED	0.6357	0.1008	6.31	0.008	6.63
	LD	0.102061	0.009926	10.28	0.002	3.43
	LST	-0.0065177	0.0009110	-7.15	0.006	1.29
	R	0.00007163	0.00001103	6.49	0.007	2.19
6	Predictor	Coef	SE Coef	Т	P	VIF
	Constant	-0.2854	0.1384	-2.06	0.175	
	DD	0.10827	0.02318	4 67	0.043	2.50
	ED	0.6249	0.1114	5.61	0.030	676
	ID	0.10002	0.01125	8.89	0.012	3 68
		_0.002909	0.00/123	-0.71	0.552	2 92
	IST	-0.002909	0.004107	_4 47	0.047	3.61
	D	0.0006857	0.001009	5 2/	0.047	2 10

DD as a variable has a weak positive correlation with K - factor (0.245) and is not significant at 0.525. This means that DD as a variable alone cannot make any meaningful contribution that will cause any change in K - factor. ED as a variable has a weak positive correlation with K -

factor (0.034) and is not significant at 0.931. This means that ED as a variable alone even though positive cannot make any meaningful contribution that will cause any change in K - factor. However, with DD, there is a strong negative correlation (-0.720) and is significant also at

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0.029 which is less than 0.05 level of significance. LD as a variable has a weak positive correlation with K - factor (0.315) and is not significant at 0.409.

This means that LD as a variable alone cannot make any meaningful contribution that will cause changes in K - factor. Correlating LD with DD shows a positive relationship (0.570) and is not significant at 0.109, which is greater than 0.05 level of significance. On the other hand, LD has a strong negative relationship with ED (-0.833) and is significant at 0.005. LS as a variable has a weak positive relationship with K - factor (0.260) and is not significant at 0.485; compared with DD, it has a weak negative relationship (-0.105), which is not significant at 0.787; with ED, it has a very weak positive relationship (0.006) and is not significant at 0.988 and finally with LD, it has a very weak negative relationship (-0.008) and is not significant at 0.984.

	Correl	ations: K	_Factor, I	DD, ED, L	D, LS, LS	ST, NDVI	, R, SMI	
	K-Factor	DD	ED	LD	LS	LST	NDVI	R
DD	0.245							
	0.525							
ED	0.034	-0.720						
	0.931	0.029						
LD	0.315	0.570	-0.833					
	0.409	0.109	0.005					
LS	0.26	-0.105	0.006	-0.008				
	0.485	0.787	0.988	0.984				
LST	-0.680	0.037	-0.072	-0.047	-0.747			
	0.044	0.924	0.854	0.904	0.021			
NDVI	0.683	0.271	0.293	-0.249	0.383	-0.600		
	0.043	0.480	0.444	0.518	0.309	0.087		
R	0.598	-0.229	0.590	-0.447	0.071	-0.388	0.693	
	0.089	0.554	0.095	0.228	0.857	0.303	0.038	
SMI	0.607	0.061	0.355	-0.308	0.465	-0.560	0.904	0.806
	0.083	0.875	0.349	0.419	0.208	0.117	0.001	0.009

LST as a variable has a strong negative relationship with K - factor (-0.680) and is significant at 0.044; compared with DD, it has a weak positive relationship (0.037) and is not significant at 0.924; with Ed, it has a very weak negative relationship (-0.072) and is not significant at 0.854; with LD, it has a very weak negative relationship (-0.047) and is not significant at 0.904; and finally with LS, it has a strong negative relationship (0.747) and is significant at 0.021.

NDVI as a variable alone has a strong positive relationship with K - factor (0.683) and is significant at 0.043; compared with DD, it has a weak positive relationship 0.271) and is not significant at 0.480; also compared with ED, it has a weak positive relationship (0.293) and is not significant at 0.444; with LD, it has a weak negative relationship (-0.249) and is not significant at 0.518; also with LS, it has a positive relationship (0.383) and is not significant at 0.309 and finally, when compared with LST, it has a strong negative relationship (-0.600) and is not significant at 0.087. R as a variable alone has a positive relationship with K - factor (0.598) and is not significant at 0.089; compared with DD, it has a negative relationship (-0.229) and is not significant at 0.554; also compared with ED, has a positive relationship (0.590) and is not significant at 0.095; with LD, it has a negative relationship (-0.447) and is not significant at 0.228; also with LS, it has a very weak negative relationship (-0.071) and is not significant at 0.857 and when compared with LST, it has a negative relationship (-0.388) and is not significant at 0.303; and finally when compared with NDVI, it has a strong positive relationship (0.693) and is significant at 0.038.

SMI as a variable alone has a positive relationship with K – factor (0.607) and is not significant at 0.083; compared with DD, it has a very weak positive relationship (0.061) and is not significant at 0.875; also compared with ED, it has a weak positive relationship (0.355) and is not significant at 0.349; with LD, it has a weak negative relationship (-0.308) and is not significant at 0.419; also with LS, it has a weak positive relationship (0.465) and is not significant at 0.208 and when compared with LST, it has a negative relationship (-0.560) and is not significant at 0.117; when compared with NDVI, it has a very strong positive relationship (0.904) and is significant at 0.001

and finally when compare with R, it has a strong positive relationship (0.806) and is significant at 0.009.

# CONCLUSION

The research showed that dynamic causative factors -Drainage Density, Erosion Density, Lineament Density, Slope Length, Land Surface Temperature, Normalized Difference Vegetation Index, Rainfall and Soil Moisture Index, influence soil susceptibility to, initiate and trigger erosion hazards in Anambra State, Southeastern Nigeria. The approach employed is very important for sustainable land-use management and erosion prevention. Therefore, understanding the appropriate selection or combination of the vital causative factors is required to achieve accurate susceptibility estimate. The major objective is to know the percentage contribution of dynamic causative factors to occurrence of soil erosion in Anambra State. The study was able to pin-point the dynamic CFs such as DD, ED, LD, LS, LST and R, which contributed 99.4% to Soil Erodibility (K - Factor) that encourages and helps in triggering soil erosion in the study area in addition to other already known and unknown factors of soil erosion called redundant factors in the context of this research.

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# A Study on Potential Factors and Physilogical Biomarkers of Cross Bred Cattle Affected with Haemoprotozoan Infections in Dera Ismail Khan, Khyber Pakhtunkhwa–Pakistan

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## **ABSTRACT**

The goal of this study was to assess the prevalence and probable factors of blood protozoa infections in hybrid cattle in the Dera Ismail Khan area, as well as their consequences on blood characteristics. A total of 500 blood samples were taken and analyzed using a blood microscope for this purpose. In conclusion the Taylor's disease was substantially more common in this location than other hematuria diseases in hybrid cattle. Physical condition, feeding method, and location were shown to be non-significant factors associated to the occurrence of infection, while age, sex, tick infection, and animal husbandry were revealed to be significant factors. The total number of white blood cells, haemoglobin concentration, compacted cell volume, total number of red blood cells, and blood index (average red blood cell volume, average red blood cell haemoglobin, and average red blood cell haemoglobin concentration) were all significantly lower, indicating macrocytic hypochromic anaemia, according to the results of the haematological examination. Due to a lack of data on the prevalence or current status of schistosomiasis infection in the Dera Ismail Khan region, this study contributes to the collection of information and the promotion of treatment and control strategies.

**KEY WORDS:** HEMOPROTOZOANS; CROSSBRED CATTLE; RISK FACTORS; HAEMATOLOGICAL PROFILE; DERA ISMAIL KHAN.

## **INTRODUCTION**

Pakistan is an agricultural country with a large cow herd. The fact that 30 to 35 million rural Pakistanis engage in animal husbandry and get 30 to 40% of their income from livestock and dairy products shows just how important livestock is to the country's rural economy. Dairy and beef production contributed for 11.39 percent of the national economy and 58.33 percent of agricultural GDP, respectively (Pakistan Economic Survey 2016-17).Pakistan imports Holstein-Friesen and Jersy dairy cows for crossbreeding in order to improve the cow's

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milk, meat, and skin output. Many diseases affect these exotic and hybrid cows include foot-and-mouth, liver and respiratory problems, mastitis, and blood protozoa disease. Anaplasmosis, Trypanosoma, and Babesia are all parasitic diseases that threaten the health and performance of cattle). You can observe these unusual cases of blood protozoal disease year-round. When it's hot and humid, disease outbreaks in exotic and hybrid cattle are more prevalent than in domestic cattle (Muhammad et al., 1999; Nasir et al., 2000; Rajput et al., 2005).

Many different types of insects, such as ticks and flies, transmit protozoa, such as the Hyalopia tick, *Dermatodes* fly, *Rhipicephalus* fly, *Boophilus* fly, *Haemaphysalis* fly, and Ixodes fly. Sand flies, on the other hand, transmit trypanosoma parasites. Hybrid cattle have a greater incidence of schistosomiasis than native cow breeds, and this schistosomiasis has resulted in significant losses in global animal husbandry. Due to the obvious causes of mortality, decreased profitability and reduced productivity



of workers, they have significant financial consequences. Decastro (1997) estimates that blood protozoa and tickborne diseases generate US\$1.4 to US\$190 billion in global economic harm each year (Unilenberg et al. 1995; Decastro, 1997; Ananda et al., 2009).

Tropical cattle theileriasis is caused by a small theileria, whereas East Coast fever is brought on by ring-shaped theileria. Anorexia, anemia, constipation, or bloody diarrhoea are all signs and symptoms of the disease. It is thought that the parasites Anaplasma marginalis and Anaplasma centralis are the cause of anaplasmosis. Constipation, fever, anorexia, dullness, depression, and anemia are some of the signs and symptoms of this disease. Babesiosis is the next kind of schistosomiasis that may be devastating for pet owners who keep tiny animals. A group of bacteria called Babesia are responsible for the illness. These bacteria include Babesia grandiflora, Bovis, and Diversiforms. An elevated rectal temperature, anemia, anorexia, and neurological issues are all signs of infection. Among Pakistani mixed cattle, trypanosomiasis is caused by Trypanosoma Congo, Trypanosoma solani, and Trypanosoma brucei. Another sign is severe anemic symptoms such as fatigue and loss of appetite, along with a high temperature and reduced productivity. Acute blood protozoal infection is diagnosed by clinical signs and Giemsa-stained blood smears. Hematology is primarily concerned with conveying information about poor health, production difficulties, and the robustness of cattle in general. As an indicator of the severity of the disease, hematological changes are an excellent diagnostic and prognostic tool (Rezaci and Naghadeh, 2006; Col and Uslu, 2007; Nazifi et al., 2010, Durrani et al. 2008; Atif et al., 2012).

# MATERIAL AND METHODS

**Study Area:** The study took place in five different agro-ecological tehsils in the D.I. Khan district (Paroa, Daraban, Dera Ismail Khan, Paharpur, and Kulachi) (D.I. Khan). There are insufficient data on the prevalence of blood protozoa infection and its influence on host biomarkers in the research location.

**Blood Microscopy:** Random blood samples were taken from 100 hybrid cattle in D.I. Khan's urban and rural areas in EDTA-coated vaccination containers. The obtained samples are kept in a cold storage facility. On a clean microscope slide, a thin blood smear was formed and preserved with anhydrous methanol. The dyeing was done with the Giemsa staining process. After cleaning and drying the slides, examine them under a microscope for blood protozoa (Ullah et al., 2018).

**Hematological Analysis:** Hematology analysis blood samples are also utilized to analyses the impact of various infections on hematological parameters. Hemoglobin concentration (Hg), compacted cell volume (PVC), average red blood cell hemoglobin concentration (MCHC), total red blood cell count (TEC), total white blood cell count (TLC), average red blood cell volume (MCV), and average red blood cell volume (MCV) are all determined using blood samples. Hemoglobin is a protein that carries oxygen throughout the body (MCH). The Hematology Analyzer (Abacus Junior Vet, Austria) of the University of Lahore Veterinary and Animal Science University Diagnostic Laboratory evaluated these blood samples (UDL).

**Statistical Analysis:** The prevalence of the disease is computed using the Thrusfield calculation (2002). The data of risk variables is assessed by statistical analysis using the chi-square test (x2), and hematological parameters are tested using the student's t test in SPSS.20 (IBM, Armonk, NY, USA).

# **RESULTS AND DISCUSSION**

Table 1 indicates the overall prevalence of blood protozoa infection, with Taylor's illness being found in 3% (15/500) of blood samples, Babesiosis in 1.8 percent (9/500), and Trypanosomiasis in 0.8 percent (4/500). The current investigation found significantly more cases of Taylor's disease (P0.05) than other schistosomiasis infections, as previously described in indigenous studies (Ullah et al., 2018). This increased prevalence of Taylor's disease could be attributed to favourable variables like ticks that can transmit and complete the disease correctly.

Table 1. Prevalence of different hemoprotozoan infections in district Dera Ismail Khan, KP					
Type of infection	Positive (%)	Prevalence	P-value		
Theileriosis Trypanosomiasis Babesiosis	15 4 9	3 0.8 1.8	0.031		

Blood samples from hybrid cattle infected with hematoplasma was evaluated by a haematology analyzer using haematological parameters such as TEC, TLC, Hg, PCV, MCV, MCH, and MCHC. The average value of the positive blood protozoa animals' haematological parameters was compared to the average value of the normal haematological parameters from the Merck Veterinary Manual. Significant and non-significant relationships between several haematological parameters were investigated in this study. Total red blood cell count, total white blood cell count, haemoglobin concentration, compacted cell volume, average red blood cell haemoglobin, and average red blood cell haemoglobin concentration were reduced dramatically in this study, while average red blood cell volume did not. Hypochromic giant cell anemia was demonstrated by decreased TEC, TLC, HgB, PCV, and MCH but increased MCV. The extensive destruction of red blood cells by blood pear pulp in the acute stage of schistosomiasis, which leads to severe anemia, causes a decrease in HgB, PCV, and TEC. These findings was very comparable to those of Atif et al. However, the findings of Durany et al. (2008) and Qayum et al. (2010) differ from those of Sandhu et al. (1998), who found that a decrease

in MCV and MCHC caused hybrid cattle to develop orthochromatic orthocytic anemia.

Table 2. Association of various factors with the     occurrence of hemoprotozoan infections							
Risk Factor	Determinants	No. of sample observed	Positive	Prevalence (%)	P-value		
Age	Young	120	15	12.50	0.00		
	Adult	194	4	2.06			
	Old	186	9	4.84			
Sex	Male	232	10	4.31	0.00		
	Female	268	18	6.72			
Tick infestation	Present	258	19	7.36	0.00		
	Absent	242	9	3.72			
Animal Keeping	Hygienic	210	04	1.9	0.00		
	Unhygienic	290	24	8.28			
Body Condition	Poor	263	20	7.6			
	Good	237	08	3.38			
Feeding Pattern	Stall fed	266	17	6.39			
	Nomadic	234	11	4.70			
Location	Urban	250	11	4.40			
	Rural	250	17	6.80			

Table 3	Comparative	effect of Her	ionrotozoan	infections (	on nhysiold	ogical hiomarkers
Table J.	Comparative	CHECE OF HEL	IUpi Utuzuan	miccuons	on physiol	igical biomarkers

Hematological Parameters	Babesia n=5	Theileria n=10	Anaplasma n=11	Trypanosoma n=2	Control healthy Mean±SE
TEC (106/µL)	6.39± .784 <sup>b</sup>	6.51±.564 <sup>b</sup>	5.42 <u>+</u> .244 <sup>a</sup>	4.91± .89 <sup>b</sup>	8.33 <u>+</u> 1.666
TLC (103/µL)	$4.79 \pm .304^{b}$	6.26±.624 <sup>b</sup>	5.91±.559 <sup>b</sup>	5.45± .755 <sup>b</sup>	8.00±2.309
HB (g/dl)	7.33±.835 <sup>b</sup>	6.82± .315 <sup>a</sup>	8.53±.40 <sup>b</sup>	$9.00 \pm 2.00^{b}$	11.00±2.081
PCV (%)	31.03± 3.55 <sup>b</sup>	30.37± 1.91 <sup>b</sup>	24.93± 1.48 <sup>a</sup>	24.00± 2.00 <sup>b</sup>	35.33 <u>+</u> 6.359
MCV (fl)	55.89± 1.76 <sup>b</sup>	55.77± 1.55 <sup>b</sup>	56.24± 1.68 <sup>b</sup>	56.46± 1.84 <sup>b</sup>	50.00±5.773
MCH (pg)	13.51± 2.44 <sup>b</sup>	13.44± .896 <sup>b</sup>	13.4±.546 <sup>b</sup>	12.75± 1.00 <sup>b</sup>	14.00±1.732
MCHC (g/dl)	20.11± .886 <sup>a</sup>	26.48± 1.15 <sup>a</sup>	23.40± .971 <sup>a</sup>	21.92± 2.42 <sup>a</sup>	33.00±1.732

All calves infected with the blood protozoa in this investigation developed anemia. The low average PCV values of all schistosomiasis-infected cattle suggest that schistosomiasis infection is the source of anemia. Because all blood protozoa cause red blood cell phagocytosis, hemolysis of red blood cells, which is frequent in all blood protozoa infections, causes anemia. According to Adejinmi et al. (2004), anemia can be used to better understand the severity of blood protozoa infections because the PCV value lowers in all blood protozoa infections.

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# On the Auditory Transmission using Brainstem Evoked Response Audiometry in Indian Women with Iron Deficiency Anemia

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### ABSTRACT

Iron deficiency anemia is a common nutritional disorder prevalent in many developing and underdeveloped countries. It affects various physiological aspects that have been vastly explored by researchers during developmental and nondevelopmental phases. The anemic status due to iron deficiency possibly leads to various neurodeficits and functional impairment. Brainstem evoked response audiometry (BERA) is an objective electrophysiological method used for assessing the transmission in the auditory pathways from the auditory nerve to the brainstem. Since iron deficiency anemia is widespread in women belonging to reproductive age, the present study aims to explore the impact of this type of anemia on hearing. The study included 30 anemic adult females belonging to the age group 18-30 years and 30 age matched controls. Hemoglobin and serum ferritin levels were investigated to evaluate the anemic status. BERA was performed on them to assess the auditory transmission. Results were compared between two groups by unpaired Student's t-test. A p value < 0.05 was considered significant. Mild increase in absolute latencies of wave I, III, V and mild increase inter-peak latencies of waves I – III, III – V and I-V in anemic group when compared to healthy controls, which was not statistically significant. Iron deficiency anemia may possibly effect the impulse transmission in auditory pathway, which may lead to sensorineural hearing loss in women.

KEY WORDS: ANAEMIA, NUTRITIONAL ANEMIA, ADULT FEMALES, EVOKED POTENTIALS, DEAFNESS.

## **INTRODUCTION**

Anemia is a major health problem present globally affecting 1.6 billion people which is estimated to be 24.8% of the population, of which iron deficiency is a major contributing factor. The WHO estimates that Iron Deficiency Anemia (IDA) affects 30% of non-pregnant women of reproductive age and 42% of pregnant women. Women in developing countries are more susceptible to this deficiency due to low dietary intake, menstrual blood loss, and increased demand during pregnancy and lactation. National Family Health Survey (NFHS)-4 done in India during the year 2015-16 shows a prevalence of IDA in 53% of women belonging to the age group of 15-49 years (Alecia 2014).



According to WHO, IDA in non-pregnant adult females is blood hemoglobin <12 g/dl and serum ferritin <15 ng/ml. Iron is not only required during early developmental stages for normal brain growth but also plays an important role in later part of life for the maintenance of various metabolic activities and physiological functions. Besides iron having a key role in hemoglobin synthesis, it is required for non-hematological functions by nervous system during development (in-utero, infancy and childhood). Myelin synthesis, development of oligodendrocytes, neurogenesis, synthesis of neurotransmitters like dopamine, serotonin, catecholamines and GABA, all are iron dependent.

Researchers have found that iron is required during nondevelopmental phases of life as well. The uptake of iron by the brain lasts throughout the life and is utilized by the oligodendrocytes for formation and maintenance of myelin . Since myelin is involved in conduction in the nerve fibres, iron deficiency anemia which is a severe form of iron deficiency may be associated with alteration in brainstem auditory evoked potentials. BERA is used to assess the auditory transmission i.e generation and conduction of impulse in the auditory pathway. BERA represents the progressive activation of different levels of the auditory pathway consisting of I – V waves.



Waves I & II arises from cochlear nerve, wave III from Cochlear Nucleus , wave IV from Superior Olivary Nucleus and wave V from Lateral Lemniscus. Latency of Wave I indicates peripheral transmission and wave III and V indicates brainstem transmission of auditory impulses. The inter peak latency between wave I-V depicts conduction time and is an index of central nervous system development. BERA can be used extensively to identify subclinical lesions associated with various demyelinating diseases and post hypoxic damage .Hence, we undertook the present study to explore whether iron deficiency anemia effects the brainstem auditory evoked potential and in turn on hearing in adult life.

# MATERIAL AND METHODS

The study was conducted in the Central Neuro-Physiology lab of Acharya Vinoba Bhave Rural hospital and teaching institute, Jawaharlal Nehru Medical College, Wardha. The cases (30) included females in the age group of 18 -30 years whose blood hemoglobin level < 12g/dl and serum ferritin < 15  $\mu$ g/L. The comparison group (30) (Normal females without IDA- non anemic) were age matched females with normal blood hemoglobin and Serum Ferritin levels.i.e hemoglobin levels > 12 g/dl and Serum ferritin levels.i.e hemoglobin levels > 12 g/dl and Serum ferritin levels > 15  $\mu$ g/L (Algarin 2003).

The following was the exclusion criteria- Current pregnancy or pregnancy within the previous year, current lactation, hormonal contraceptive use, irregular menses, current blood donation, pre-existing ear diseases with clinical deafness, endocrine disorders (e.g: Diabetes Mellitus, Thyroid dysfunction), Neurological diseases and other types of anemia (Biacabe et al., 2001).

Table 1. Age & hematological parameters of anemic &non-anemic females.

Study Parameters		
	Cases (30 N)	Controls (30 N)
	mean <u>+</u> SD	mean±SD
Age (years)	25.24±1.6	25.07±1.2
Hemoglobin (gm/dl)	10.90±2.14	12.56 <u>+</u> 0.80
Serum ferritin (µg/L)	12.75 <u>+</u> 0.62	24.27±1.12

Table 2. Absolute latencies of waves I, III & V of anemic& non-anemic females.

Absolute Latencies (ms)	Cases mean <u>±</u> SD	Controls mean <u>±</u> SD			
Wave I	1.84 <u>+</u> 0.23	1.62±0.31			
Wave III	3.74 <u>±</u> 0.26	3.46±0.24			
Wave V	5.70 <u>±</u> .56	5.53±0.30			
*p <0.05					

After undergoing complete medical history and clinical examination, the suitable cases and controls were subjected to hematological evaluation and BERA recording. Blood Hemoglobin concentration was estimated using automatic Coulter method and Serum Ferritin estimation was done by ELISA (VITROS 5600 (ICSH)). BERA was recorded using Neuron Spectrum-5, Neurosoft Chroma (Russia). BERA is an evoked potential generated by a brief click transmitted from an acoustic transducer in the form of an insert earphone or headphone. The elicited waveform response is measured by surface electrodes typically placed at the vertex of the scalp and mastoid. The waveform peaks are labeled I-V. These waveforms normally occur within a 10millisecond time period after a click stimulus presented at high intensities (70 dB normal hearing level [nHL]). The following parameters were recorded - absolute latencies of wave I, II, III, IV and V with inter-peak latencies of I-III and III-V, I-V (Beard et al., 1993).

**Statistical Analysis:** Significance of difference in the mean values of different parameters in two groups was assessed by Student's "t" test and p-value < 0.05 was considered to be significant. All the values were expressed as mean and 1 standard deviation. Calculations were done using SPSS (version 18) and Microsoft Excel software (Chung et al., 2014).

# **RESULTS AND DISCUSSION**

Total 60 subjects were included in this study, among which, 30 were anemic cases and 30 were non-anemic controls. Values of all the study parameters of the anemic cases and non – anemic controls are given in the Table 1 (Falkingham et al., 2010).

Table 3. Inter-peak latencies of anemic & non-anemic females.				
Inter-peak latencies (ms)	Cases mean <u>+</u> SD	Controls mean±SD		
I-III	2.38 ±0.23	2.12 ±2.43		
III-V	2.40± 0.49	2.32± 0.31		
I-V	3.56 <u>+</u> 0.48	3.11 ± 0.12		
*p <0.05				

The absolute latencies (Table 2) and inter-peak latencies (Table 3) of the anemic females were prolonged when compared to non-anemic females but were not statistically significant (p >0.05) (Ferraro & Durrant 1994).

Anemia, particularly iron deficiency anemia is a prevalent disorder either due reduced intake or increased loss. 53% of Indian women belonging to reproductive age group suffer from Iron deficiency anemia. The major cause of anemia in women is due to nutritional deficiency, increased requirement during pregnancy and lactation, loss during menstruation and parturition, intake of phytates. Iron deficiency anemia is a grave form of iron deficiency and this deficiency has an impact on various physiological functions. BERA is a noninvasive electrophysiological tool to assess the auditory transmission. The different structures of the auditory pathway are stimulated and recorded from the scalp and mastoid using electrodes. The wave I is generated from cochlea, wave III is generated from cochlear nucleus and wave V is generated from lateral lemniscus and inferior colliculus (Hill 1989) (Lozano et al., 2019; Lozoff 2007; McLean et al., 2019; Shankar et al., 2000; Ortiz et al., 2004; Ramit & Das 2016).

Alteration in the process of impulse transmission leads to prolonging of absolute latencies (I,III,V) and interpeak latencies (I-III, III-V, I-V), found in disorders like demyelination, ischemia & degeneration leading to hearing impairment. In our study the absolute and interpeak latencies were prolonged in anemic women when compared to non-anemic women, however the difference was not statistically significant. Similar evidences were demonstrated N. Shankar et al. where the absolute & inter-peak latencies were increased in anemic children. Ramit Dev studied 40 subjects with IDA in the age group of 12-16 years and found increased absolute latencies in the waves I, III & V and also increased inter-peak latencies indicating delayed transmission in auditory pathway when compared to non-anemic subjects (Schieffer et al., 2017; Starr 1994; Stockard et al., 1993).

Algerin C et al. reported significantly prolonged absolute and inter-peak latencies in children. In a cohort study done in children the prevalence of hearing loss was 3.0% in children with IDA and 1.7% in those without IDA. Similar studies in the U.S.A and Taiwan in adult population has suggested IDA may be a significant causal factor for sensorineural hearing loss. The possible mechanisms explained for neuro-deficits in IDA are that since iron is an important cofactor required for DNA synthesis and neurotransmitter metabolism, its low levels may hamper normal physiological functioning; dependence of oligodendrocytes on iron for myelination hampers impulse transmission and low hemoglobin in anemia leads to reduced oxygen delivery leading to increased ischemia in these tissues (Wang et al., 2020).

Since there is data mounting regarding the effects of IDA during developmental stages like infancy, childhood and adolescence; the present study focuses on nondevelopmental effects of IDA in adult females. Because of high prevalence of IDA in developing countries these females are vulnerable to deleterious effects of IDA particularly auditory response. Further research studies involving larger population, correlating the different waves of BERA with different grades of anemia and prospective studies to demonstrate the effect of iron supplementation on BERA are required for confirmatory conclusions.

# CONCLUSION

The findings in our are indicative of a neurological impairment consequent to IDA though, perhaps, the significance could not be revealed as women showed only mild anemia and may be greater numbers need to be studied. Correction of anemia is extremely important as persistence of anemia may lead to sensorineural hearing loss in women.

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# **Bias in Artificial Intelligence and Machine Learning**

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#### ABSTRACT

Artificial Intelligence (AI)-based systems are firmly ingrained in our daily lives, and they are frequently entrusted with making critical decisions that affect individuals and society. Image identification, recommendation algorithms, e-commerce, and online advertising have all profited from AI and machine learning (ML) applications over last decade. With the inclusion of AI and machine learning in such usages, there has been an increase in alarming reports of many types of biases, including gender, racism, and other factors, caused by these systems and the system. A very common question nowadays is, "What is bias?". Though bias can be defined in a number of ways, a common definition is – Algorithmic bias arises when a machine learning model generates outputs that are inherently skewed as a result of erroneous assumptions. Bias can enter the system at various stages, planning, collection of data, during the time of analyses of data, or while publishing a particular research work. As these systems become more commercialised, the negative impacts of bias are becoming severe and hence attracting attention by data scientists for solutions. The knowledge of data scientists regarding biases is increasing along with awareness of it, and hence they are working on mitigating the problem of bias.

KEY WORDS: FAIRNESS AND BIAS IN AI/ML, ARTIFICIAL INTELLIGENCE, MACHINE LEARNING, BIAS

## **INTRODUCTION**

In the last 3 years, there has been a significant increase in overall use of AI across the globe. The percentage of enterprises using AI has gone up from 15% to 37%. Machine algorithms are increasingly being employed in high-stakes decisions such as loan applications, dating, and hiring. Algorithmic decision-making has significant advantages; unlike humans, robots are never bored or exhausted, and they can examine a wide range of considerations, far more than humans can. Algorithms, like humans, are prone to biases that cause them to make "unfair" conclusions (Althubaiti et al., 2016).

**Unfair algorithm:** An unfair algorithm is one that generates judgements that promote a specific group of people (Alexandra et al., 2016).

For example, RACIAL BIAS was anticipated by the COMPAS algorithm for forecasting re-offending risk,



which forecast larger risk values for black defendants than their actual risk. In another incident, it was discovered that Google's Adverts engine for targeted advertising served much fewer commercial for positions with high salaries to women than to men – GENDER BIAS.

As a consequence of these occurrences, public worry about the negative consequences of AI on our lives is developing. AI-assisted decision-making has the potential to amplify pre-existing prejudices while also introducing new classifications and criteria with new biases.

In this paper, we discuss what bias really means and its various types using some real-life examples. After understanding bias, we learn ways to mitigate it and account for it. We also analyse what "fairness" means and how can we ensure that our model is fair. We categorise the works into three groups:

What is Bias?: Bias has a number of definitions and is generally treated as a negative term. Bias can enter through various aspects of AI/ML research, like, bias in data collection, bias due to under and over representation of population, analysis to get an already decided result, etc (Maria Šimundic 2013; Pham et al., 2019).



Some of the common definitions of bias are-

- Any pattern or variation from the truth in data collection, analysis, interpretation, and dissemination that could lead to inaccurate conclusions is classified as bias.
- When the data available isn't representative of the population or issue being examined, it's called data bias
- Bias can generally mean systematic favouritism of a group over another.
- An AI system's decision that is prejudiced in favour of or against single human or set of persons, especially in an unjust manner, is referred to as bias.

**Types of Bias:** Bias can be classified into various types and its definition divided into different categories. We have discussed different bias below-

**Cognitive Bias:** Cognitive biases are intrinsic dispositions to comprehend and process information depending on our prior experiences, preferences, and in some cases, genetic wiring. There are 5 major types of cognitive-bias-

**Confirmation-Bias:** It is said that the data will confess to almost anything if tortured long enough. When people deliberately seek out and favour information or data that supports their beliefs or preconceptions, they ignore or disregard contradictory or mitigating facts. It's a form of cognitive bias or purposeful bias. An intentional bias or explicit bias is when there is a deliberate tailoring of the data to fabricate the results of an experiment or study. This type of bias embroiders the information collected to move in a certain and predetermined direction to get a result which is required. In such biases, the study is not done to get results but rather a test is performed in a way to explain a presumed hypothesis (Zhang et al., 2018).

Participants in a confirmation bias study on the 2004 United State presidential election, for example, strong preconceived notions about candidates. The review concludes that pre-existing opinions about the candidates produced significant prejudice, resulting in erroneous judgement and illogical interpretation, after analysing contradictory utterances by the various contenders. This revealed that social reasoning is prone to confirmation bias (Dwork et al., 2011; Wadsworth et al., 2018).

**Survivorship-Bias:** The logical fallacy of focussing on the people or things that made it past some sort of selection process and neglecting those who did not, usually due to their lack of visibility, is known as survival bias. This can lead to erroneous conclusions in a variety of ways. Because failures are neglected, survivorship bias can lead to unduly optimistic beliefs. Some examples of survivorship bias (Christopher et al., 2010).

**Is Your Friend Really Photogenic?**: We all have friends whose social media feeds are loaded with incredible pictures, and we all believe they are photogenic. Is this actually the case? There's a good chance that pal isn't as flawless as the internet portrays. They could simply be spending a lot of time taking images in the hopes that at least one of them would be chosen. What we see is just one among many images, leading us to draw the incorrect idea that our friends are photogenic.

**Is It True That Asians Thrive At Computer Science?:** Asians are frequently thought to be skilled in computer technology and mathematics in the West, to the point where it has become a stereotype. Unfortunately, this isn't entirely correct. It's possible that some of it is merely a numbers game Despite the fact that just 10% of Asians are computer and math experts, Asia's population is much larger than Americans. Humans present in the West may have had more exposure to those particular Asians, resulting in this widely held belief. This is a great example of concentrating entirely on the task at hand.

**Sunk-Cash-Fallacy:** The sunk cost fallacy refers to people's propensity to make judgments based on how much they've already committed, which leads to even greater investment but no rewards.

#### Some Examples of Sunk Cash Fallacy-

• Breaking the diet and sunk costs

Assume we were on a rigorous diet at the time, but we blew it at lunch when we indulged in a fantastic pizza. You intended to eat healthy for dinner, but since your diet has already been ruined, you might as well go all out and eat something terrible for supper as well. The sunk cost fallacy is illustrated here (Woodworth et al., 2017).

• Advertising and the sunk cost fallacy

**Consider this scenario:** you've spent a lot of money promoting a product, but sales aren't keeping up with the promotion. Unfortunately, it's all too easy to believe that because you've already spent so much, there's no point in stopping now and that you should go all out and spend even more money on marketing (Bruce & Frey 2018) (Colin & Blyth et al., 1972).

**False-Causality-Bias:** We are continually looking for patterns as data scientists. As a result of this proclivity, we occasionally discover patterns where none exist. When it is falsely assumed that if two events occur together, one must have caused the other.

An examples of false causality bias- In the 1980s, a professor looking into the causes of crime in New York City discovered a substantial link between the number of serious crimes and the amount of ice cream sold by street sellers. Should we, however, conclude that eating ice cream causes people to commit crimes? Because this makes little sense, we should assume that both were caused by an unseen variable. Summer is when crime rates are highest, and it is also when the majority of ice cream is sold. Ice cream sales aren't related to crime, and crime isn't the cause of sale of ice-creams. Availability Bias: The phrase "availability bias" describes how data scientists make assumptions based on realworld data or current knowledge. They believe data that is instantly available is relevant data. An example of availability bias-If someone says that drinking beer doesn't make you fat because Mr. A drinks beer everyday and is still not fat, this is an example of availability bias as the conclusion that beer doesn't make you fat is based on limited data which can just be an exception and this conclusion can be invalid (Cynthia 2012).

**Types of Bias During Trial:** Bias during trial can be of different types. There are three major stages of trial and each stage has different kinds of bias.

The three different stages are – i. Pre-trial ii. During trial iii. After trial Pre – trial bias During this stage, there are 3 types of bias-

**Flawed Study Design:** Risks and outcomes of the study are stated ambiguously and with no objectives and validated methods. Standardization and blind are not taken into consideration (Eirini et al., 2019; Kamiran & Calders 2012).

**Selection Bias:** When the participation pool, or subsequent data, is not representative of the targeted respondents, a selection bias occurs.

**Channeling Bias:** When a medicine is preferentially administered to patients with differing baseline characteristics, this is known as channelling bias

## **Bias During Trial**

**Interviewer Bias:** It is the effect of the interviewer's characteristics and the types of questions they ask. Personal opinions and tendencies of an interviewer can lead to prejudice.

**Chronology Bias:** When earlier recruited study participants allocated into one intervention group, and later participants ending up in another group.

**Recall Bias:** Participants in studies may occasionally provide incorrect responses that rely on their capacity to recall earlier events. As a result of recall mistake, the prejudice in this scenario is referred to as recall bias.

**Transfer Bias:** When study cohorts experience unequal losses to follow-up, transfer bias might arise .

**Exposure Misclassification:** It's a type of cognitive bias. A systematic error known as misclassification bias might arise at any point during the research process. It happens when a person is placed in a category to which they are not supposed to belong.

Performance Bias: Performance bias occurs when one

group of subjects in an experiment receives more attention from investigators than another. There are systematic disparities between groups as a result of the variance in treatment levels, making true results difficult or impossible to achieve.

## **Bias After Trial**

The 2 types of bias in this step are-

**Citation Bias:** The propensity for positive study findings to be quoted more frequently than neutral or negative findings.

**Confounding Bias:**When two or more factors are individually related with both the desired outcome and the exposure, confounding occurs.

## Some Other Types of Biases

**Historical Bias:** the prejudice and the social and technical concerns that already exist around us and can permeate into the process of data generation, even with ideal sampling and/or feature selection. As a consequence of the fact that only 5% of 500 CEOs are female, searching for female CEOs yielded fewer female CEO images in a picture search result from 2018, skewing the search results in favour of male CEOs. Of course, these search results reflected reality, but the notion of whether or not search engines should mirror actuality is worthy of discussion. Measurement Bias is caused by the way we select, use, and measure a specific trait.

Prior arrests and arrests of friends or family members were utilised as proxy variables in the recidivism risk prediction tool COMPAS to forecast the amount of "risk profile" or "criminal behaviour," which could be considered mismeasured proxies on their own. This indicates towards the fact that minority groups are more frequently inspected and kept tabs on, resulting in greater arrest rates. However, people from minority groups should not be assumed to be more dangerous simply because they have a greater arrest rate. There are differences in how these groups are assessed and handled (Kamiran & Calders 2012).

**Aggregation Bias:** arises when incorrect inferences about a subgroup are generated based on data from other subgroups, or when faulty beliefs about a community have an impact on the model's output and definition in general. This type of bias is noticed in clinical aid techniques and tools. Consider a set of diabetic people who appear to differ by nationality and gender, or HbA1c readings, which are regularly used in diabetes diagnosis and monitoring and differ in a variety of ways across genders and nationalities. Because of all of these characteristics, as well as their varying meanings and impacts among sub-classes and populations, a general prototype is unlikely to be the best fit for all of us. According to a study on Machine Learning Bias and Fairness, population is categorized into five different groups. This is true even if they are equally represented in the training data (Farnadi et al., 2018).

Population bias occurs when the user audience represented in the dataset or platform differs from the target group in terms of statistics, demographics, representatives, and user attributes. Men are more likely to use online forums such as Reddit or Twitter, while women are thought to prefer Pinterest, Facebook, and Instagram.

The Simpson's Paradox skews data that is made up of subgroups or individuals who behave differently. According to Simpson's paradox, a trend, association, or characteristic identified in underlying subgroups can differ substantially from the relationship or characteristic detected when these subgroups are aggregated. When our judgement is influenced by the behaviour or content of others, this is known as social bias. When we are attempting to appraise or analyse an item that has a low rating but is persuaded by other high ratings, we alter our score, believing that we are being too harsh.

**Real-Life Examples of Bias:** In this section, we examine several real-world examples of bias in AI and machine learning to gain a better understanding of what bias is and the repercussions of allowing it to exist.

**Racism Embedded In US Healthcare:** In October 2019, researchers uncovered that an algorithm used in US hospitals to predict which patients would require more medical care preferred white patients over black patients While race was not a factor in this investigation, healthcare spending history was found to be highly associated to race. The concept was that a person's healthcare needs might be summed up by their cost. Black patients with the same ailments had lower healthcare costs on average than white patients with the same conditions for a variety of reasons (Hennekens & Buring 1987).

**Solution:** Because racial health disparities are driven by a multitude of causes, many of which act in concert, therapies must take into account all of the ways racism influences health care. Interventions must focus on physicians, patients, and their interactions because both physicians and patients play a role in the success of medical care. Other biases are deeply embedded in the health-care system, needing structural reforms. Racial disparities in health care can be decreased by enacting policies that address the many factors that contribute to racism (Louis et al., 2015).

Amazon's Hiring Algorithm: Amazon is one of the world's most powerful technology companies. As a result, it's no wonder that machine learning and artificial intelligence are heavily used by them. Amazon discovered in 2015 that their algorithm for hiring staff was skewed against women. The reason for this was that the algorithm had been programmed to favour males over women based on the number of resumes submitted over the preceding ten years and the fact that men made up the majority of the candidates (Zafar et al., 2017). **2016 Us Elections:** During the 2016 presidential election, many people thought Hillary Clinton and Donald Trump were untrustworthy and unlikable; in fact, just a third of voters said either candidate was "honest and trustworthy." Despite this, Donald Trump appears to be the campaign's most unpopular candidate. Clinton received more favourable coverage in six major news outlets, according to Data Face. (Including the New York Times, Wall Street Journal, Chicago Tribune, and Washington Post). Donald Trump was declared the winner, despite forecasts that Hillary Clinton would be the next president. Desirability in social situations the gap could be due to bias (Goodfellow et al., 2014).

**Social Desirability Bias:** This phenomenon occurs when some respondents explain their response embroidered to make it more socially acceptable rather than their "true" reaction (Harini et al., 2019).

Facebook's Ad's Algorithm: After allowing advertisers to target ads based on gender, ethnicity, and religion, all of which are legally protected categories in the US, Facebook was found to be in violation of the US constitution in 2019. Nursing and secretarial jobs primarily targeted women, whereas janitors and taxi drivers primarily targeted men, particularly those from minority backgrounds. Because the algorithm determined that providing real estate ads to white people resulted in higher engagement rates, minorities were no longer seen the adverts. This issue develops as a result of the learning process of the AI computer. As is the nature of machine learning algorithms, the ad platform developed a pattern from the data it was given, but the pattern represented existing societal imbalances and, if left unchecked, would have contributed to perpetuate them further.

**Beauty Pageant Algorithm Prove To Be Racist:** Thousands of people participated from all across the world and submitted their photographs to be judged by robots in an international beauty competition in 2016. Beauty. To determine what idea of "true beauty" is held by the computer, AI was meant to employ an advanced algorithm without the involvement of human bias. However, things quickly went wrong when the algorithm began to associate skin colour with attractiveness, selecting winners only on the basis of race (Matt et al., 2017).

**Mitigation of the Bias:** We now have a deep understanding of what bias is and its various forms after reading about the different types and analysing some real-life examples. After understanding bias, we now see how it can be ameliorated. We also discuss the legal issues of mitigating bias. There are three different approaches of mitigating bias from the process of machine learning-

**Pre-Processing:** Because the data source and extraction procedures may introduce unwanted bias, effective bias mitigation begins from the data collection and processing phase. As a result, the greatest amount of work should be spent into evaluating the data source's integrity and

ensuring that the data collection procedure incorporates adequate and trustworthy measuring methodologies. The majority of data was collected through questionnaires prior to the "big data" era. This enabled for the creation of experimental designs that used statistical analysis to control for potential biases. Today's technology allows us to access vast volumes of data at little cost, but knowledge on the circumstances in which the data was collected is typically scarce (Walker 2014; Hardt 2017; Srebro et al., 2017).

As a result, pre-processing procedures make sure that the data fed as input is fair and equitable. Hide the protected attributes, change the data set's class labels, and reweight or resample the data are all options. To guarantee that the data sample is representative, it may be essential to rebuild omitted or censored data in some cases. There are several imputation approaches that may be used to accomplish this goal, with hot deck operations being one of the more effective (Mehrabi et al., 2019; Paul 2011).

**In-Processing:** The in-processing algorithms are the second sort of mitigation strategy. In this circumstance, unintentional bias is prevented directly during the training period. Incorporating a fairness penalty directly into the loss function is a simple method to achieve this goal. A decision boundary covariance limitation is one strategy for logistic regression or linear SVM. A meta-algorithm, on the other hand, accepts an input of a fairness metric and outputs a new classifier that is optimal for that metric. Debiasing-based adversarial classification was also made possible by the invention of generative adversarial networks (GANs). In this discipline, the capacity of an adversarial neural network to predict a protected property is minimised, while a neural network classifier is taught as a typical predictor.

**Post-Processing:** A post-processing method is used in the third category of mitigation algorithms. Only the output of a trained classifier is changed in this case. The Bayes optimum equalised odds predictor can be used to adjust the output labels in order to accomplish an equivalence aim. A paper with different approach employs soft classification based on proxy model outputs to offer a weighted estimate for demographic disparity. Post-processing methods have the advantage of providing fair classifiers without requiring the original model to be retrained, which possibly is time intensive as well as difficult to use in production. This strategy, on the other hand, may reduce accuracy or jeopardise any generalisation gained by the initial classifier.

Accounting for Bias: The assignment of responsibility for how an algorithm is produced and its impact on society is referred to as algorithmic accountability. The problem is worsened in AI systems since the solution is inferred rather than specified utilising machine learning techniques and complex data. The most essential are discussed below, and they account for bias either proactively, through bias-aware data collection, or retroactively, by explaining AI conclusions in human terms; we also stress the importance of recognizing and recording prejudice through formalizations such as ontologies.

**Proactively:** To address a variety of demands, a variety of data collection methods are employed; nevertheless, these methods may create bias throughout the data collection stage. Individual bias checklists and elicitation tasks, as well as mathematical pooling, group elicitation and consensus building, and hybrid bias elicitation in evidence synthesis methodologies, have all been provided for a systematic approach to bias elicitation in evidence synthesis. Bias elicitations have been demonstrated to be biased even when high-quality assessors are utilised, and treatments have been suggested. To deal with data and label shortages, crowdsourcing is a typical machine learning approach that relies on large-scale human input. Because people from varied ideological and cultural backgrounds are involved, biased labelling may be visible to all of them, making it more difficult to minimise biases in crowdsourced data.

**Describing And Modelling Bias Using Ontologies:** Not only does bias analysis necessitate a thorough comprehension of the many sources, but it also necessitates the interpretation and description of bias's meaning, potential side effects, provenance, and context. Unbalanced categories are sometimes misconstrued as prejudice and seen as potential sources of unfavourable results. Furthermore, knowledge bases and ontologies, like any other data source, are prone to bias and imbalance in knowledge. For instance, the amount of research done on disorders linked to these genes may change descriptions of existing gene mutations in a knowledge base like COSMIC or the Gene Ontology properties associated with a gene.

Expressive formal prototypes are necessary to capture and validate the properties of a source of data, as well as the conditions or environment in which the data source is skewed. Bias can be measured and detected in a wide range of data sets using formalizations like description and causal logics. They also make it possible to annotate claims with trustworthiness, timing, and causal linkages. Ontologies can employ classes, properties, and subsumption linkages, as well as contextual representations of these notions, to build a universe of discourses. Existing logic-based and ontological formalisms aren't meant to capture contextual bias or identify imbalanced categories that frequently correlate to real-world events, despite their expressiveness.

As a result, expressive ontological formalisms are required to characterise the contextual characteristics of various types of sources, such as data sets, knowledge bases, and ontologies, as well as annotations demonstrating the causality and provenance of the represented knowledge. These formalisms will provide reasoning processes to bias detection algorithms, allowing them to enhance accuracy while clarifying the meaning, conditions, source, and context of prejudice. As a result, context-aware bias description and interpretability will be possible thanks to domain modelling with ontologies.

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**Retroactively:** The ability to explain the internal mechanics of a learning model in human words is known as explain ability. It's sometimes confused with interpretability, but the latter refers to the model's ability to predict what will happen if the inputs or parameters are changed. Although there have been attempts to address interpretable ML for some time (Hoffman & Klein, 2017), the academic literature has expanded in recent years, with terminology such as explainable AI (Adadi & Berrada, 2018) and black box explanation (Adadi & Berrada, 2018) gaining popularity. Guidotti and his colleagues are a group of people that are passionate about what they do (Guidotti et al., 2019).

To decipher a model's global logic, many studies propose building an interpretable classifier that can imitate the perplexing decision mechanism. (Montavon et al., 2018) used these methodologies to explain specific models like deep neural networks. Only a few people dispute the black box paradigm (Henelius et al., 2014). Transparent classifiers that are self-interpreting and have predicted accuracy comparable to cryptic techniques have been created due to the difficulty of ex post characterising black boxes and sophisticated models. Bayesian models (Li & Huan, 2017), generalised additive models (Lou et al., 2013), supersparse linear models (Ustun & Rudin, 2016), rule-based decision sets (Lakkarajuet al., 2016), optimal classification trees (Bertsimas & Dunn, 2017), model trees (Broelemann & Kasneci, 2017), model (Zhang et al., 2018).

**Fairness:** There is no standard definition of fairness that is used world-wide but there are more than 20 different definitions. Some of the definitions are listed below-

Methods to ensure fairness	Explanation	
Use statistical calibration	To decrease bias, use a variety of statistical approaches data resampling or reweighing.	
Use a regularizer	To existing ML algorithms, add a fairness regularizer (a mathematical constraint that ensures the model is fair).	
Use surrogate models	Wrap a fair algorithm around the existing baseline machine learning methods.	
Use fair Machine Learning models	Adopt entirely new machine learning algorithms that ensur fair results.	
	To guarantee equitable outcomes for all groups with protected and sensitive traits, calibrate the prediction probability threshold.	
Calibrate the threshold		

**Equalized Odds:** The concept was first defined in the context of binary classes. Blake Woodworth expanded the concept for a number of sessions in 2017. Equalised odds, also known as conditional procedure accuracy equality and disparate treatments in machine learning, is a fairness metric. If the true positive and false positive rates in the protected and unprotected groups are the same, the classifier meets this condition satisfying the formula:

**Demographic-Parity:** According to demographic parity, all members of a protected group (such as gender) should

have an equal chance of success. The favoured decision is one that results in a positive outcome, such as "getting into university," "receiving a loan," or "being seen the ad." The difference should ideally be zero, as previously indicated, however this is not always the case.

**Fairness Through Awareness:** When an algorithm makes similar predictions for similar people, it is said to be fair. To put it another way, any two people who are comparable in terms of a task-specific similarity (inverse distance) metric should provide the same results.

**Treatment Equality:** When the ratio of false negatives to false positives for both protected group categories is the same, treatment equality is attained.

**Test Fairness:** According to the test fairness requirement, participants in two groups - protected and unprotected (female and male) - must have an equal chance of accurately belonging to the positive class for any projected probability score S.

**Counterfactual Fairness:** According to the notion of counterfactual fairness, a choice is fair to an individual if it is the same in the real world and a hypothetical world in which the individual belongs to a different demographic group.

**Fairness in Relational Domains:** A fairness concept capable of capturing the relationship structure of a domain—not just by looking at individual attributes, but also by looking at social, organisational, and other links between people.

**Conditional Statistical Parity:** Given a collection of acceptable considerations, what should you do? Participants in both the protected and unprotected (female and male) groups should have an equal chance of reaching a favourable outcome, according to conditional statistical parity (L).

**Future Directions and Conclusions:** There are several unturned stones in this field and still a huge scope of growth. Firstly, despite the fact that there exists a number of bias mitigation techniques but there are no conclusive results as to how efficient the method of mitigation is or on what basis should the mitigation method be selected or which method is best for which type of bias. As there are so many unanswered questions, the problem of bias cannot be fully resolved. There is a need for a comprehensive assessment of existing approaches in order to gain a thorough understanding of their efficacy and limitations, as well as to give more options. The problem with having a system is that different methods perform differently with different bias.

This issue must be solved by using a standard data set. Therefore, an internationally accepted evaluation must be developed which is used to check the performance efficiency of the model and also covers all the fairnessrelated aspects. Secondly, the definition of "fairness" is a problem. There is no standard definition of fairness, but multiple definitions occur which make it difficult to understand what fair is as "fair is not fair everywhere". Therefore, a standard definition of "fairness" must be derived to making judging a model as fair or unfair easier.

Thirdly, the data scientists and all the other members involved in ML must be aware of all types of bias and the concept to fairness. Regular checks on the ML multidimensionally will ensure a fair model. Two strategies could be used as a solution for addressing the problem of bias:

# CONCLUSION

To summarise, the issue of bias and unfairness in AI/MLbased decision-making systems has recently attracted a lot of attention. This research looks at some real-life examples of prejudice and how to overcome it to help readers understand what it is. We also talk about the issue of a nebulous sense of fairness. Finally, we'd like to emphasise that prejudices are profoundly ingrained in our cultures, and it's a misconception to expect that the AI and prejudice issues can be solved solely by technical means. Because technology reflects and projects our biases into the future, it is the responsibility of technology developers to recognise the limitations of the technology and implement safeguards to avoid any issues.

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# Effects of Eimeria Species on Different Rabbit Breeds

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#### ABSTRACT

A limiting factor in the successful development of rabbit farming is diseases of invasive etiology, in particular eimerioses. The main reason for the underproduction is the massive destruction of the cells of the intestinal mucosa. Studies were carried out on Californian (C), Soviet Chinchilla (S) rabbits and their hybrids at 30, 45 and 60 days of age. A group of 6 animals in each of the experimental (infested) and control (intact) groups was formed. One-day-old rabbits of the experimental groups were infected with different doses of oocysts (50,000, 100,000 or 200,000 per individual) of the Eimeria species E. perforans and E. irresidua. On days 30, 45 and 60 after infection, animals in the experimental and control groups were slaughtered to assess the intensity of infection. Material was selected for histological examination. Various staining methods were used to contrast endogenous stages of Eimeria in the intestinal mucosa: alcian blue and Carazzi haematoxylin; Mayer's haematoxylin and 1% alcohol eosin; Gill's haematoxylin and 1% alcohol eosin; Van Gieson picro-fuchsin; toluidine blue. When determining the intensity of infestation in different breed and age groups, it was found that Californian animals were most susceptible to infestation by E. perforans and E. irresidua oocysts, regardless of the dose of infestation. The histological examination of the small intestine of infected rabbits of experimental breedage groups revealed that despite the absence of any clinical manifestations, damage to the epithelial plate of the small intestine mucosa was found in the epithelial plate of the intestinal villi as well as significant damage in the intrinsic plate of the mucosa, which are most effectively revealed by staining with alcyan blue and Carazzi hematoxylin and toluidine blue.

**KEY WORDS:** RABBITS, BREEDS, INTENSITY OF INFESTATION, ALCIAN BLUE, CARAZZI'S HAEMATOXYLIN, TOLUIDINE BLUE.

## INTRODUCTION

In order to provide the public with livestock products, there are many options for the production and breeding of rabbits, which is a rather attractive way of obtaining the required volume of meat, high quality pelts and also laboratory animals for research activities. A limiting factor in the successful development of rabbit farming in the world, and in particular in the Russian Federation, is diseases of invasive etiology. The causative agents of these diseases have evolutionarily adapted to parasitise in animals. The pathological processes recorded in parasitic diseases are influenced by certain factors,



including: the animal type, its breed, type of feeding and housing, hygiene, immune status; parasite specificity, their ability to adapt, including competitiveness through rapid reproduction rates; presence of factors causing the pathogenic properties of parasites, etc (Edwards et al., 2016).

The animal organism reacts to the penetration of the pathogen with a complex of pathophysiological and immunomorphological reactions. The defence systems of the affected organism focus on eliminating the pathogen and repairing the structural and functional damage inflicted during the infestation. The range of effects of parasites on the host is extremely wide, and often the same parasite can act in different ways. The criterion for the degree of pathogenic effect on the host is the concept of virulence (Dimitrijevic et al., 2018).

Any disease of invasive etiology causes damage to internal organs as well as to whole organ systems. Clinical and laboratory tests are carried out to determine the exposure of animals to the pathogen. In turn, an autopsy



reveals macroscopic changes to internal organs and tissues. The pathomorphological assessment also allows for analysis of the nature of changes in the damaged organs and tissues at the histological level. The results of the experiment will help to develop or adjust the directions of prevention and treatment of sick animals. In this work we considered it important to study the pathomorphological changes occurring in the small intestine of rabbits infected with protozoa of the genus Eimeria (Kuznetsov et al., 2018).

Eimeriosis is one of the main causes of stunted growth and large wasting of young farm animals, reduced live weight as well as the quality of the wool coat of adult animals. The main reason for the underproduction is the massive destruction of the cells of the intestinal mucosa, which is represented by several plates. Its epithelial plate is made up of multiple populations of diverse cells that perform specific functions. The most important of these are the caemic enterocytes, which ensure parietal digestion and absorption of nutrients into the bloodstream. It is these cells that are mainly affected by the endogenous stages of Eimeridae. The intrinsic mucosal plate forms the basis of the intestinal villi, elements that allow a significant increase in the useful area of digestion and absorption, greatly increasing the organ's efficiency in its basic functions.

Members of the Eimeria genus localise in the epithelial and intrinsic plate cells of the intestinal tube mucosa, causing catarrhal haemorrhagic enteritis, manifested by hyperemia and swelling of the mucosa, epithelial desquamation and the intestinal villi disruption. Due to the pathogenic action of the parasite, the surface of the mucous membrane of the organ is covered with a viscous, transparent mucus. Diapedesis haemorrhages occur take place. In some cases, infestations are chronic and asymptomatic, making them difficult to diagnose in a timely manner. (Kuznetsov et al. 2020) note in their work that coccidia have a significant impact on the morphobiological and immunological qualities of mucus, which is important for the vertebrate microbiota. The aim of our research was to compare the pathogenic effects of Eimeria on rabbits of different breeds.

# MATERIAL AND METHODS

Studies were conducted at the Department of Biology, Ecology and Histology, St Petersburg State University of Veterinary Medicine on rabbits of *Californian* (C), *Soviet Chinchilla* (S) and their hybrids at 30, 45 and 60 days of age. In the experiment, pairwise comparisons were made between experimental (infested) and control (intact) groups of 6 animals each: purebred C\*C, purebred S\*S, and hybrid S\*C/C\*S. On the first day after birth, the rabbits of the experimental groups were infected with different doses of oocysts (50,000, 100,000 or 200,000 per individual) of the Eimeria species *E. perforans* and *E. irresidua* (Fadunsin et al., 2017).

On days 30, 45 and 60 after infection, animals in the experimental and control groups were slaughtered to

assess the intensity of infection. Material was selected for histological examination. To determine the intensity of infestation, 3 samples of 1 gram of contents from each section of the intestine were taken and examined by the Fülleborn flotation method, using a vessel with a known surface area. After settling with a parasitological loop with a known area, six drops were taken from the surface of the suspension and transferred onto slides. Oocysts were counted in all six drops.

The arithmetic mean number in one drop was then calculated. The number of oocysts in 1 g of starting material was calculated from the ratio of the loop area to the surface area of the beaker. Histological examination of 10mm×10mm sections of the small intestine was carried out according to the protocol for making microslides. The samples were fixed in standardised 10% formalin for 2 to 4 days. Organ fragments were washed in running tap water for 1 to 2 hours before being wired in a battery of alcohol. This was followed by dewatering using a six-stage isoprep battery and a three-stage sealing in HISTOMIX paraffin medium for 20 minutes each, before being poured into the paraffin medium to form blocks. Sections 4-4.5 µm thick were made on a ROTMIC-2M rotary motorised microtome. Before staining, paraffin was removed by dissolving it in xylene and 96% ethanol for 4 minutes in each medium and washed in distilled water for 5 minutes (Mykhailiutenko et al., 2019).

Various staining methods were used to contrast endogenous stages of Eimeria in the intestinal mucosa: alcian blue and Carazzi haematoxylin; Mayer's haematoxylin and 1% alcohol eosin; Gill's haematoxylin and 1% alcohol eosin; Van Gieson picro-fuchsin; toluidine blue. Histopreparations were examined by light microscopy using MIKMED-5 optics at x10 eyepiece magnification and x40 and x100 objectives. Statistical processing of infestation intensity data was carried out with Past 3 software. The reported study was funded by RFBR project No.19-316-90059. (The reported study was funded by RFBR, project No.19-316-90059)

## **RESULTS AND DISCUSSION**

When studying the resistance of different rabbit breeds and their hybrids to experimental infection with certain doses of oocysts of Eimeria association, it was found that when infected with 50,000 oocysts, the maximum intensity of infestation one month after infection was observed in californian rabbits (21435.8±386.1 oocysts), which exceeded the animals of the hybrid and Soviet chinchilla breed groups by 15% and 9% respectively. At day 45 of infection, the highest intensity of infestation was observed in californian and hybrid rabbits, which exceeded the average of purebred Soviet chinchilla by 12% and 17% respectively. However, on day 60 of infection, the number of oocysts detected in the Californian breed was almost equal to that of the Soviet chinchilla with a difference of 398 oocysts on average, outstripping the hybrid by only 4%.

The following trend can be observed when considering

the average infestation intensity in different breed and age groups when 100,000 oocysts are infested. Animals of the Californian breed at day 30 and 45 of infection show the greatest susceptibility and parasite establishment, outperforming hybrid rabbits by an average of 20,763 oocysts and 17,859 oocysts, respectively. However, by the end of the experiment the rabbits of the hybrid breed group had the highest rate of infestation (18918.9±167.4 oocysts), 3.6% more than those of the Californian breed (18236±284.1 oocysts) (Pehlivanoglu et al., 2016).

Analysing the intensity of infestation at the maximum dose of infestation in experimental rabbits of all breed and age groups, it was found that at day 30 of infection a comparable and almost identical degree of infestation was observed. If you compare it with the Californian breed, the difference is between 3% and 5%. On day 45 of infection, the lowest intensity of infestation was found in rabbits of the hybrid group (17583.6+442.7 oocysts), yielding to purebred animals of the Soviet chinchilla by almost 16% and to the Californian by about 20%. However, at two months of age in purebred rabbits, the intensity of infestation ranged from an average of 18748.59±139.7 to 18996.6±267.8 oocysts per head. Hybrid two-month-old rabbits have the lowest rate of infestation, about 17390+80.2 oocvsts, which is 8.5% and 7.3% lower than in the California and Soviet chinchilla breeds, respectively.

Figure 1: Damage caused by endocytic stages of small intestinal mucosa (Stains: alcian blue and Carazzi's haematoxylin; magnification: x400 (A) and x1000 (B)



We have also investigated the pathomorphological changes observed in small intestinal wall lesions by endogenous stages of Eimeria association. For better visualisation of microstructures, different staining methods were tried in order to determine the most promising method

to study the pathomorphological effects of coccidia on the cellular elements of the intestinal mucosa. It was found experimentally that of the five staining methods studied, not all of them gave a complete and clear picture of the pathological changes.In our opinion, alcian blue and Carazzi's haematoxylin or toluidine blue stains are the most contrasting and facilitate the rapid detection of endocytic forms of Eimeridae. The use of alcyanine blue, on the other hand, allows the detection of secretory bokalovid cells (Figure 1).

Figure 2. Endocytic stages of Eimeria in the small intestinal mucosa (Stained with toluidine blue; magnification: x400 (A) and x1000 (B))



Merozoites, as part of the meronts, are clearly visible and easily differentiated from fibroblastic cells and nuclei of caemic enterocytes (Figure 2). When stained with Gill's haematoxylin and alcohol eosin (Figure 3) and Mayer's haematoxylin and alcohol eosin (Figure 4), the histomap is less contrasting. Merozoites within the meronte can only be differentiated by the specific shape of the parasite, while the intensity of the staining is usually hardly differentiated from the nuclei of enterocytes and fibroblasts of the mucous membrane's own plate. The least informative, in our opinion, is Van Gieson staining (Figure 5) (Sidorenko et al., 2020).

As can be seen in Figure 5, there is no contrast: the cell nuclei differ faintly in colour from the cytoplasm and it becomes very difficult to detect merozoites within the meronts. The small intestine wall of the experimental animals retains its typical structure.

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Figure 3. Damage caused by endocytic stages of Eimeria in the epithelial plate of the small intestinal mucosa (Staining: Gill's haematoxylin and 1% alcohol eosin; magnification: x400 (A) and x1000 (B)



Figure 4. Damage caused by endocytic stages of Eimeria in the epithelial and intrinsic plate of the small intestinal mucosa (Staining: Mayer's haematoxylin and 1% alcohol eosin; magnification: x400 (A) and x1000 (B)



Figure 5. Damage caused by endocytic stages of Eimeridae in

epithelial and intrinsic mucosal plate of the small intestine (Stains: Perls van Gieson; magnification: x400 (A) and x1000 (B))



Enterocytes of the apical part of some villi show signs of intracellular edema accompanied by fusion of cell borders, moderate lucidity of the cytoplasm and nucleus, and smoothing of the chromatin pattern. There is often an increase in secreted bocalytic cell activity in the form of increased intracellular vacuole size.

Intracellular large-volume vacuolisation of other enterocytes is not uncommon, mainly on the basal pole side of the enterocytes. In addition, parasitiform vacuoles formed by eimeria are found in the structure of the mucosa. At the basal lamina level, multiple small to medium-sized cavities can be observed in the structure of many villi, which may indicate subepithelial oedema. The stromal part of the intestinal villi sometimes shows a similar pathological pattern. The mucosa is diffusely infiltrated with small lymphocytes, which subepithelially form linear dense clusters (Sokół et al., 2014).

## CONCLUSION

When determining the intensity of infestation in different breed and age groups, it was found that Californian animals were most susceptible to infestation by E. perforans and E. irresidua oocysts, regardless of the dose of infestation. The histological examination of the small intestine of infected rabbits of experimental breed-age groups revealed that despite the absence of any clinical manifestations, damage to the epithelial plate of the small intestine mucosa was found in the epithelial plate of the intestinal villi as well as significant damage in the intrinsic plate of the mucosa, which are most effectively revealed by staining with alcyan blue and Carazzi hematoxylin and toluidine blue.

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# Factors Determining Well known Status for a Trademark: A Study in Indian Context

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## ABSTRACT

The term 'Well-known trademark" had been in use since 1925 with incorporation of Art 6bis in the Paris Convention and its subsequent affirmation in TRIPS. The Indian Trademark Act defined this term taking the colour of TRIPS provision and provided the Registrar to decide the status of well-known. An analytical and descriptive study was undertaken to look upon the factors which are considered towards determining the status of well-known. The case study method in doctrinal form and court case judgements are adopted by the author for this study. The purpose of this study is to investigate and find out the relevant determining factors and the position of the Registrar. This study is useful for the researchers and lawyers dealing with trademarks especially well-known.

**KEY WORDS:** WELL-KNOWN TRADEMARK, PARIS CONVENTION, SPECIAL PROTECTION, RELEVANT SECTION OF PEOPLE.

## **INTRODUCTION**

The special status to famous marks was instigated through Art. 6bis of Paris Convention and subsequently by Art. 16(2) & 16(3) of the TRIPS Agreement. Pursuant to this inclusion, the member countries that have subsequently ratified the convention have incorporated the provisions in line with the international instrument to their domestic legislation about a trademark which have attained suitable reputation. These provisions provide much higher protection to such trademarks. Apart from that, not defining 'well known' in both the Conventions has resulted in different interpretations of the word ' wellknown' causing variation of its meaning from country to country or jurisdiction to jurisdiction. The determinative test to assist right holders or even courts is also not provided and this is the reason why the application of well-known trademark varies around the world.

Achieving the tag of 'well-known' to a given trademark indicates attainment of reputation and goodwill in this current competitive market. Hence towards its protection

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the traditional requirements like confusion and deception has shifted from primary to secondary consideration. A considerable sum of money, effort and resources are being utilized by the entrepreneurs and MNCs of a trademark to keep their brand reputation and popularity in this globalized market and even to make it famous. Additionally, consumers are also to be protected from confusion and deception in the market.

**Need of Protection of Wellknown Trademark:** Being incorporated into the International instruments, well-known trademarks become a worldwide phenomenon and consequently requirement of its protection increased. On achieving the status of 'well known' the mark gets special protection and consideration not in any specific country but on international level as it has a worldwide connotation. Generally three levels of protections are given to well-known trademarks. The major rights given to this kind of trademark are opposing the registration of a similar or offending marks, rectification of trademark register and also its removal in case of similar marks. The other right is to restrain others to use it through an action of passing off and infringement proceedings against use of confusingly similar marks (Cook 2009).

The main aim of formulation of trademark laws and other related regulations is to provide clear identification with respect to origin of the goods or services as the consumer protection and prevention of confusion is at the root of


such laws. The following are reasons for the protection of Well-known trademark:-

- To protect the interest of consumers as to identify the actual source of origin of a well-known trademark.
- Applying a mark similar to well-known trademark, will lead to mislead the consumers and defeat the very purpose of trademark law.

This concept will surely be proved to be a useful tool against trademark pirates who conspiring to adopt a similar trade mark to well-known trademark on his goods and services (Rastogi et al., 2020).

Wellknown Trademark in India: Being a member of the Paris convention, India has incorporated the provision mentioned in the convention into its domestic legislation and well-known trademark got prominence over all other ordinary trademark. The term "well-known trademark" was first inserted in the Paris Convention with the insertion of Art 6bis in its Revision conference at Hague. Additionally, special treatment was also provided to well-known trademarks by TRIPS. Influenced by TRIPS, the Indian trademark Act provided a special definition of well-known trademark towards fulfilment of its obligation in line with this convention. The definition imbedded into the Indian trademark legislation includes goods as well as services. On analysis of the definition it can be said that a mark can be categorised as well-known which become so popular to the substantial segment of people who generally uses that trademark on goods or they enjoy services if the trademark is related to services (Mostert 1997; Carvalho 2006).

In absence of a statutory definition acquisition of reputation depends upon the usage of a particular goods or services in connection with business. However, the reputation of an entity may be limited to particular region or locality where it conducts the business and no need to be extended throughout the country.In India the expression 'well-known' has mostly been used by the Courts, Authors and other experts as a matter of ordinary English usage, to refer to a trade mark which was comparatively better known amongst the traders or consumers. An extraordinary protection with respect to well-known trademark in India has been accorded by the Trademark Act against misuse of well-known trademark and acceptability for registration of identical or deceptively similar mark. Such special protection is also accorded through the judicial interpretation and pronouncement in cases involved such issue in India.

India has incorporated all the rights envisaged for wellknown trademarks prospectively into its new legislation. A comprehensive list of around ninety seven trademark which are decided and declared as well known by judicial , quasi-judicial and regulatory bodies are uploaded on the website of the registrar of Indian Trademark. The 1999 Act has specifically divided or classified trademark into two types namely (a) General Trademarks and (b) Wellknown trademarks with the method of identification as well-known. Apart from these provisions, some factors are also available in the Act which deals with issues related to protection of well-known trademark. It is to be noted that all rights of an ordinary trademark are also available to well-known trademark in addition to enjoy the rights of common law under the law of passing off. With registration as a well-known trademark in India, it will enjoy all the rights of registered as well as unregistered trademark in India (Klimkeviciute 2010).

Wellknownn Trademark Under new Definition: Matter related to trademark whether it is gualified or eligible to become a well-known trademark will be decided by the Registrar of trademark as mandated by the law taking into consideration of various facts under the principal established by rules. Some substantive matters are stated in section 11(6) to (9) which is required to be kept into consideration by the registrar while determining whether it is well known or not. The registrar is also empowered and authorised by section 11(6) to keep into consideration any other fact which is relevant towards its determination. It states specific things in sub clause (v). The most important prescription in relation to such determination process is mentioned on Section 11(9). It lists out factors which need not to be considered determinative in relation to well-known trademark by the registrar (Mostert 1997; Dhadwad 2018).

It can be refer as 'No factors', as it would be established that the larger protection extended to well-known marks is in fact a protection to globe-trotting international trademark. In determining well-known status, the opinion and interpretation of court is also relevant and important. The facts would be examined by the court that the mark is well-known, keeping in mind the factors emanating from the definition under the section 2(1)(zg). In addition, the court shall also take into account the matter which the Registrar is mandated under Section 11(6) and 11(7). When a court is of the opinion that the mark does not deserve protection under the head of wellknown trademark, it will so declared by it.

**Factors Determining Well Known Status:** Indian trademark Act gives blanket powers to Registrar to decide and determine any trademark as well-known and to provide a better recognition and protection. The Act seeks to give sufficient guidelines to the Registrar as to 'facts which he should consider relevant' or, which the registrar may look into. He should look into the following conditions:-

- Whether a relevant section of public aware about such trademark or having knowledge of the same.
- The extent and duration of the use of such trademark by the people of such relevant section and also the geographical area of the use of such trademarks.
- The level of promotional activities and advertisement by the companies with respect to such trademark.
- The extent of exposure and promotion of the goods with which such trademark is affixed in any fair or exhibition by the owner.
- The level of registration and publication of goods

where such trademark is attached and the area of geographical location under the Trademark Act.

- Any right successfully enforced by a competent court in any matter involving well-known trademark.
- The level of recognition and preferences given by any court or registrar with respect to such well-known trademark.

Language used by this provision in the Trademark Act is self-explanatory. It directs the registrar to look upon the use, promotion, registration, publication and enforcement of such trademark, the status of which as to a well-known is in question. The method of looking at all of the above is to see the period of its use, the level of its use and the physical geographical area where it has been used. Similarly, all other factors can be multiplied by duration, extent and geographical spread, which would give us the operations of the trademark.

With the direction to look at 'duration', it appears that comparably newer trademarks may not be given the status of well-known trademarks. The more the promotion, more is the likelihood of becoming a well-known trademark. The statistics and evidence of presentation in any fairs/exhibition will be necessitated. The more the number of countries of registration, the more the likelihood of being a well-known trademark. Out of the facts listed above, the most important and relevant fact will be the awareness and knowledge of such marks over a relevant group or section of the public. The crucial factor which gets primacy over other factors is the knowledge of the trademark and also recognition of it among the people. If a trademark does not enjoy large volume of sales but is known and recognised in the market to a considerable extent, it might be awarded the status of well known. The registrar is also mandated to check the extent of advertisement, marketing and publicity engaged with such trademark towards such determination.

Whether a trademark which is famous in India only, be called a well-known trademark is an unanswerable question. The words 'including knowledge in India' indicates that, it will be essential for a trademark to become well known that there is an existing knowledge of it among people not in India but also among other jurisdictions in the world. The registrar is enjoined the primacy on the word "the knowledge of the trade mark in the relevant section of the public, including knowledge in India as a result of promotion of trademark". The method of determining the extent of knowledge about such trademark and recognition of it among people has been elaborately discussed in the Act. The following factors are to be taken into consideration:-

- 1. Total number of actual and potential consumers those are using the goods or services where such trademark is attached.
- 2. Involvement of number of people in the channel of distribution process of the goods or services whether such trademark is attached.
- 3. The size of business and its expansion and reach

which is manufacturing the goods or involved in services where such trademark is attached and its reach among people or consumers.

In trade circle and channel, manufacturing and dealing with goods where such trademark is attached and the consumers which are the ultimate user of such goods are proved to be very prominent and determinative factor. If a trademark enjoys very large quantum of sales or has an international sale network of licensees or franchisees or other stockists, it can be categorised as well-known trademark. Even without advertisement or publicity, if it is recognised or known by sale force of trade channels, still it could be determined or categorised as well-known trademark.Thus, knowledge and recognition are more relevant.

Larger the sale-network, business circle, trade channels, persuaders and the consumers, greater scope for recognition by the people and consequently determination by the Registrar as a well-known trademark. Apart from that, trademark Act directs the trademark Registrar to take consideration of the prior and quantum of use of such trademark among a geographical area or specific territory where the goods or services are being used. While looking on promotional aspect of trademark, the process of advertisement and publicity, its duration, extent and geographical area are all considered. Promotional techniques adopted by the proprietors of such goods may also be considered as most important factors for ascertaining and acknowledging the status of well-known for those trademarks. Lately in India, the advertisement has been considered equivalent to use of the trademark by courts, which has been given statutory recognition.

Presentation of the trademark and its exposure at any fairs or exhibition of the product or service at which such trademark is applied is also an important factor for determining the status of well-known. Presentation for registration in jurisdictions or publication for registrations are to be given due weight as under the Act by the determining authority and registrar. Section 11(6) sub clause (v) speaks about the enforcement of such right by any court of competent jurisdiction in matters or cases where the validity is challenged and also the decision of registrar towards enforcement of trademark is also an important determinative factor. While taking cognisance of the trans-border reputation by courts, it would be taken notice of the fact, that the trademark got the status of well-known by other authorities or the Courts. Here the term 'other authorities' means the authority other than the Registrar and the Courts in India. The Courts and other authorities of foreign country are considered to be the 'other authority' in this context.

Although, apart from these provisions, other factors are also assessed while determining a mark as well-known trademark. Whether a trademark has got reputation and subsequently the status of well-known is a question of fact. Each case will be treated and looked distinctively depends upon the facts and circumstances of the case.

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Various other factors like variations among industries, product and services including the national market complexity will also be taken into consideration at the time of decision making. No single factor can be determinative. It depends upon the circumstances of a given case that which of the factor may be given more importance. The strong evidence may sometimes replace and gets priority over weak evidence. The situation which emerges from totality of evidence is determinative of the fact that a trademark is having goodwill/ reputation or not. The Court would sometimes be willing to take judicial notice of the fact that the given trademark is famous or well-known among other jurisdictions or territorial areas.

**Courts Determining the Status as Well-Known Trademark:** There have been few cases in which the courts have made a determination as to achieving the status of 'well-known'. There are some other cases which have dwelt on the meaning of words used in section 29(4) differently. In Kalpataru case S.J Vazirdar, Justice has held that plaintiff's trademark "KALPA-TARU" written in a stylized manner since 1977 is a well-known trademark. There were also separate registrations of the 'Kalpataru device mark' a tree and below the tree the words "KALPA-TARU" written in respect of the goods under classes 16 and 19. There was registration of Kalpataru device mark in class 36 in respect of insurance, real estate affairs and in respect of class 37 with respect to construction of building and its repair and even installation.

The court looking at the largeness of the Kalpataru group involving variety of commercial activities, large scale development of properties, the advertisements, providing various services including BPOs, IT, Malls, Hospitals and Industrial Organisations, having large business income using the said trademark, declared such trademark as well-known. It also gets significance that the word "Kalpataru" forms a part of its corporate name and also of several other group of companies and firms involved in a variety of commercial activities with the organisation through this trademark. By reason of this determination, the Court declared the trademark "Kalpataru" eligible for enlarged protection with respect to even different products or services. Resultantly an injunction was issued against the defendants.

In another case, where the trademark 'Ananda' was registered in connection with services in class 42 of health resorts, hotels and spas and also in class 3,5,21 and 30 desired to restrain the defendant from using trademark "Parkview Ananada" for residential projects the court said the trademark could not be held to be a well-known. The Court has considered the duration for the use of such trademark by the plaintiff, the extent of services being provided by it, the expenditure it had incurred in advertising and promoting its services, the geographical area where spas were being run, the volume of the business and many more. The Court continued that "Ananda" has not come to be associated with the plaintiff company to such an extent that any product sold or any services offered using the word "Ananda" either alone or in conjunction with other words would connote the connected product and services of the plaintiff company. Thus the plaintiff cannot be accorded protection across different goods or services and the court did not granted any injunction against the defendant. As it does not qualify for such protection, thus the Court implicitly has started confining the scope of section 29(4) to well-known registered trademarks.

An unregistered trademark can be a well-known even under the Indian trade mark Act 1999. However, an unregistered or a non-used well-known trademark would have to follow passing off route when it seeks to enforce rights with respect to all similar and dissimilar products or services as section 29 enumerates regarding registered trademarks. In one of a landmark case the Delhi High Court held that the long and un-interrupted use of the registered trademark by the plaintiff leads to the conclusion that the trademark has got the status of well-known within the meaning of the Trademark Act and hence the plaintiff is entitled to relief. A few cases have been decided wherein the relief has been given even for dissimilar goods or services. Courts have displayed a tendency that immediately after getting status of well-known trademark, relief will be given and the reputation is accepted, provided the parties file their papers in support of their claim. The courts in Tata Sons case restrining the defendants from using "TATA" in vehicular business by using it on batteries.

In India, primarily the provision mentioned in section 11(6) to section 11(8) would be basically used as important factor towards determination whether a trademark is a well-known trademark or not. As the test in 1999 Act is drawn from an international instrument knowing the practices in relation to determination of the status of well-known would be useful. Practice adopted by various countries, report of WIPO's committee of experts on subject matter and the INTA resolution done in September 1996 set forth some guidelines towards determination of trademarks as well-known trademark. The analysis of Frederick W. Mostert for determining well-known status of a trademark is adopted under Indian legislation.

Degree of Recognition of the Mark: To prove the recognition of a trademark as well-known the best evidence will be represented by potential licensees, manufacturers, distributors of goods of such trademark, import, and export and used by the consumers of the particular goods. The survey evidence in India is not permissible under the 1999 Act. Earlier the British courts did not encourage survey evidence. It appears now that survey shall be vital factor to establish the awareness of the public towards determination of a trademark as wellknown. The registry office of trademark has prepared a manual called Draft Trademark Manual indicating the important factors for determination of well-known trademark. The additional factors among others can also be used in assessing the extent of recognition and knowledge acquired by such trademark. These factors are as follows:-

- 1. Knowledge in public through promotion: It is to be noted that the acknowledgement and knowledge of a trademark among public those who are using it is most important factor considered in determining status of trademark as well-known. The Act said that the knowledge of trademark should be on "relevant section of people" but it is not describing it and it is a question of fact that will be decided by the court based on case to case. Notwithstanding the same, the degree and extent of promotion of trademark is very important in deciding the status of trademark as well-known.
- 2. Quantum of the use of trademark: In getting the reputation and fame for a trademark the market access share, and volume of sale is also an important factor. This factor will also be given prominence while determining the status of well-known.
- **3.** Role of publicity and advertisement: It is worthwhile to say that a trademark can become famous in a very short time using advance and modern advertising technology. With continued utilization of resources, time and effort there is always a chance of getting the status of well-known.
- 4. The extent of recognition through advertisement and registration on any geographical area: This is the other factor which required consideration while deciding such trademark as well-known. The level of recognition will be determined by its use, advertisement by the manufacturing or advertising company among a definite or extended geographical area. This is incorporated in Section 11(6).
- 5. Extent of successful enforcement of rights by Court or Registrar: The extent of recognition and protection offered by judiciary while dealing with the case where such issues related to reputation is also an important factor towards its recognition. Apart, the extent of recognition given by registrar at the time when an application preferred to registrar for registration is also a relevant factor in deciding the degree of recognition as well-known.

**Rights Conferred on Wellknown Trademark:** There are generally some rights given to any trade mark including well known trademarks. It has also been seen in the Act that a trademark which have not even used or have reputation in India can also be awarded the status and designated as a well-known trademark. Now a day, the concept of trans-border reputation has been validated by the Indian courts and the foreign marks are not getting the status of well-known in India. The rights given to well-known trademarks are:-

1. Right to opposition of registration: It is a fact that a trademark having the status of well-known will enjoy all the rights of ordinary trademark in addition to its own. The Act has made provisions for extension of the coverage of goods and services to even dissimilar goods and services in connection with well-known trademark. It is a fact that all trademarks having a level of recognition and reputation will only get the status of well-known but it is not necessary that

such reputation should be in India as per Indian Act. The owner of a well-known trademark will then necessarily oppose the registration of a trademark similar to or deceptively similar to his trademark even without any reputation in India.

- 2. Right to rectification or removal: The next important right of the owner or holder of a wellknown trademark is the removal of the trademark from register; rectify the register of trademark in relation to such a similar marks or deceptively similar marks.
- 3. **Right to restrain infringement:** The most important right of the owner or holder of well-known trademark is to restrain others through infringement proceedings or action of passing off for use of a similar trademark or deceptively similar trademarks. There is a specific mention in this Act that it qualifies a trademark for opposition against a later trademark even having no reputation in India as there is not a necessity of domestic reputation to qualify a test for the status of well-known. Further, the protection to unregistered trademarks in Section 11(3) by way of right to oppose registration satisfies the provision of the Paris Convention extending special recognition to unregistered well-known trademarks without use for a period of 05 years.

# CONCLUSION

The special status to famous marks was instigated through Paris Convention and subsequently by the TRIPS Agreement. Pursuant to this inclusion, the member countries that have subsequently ratified the convention have incorporated the provisions in line with the international instrument to their domestic legislation about a trademark which have attained suitable reputation. These provisions provide much higher protection to such trademarks. Apart from that, not defining 'well-known' in both the Conventions has resulted in different interpretations of the word 'wellknown' causing variation of its meaning from country to country or jurisdiction to jurisdiction.

Being incorporated into the International instruments. well-known trademarks become a worldwide phenomenon and consequently requirement of its protection increased. On achieving the status of 'well-known' the trademark gets special protection and consideration not in any specific country but on international level as it has a worldwide connotation. The major rights given to this kind of trademark are opposing the registration of a similar or offending trademarks, rectification of trademark register and also its removal in case of similar trademarks. The other right was to restrain others to use it through an action of passing off, infringement proceedings against use of confusingly similar marks. Being a member of the Paris convention, India has incorporated the provision mentioned in the convention into its domestic legislation and well-known trademark got prominence over all other ordinary trademark. Indian Trademark Act gives blanket powers to Registrar to decide and determine any trademark as well-known

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and to provide a better recognition and protection. The Act seeks to give sufficient guidelines to the Registrar as to 'facts which he should consider relevant' or which the registrar may look into at the time of determination of such trademark. The language of the provisions in the Act is self-explanatory. It directs the registrar to look to the use, promotion, registration, publication and enforcement of the trademark, the status of which as to a well-known mark is in question. The method of looking at all of the above is to see the period and level of use among a geographical area. In the same manner all other factors can be multiplied by duration, extent and geographical spread, which would give us the operations of the trademark.

If a trademark enjoys very large sales, has an international sale network of licensees or franchisees or other stockists, it can be a well-known trademark. Even without advertisement and publicity, a trademark if it recognised or known by sales force of trade channels, still it could be a well-known mark. There are generally some rights given to any trademark including well-known trademarks. It has also been seen in Section 11(6) to Section 11(9) that a trademark who even does not having goodwill and uses in India can also be designated as a well-known trademark. Presently Indian Courts have started validating the foreign mark as reputation in India by the principal of trans-border reputation.

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Supra note 12, s. 11(7). It says that The Registrar shall, while determining as to whether a trade mark is known or recognised in a relevant section of the public for the purposes of sub-section(6).

Supra note 12, s. 11(6), ss(i), reads as The Registrar shall, while determining whether a trade mark is a wellknown trademark, take into account any fact which he considers relevant for determining a trademark as a well-known trademark including the knowledge or recognition of that trademark in the relevant section of the public including knowledge in India obtained as a result of promotion of the trade mark."

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# **Prevalence and Perceived Causes of Nutritional Anemia Among Adolescent Girls**

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### ABSTRACT

Nutritional anemia is a disorder that cause due to a lack of one or more vital nutrients, such as iron, protein, vitamin B12, and other vitamins and minerals. The hemoglobin content in the blood is lower than usual. 1. To assess the prevalence of nutritional anemia among adolescent girls. 2. To assess perceived causes of nutritional anemia among adolescent girls. 3. To associate the demographic variable with prevalence and perceived causes of nutritional anemia among adolescent girls. A cross sectional study was conducted among adolescent girls were age of 10 to 15 years, the sample size can be calculated statistically by using the prevalence of previous studies and the sample size was 220 adolescent girls selected in a particular community area from Wardha district. Ethical approval was obtained from IEC, DMIMS (DMIMS (DU)/ IEC/Aug-2019/8685). The sample collection was done by using non-probability convenience sampling. The portable hemoglobinometer (Accusure HB meter) used for analyzing the Hb level and structure questionnaire scale was formulated on the based on the causes behind the nutritional anemia. Prevalence of nutritional anemia among adolescent girls was found 56.4%.Within that 17.3% of them had mild anemia, 35.5% of them had moderate anemia and 3.6% of them had severe anemia. The perceived causes of nutritional anemia was found, 4.03% of adolescent girls have genetic history of any type of anemia, 9.68% of them had a history of heavy menstrual flow, 10.48% of them were suffering from chronic disease in past or more than 3 months in the recent year time, 91.94% of them think that they are taken inadequate intake of iron in the food, 0.81 % had a hookworm infection, 25% of them replied that drink coffee or tea will decrease iron absorption, 89.52% of them take diet low in fruits, vegetable and cereals, 38.71% of the adolescent girls always eat overcooked food, 4.84% of them take any type of medicine and 19.35% of the adolescent girls eat junk food. Conclusion: This study finding shows that the demographic variables is shows significant association between the prevalence of nutritional anemia with educational status of caretakers. In association with the perceived causes of nutritional anemia shows significant association with type of diet.

KEY WORDS: PREVALENCE, PERCEIVED CAUSES, NUTRITIONAL ANEMIA, ADOLESCENT GIRLS.

# INTRODUCTION

Nutritional anemia is a disorder that cause due to a lack of one or more vital nutrients, such as iron, proteins, vitamin B12 and other vitamins and minerals. The hemoglobin content in the blood is lower than usual.1 All pathological conditions in which the concentration of



blood hemoglobin falls to an abnormally low level due to the deficiency of one or more nutrients are described by the word nutritional anemia. Iron, folic acid, and vitamin B12 are the principal elements needed in hemoglobin synthesis.2 Nutritional anemia in children has been shown to be associated with decreased emotional, physical and cognitive health and is a potential cause for maternal mortality rates.3 Anemia is characterized by hemoglobin (Hb) levels of < 12.0 g/dL in women and < 13.0 g/dL in men, according to the World Health Organization.4 Anemia is a major global health issue, particularly in developing countries.

This basic health problem is yet to be resolved, and it threatens to impact the health, quality of life, and working capability of billions of people worldwide.5 Anemia



impacts 1.62 billion people worldwide. This gap has been filled by the WHO Global Database on Anemia, data from 93 different countries, In the case of preschoolage children, data from as many as 76 percent of the population was analyzed and used to create statistical models to produce national prevalence estimates for countries. The highest prevalence is 47.4 percent in preschool-aged girls, and the lowest prevalence is 12.7 percent in adults. Non-pregnant women, on the other hand are the demographic group with the largest number of people affected (Cappellini 2015).

6 As compared to other developing countries, the prevalence of anemia in all classes is higher in India. Anemia affects in India around 50% of the population. As more women are affected by it than men, the issue becomes more severe. It is reported that about 20 percent to 40 percent of maternal deaths in India are due to anemia, and some form of anemia affects one in every two Indian women (56 percent). Anemia in females is characterized as less than 12 g/dL hemoglobin. Mild anemia is characterized as a level of 10-11.9 g/dL of hemoglobin, moderate anemia as a level of 7-9.9 g/dL of hemoglobin, and extreme anemia as a level of less than 7 g/dL of hemoglobin among women. Studies by the Indian Council of Medical Research (ICMR) and the District Level Household Survey (DLHS) have shown that the prevalence of anemia in pre-school infants, pregnant and lactating mothers, and teenage girls is very high (ranging from 80->90%).

In particular, low birth weight babies, young children and women of childbearing age are at risk for anemia. This is how anemia starts in infancy, worsens in girls during puberty, and gets worse during pregnancy. In India, teenage girls, who make up a significant segment of the population, are a vulnerable group at higher risk of morbidity and mortality. Due to increased demand for iron for hemoglobin, myoglobin and to make up for iron loss due to menstruation and poor dietary habits. Teenage girls are especially vulnerable to iron deficiency anaemia.7 The rapid physical, psychological and cognitive growth defines the adolescent phase. In the human lifespan, adolescent age is a vulnerable time for the development of anemia. Adolescents cover almost one tenth of the population in India and constitute a vital sector of the population in society (Benoist et al., 2005).

Present and future well-being of the adolescent can depend on their current nutritional status. The teenage age is the important years of growth, anemia has some long-term effects at this stage of life, such as growth retardation, poorer academic results, decreased immunity, irregular menstrual cycles, and later poor birth complications such as intrauterine growth restriction, birth defects, increased perinatal morbidity, and mortality. The most common nutritional condition globally is anemia. Because of the requirements for rapid growth and menstrual blood loss, anemia is normal in teenage girls. The WHO reports shows the prevalence of anemia among teenage girls in developing countries at 27 percent and in developed countries at 6 percent.

#### **Objectives of the Study**

- 1. To assess the prevalence of nutritional anemia among adolescent girls.
- 2. To assess the perceived causes of nutritional anemia among adolescent girls.
- 3. To associate the demographic variable with prevalence and perceived causes of nutritional anemia among adolescent girls.

# **MATERIAL AND METHODS**

A cross sectional study was conducted among adolescent girls were age of 10 to15 years, the sample size can be calculated statistically by using the prevalence of previous studies and the sample size was 220 adolescent girls selected in a particular community area from Wardha district. Ethical approval was obtained from IEC, DMIMS (DMIMS (DU)/IEC/Aug-2019/8685). The sample collection was done by using non-probability convenience sampling. The portable hemoglobinometer (Accusure HB meter) used for analyzing the Hb level and structure questionnaire scale was formulated on the based on the causes behind the nutritional anemia. The investigator inspect the selected community in the Wardha district and received the permission needed from the authorities concerned (Chaudhary & Dhage 2008).

In order to ensure better cooperation during the data collection, the investigator introduced herself and told them about the purpose of the research. The investigator approached the adolescent girls from age between 10-15 years in selected community and explained the purpose of the study and explain how it will be beneficial for them. The investigator took the consent from individual adolescent girls for the study. The investigator personally visited each adolescent girls, and provide orientation about the study and also administered structured questionnaire to them. Investigator instructed them not to interact with each other, doubts were clarified. A good rapport was maintained. On the first day, each participant was given a questionnaire. The questionnaire were collected soon after it was filled up. On the same day the Hb estimation was done by using portable Hemoglobinometer. After that those girls found anemic fill the structured questionnaire regarding perceived causes of nutritional anemia and collect all the forms. Given a health education Regarding Diet.

**Statistical Analysis:** The descriptive and inferential statistics was done by using SPSS 23 software. A master sheet will be prepared by the investigator to measure the data. Using frequency and percentage, baseline Performa containing sample characteristics was analyzed. Prevalence of nutritional anemia among adolescent girls, demographic variable, perceived causes of nutritional anemia can calculated by using mean, mean percentage and standard deviation. The

significance of the variance between the prevalence of nutritional anemia and demographical variables were calculated using "t" test. The significance of the variance between the prevalence and perceived causes of nutritional anemia were calculated using "t" test. The correlation between prevalence of nutritional anemia and demographical variables were determined by ANOVA and unpaired "t" test.

## **RESULTS AND DISCUSSION**

Percentage wise distribution of adolescent girls according to their demographic characteristics. The above table no.1 shows that total 15.50% of the adolescent girls were of 10 years, each 12.70% were of 11 years and 13 years, 15.90% were of 12 years, 19.50% of 14 years and 23.70% of adolescent girls were of 15 years of age. Among all adolescent girls 28.20% of the adolescent girls were educated upto 4-5th standard, 27.70% upto 6-7th standard, 41.40% of them were educated upto 8-9th standard and 2.70% of the adolescent girls were educated upto 10th standard. Minority 0.50% of the caretakers of adolescent girls were illiterate, 10% of them were educated upto primary standard, 12.30% of them were educated upto secondary standard, 23.20% of them were educated upto SSC, 24.40% of them were educated upto HSC, 19.10% of them were upto under graduation and 10.50% of the adolescent girls were educated upto graduation and above.

Out of 220, 52.30% of the adolescent girls were having monthly family income of 5001-10000 Rs, 37.20% were having between 10001-15000 Rs, 8.20% were having monthly family income of 15001-20000 Rs and only 2.30% of the adolescent girls were having monthly family income of 20001 Rs and above. 50% of the adolescent girls were from joint families, 46.40% of them were from nuclear families and 3.60% of them were from extended families. 35% of the adolescent girls were vegetarian, no one is non-vegetarian.

**Assessment with prevalence of nutritional anemia:** The above table no.2 and figure no.1 shows that 43.6% of adolescent girls had no anemia, 17.3% of them had mild anemia, 35.5% of them had moderate anemia and 3.6% of them had severe anemia. Overall prevalence was 56.4%.

Assessment with perceived causes of nutritional anemia among those adolescent girls are anemic: The above table no.3 and figure no.2 shows that 4.03% of adolescent girls have genetic history of any type of anemia, 9.68% of them had a history of heavy menstrual flow, 10.48% of them were suffering from chronic disease in past or more than 3 months in the recent year time, 91.94% of them think that you have taken inadequate intake of iron in the food, 0.81% had a hookworm infection, 25% of them replied that drink coffee or tea will decrease iron absorption, 89.52% of them take diet low in fruits, vegetable and cereals, 38.71% of the adolescent girls always eat overcooked food, 4.84% of them take any

Table 1. Percentage wise distribution of adolescent girls	
according to their demographic characteristics.	

Demographic	No. of	Percentage
Variables	adolescent	(%)
	girls	
Age(yrs)		
10 yrs	34	15.5
11 yrs	28	12.7
12 yrs	35	15.9
13 yrs	28	12.7
14 yrs	43	19.5
15 yrs	52	23.7
Education of adolescent girls		
4-5thstd	62	28.2
6-7thstd	61	27.7
8-9thstd	91	41.4
10thstd	6	2.7
Education of caretakers		
Illiterate	1	0.5
Primary	22	10.0
Secondary	27	12.3
SSC	51	23.2
HSC	54	24.4
Undergraduate	42	19.1
Graduate and above	23	10.5
Monthly family income(Rs)		
5001-10000 Rs	115	52.3
10001-15000 Rs	82	37.2
15001-20000 Rs	18	8.2
20001 Rs and above	5	2.3
Type of family		
Joint	110	50.0
Nuclear	102	46.4
Extended	8	3.6
Type of diet		
Vegetarian	77	35.0
Non Vegetarian	143	65.0
Mixed	0	0.0

type of medicine and 19.35% of the adolescent girls eat junk food. Association of prevalence of nutritional anemia among adolescent girls

This table no.4 shows the association of prevalence of nutritional anemia with demographic variable of adolescent girls. There is significant association with educational level of caretakers of adolescent girls. The tabulated ' $\aleph$ 2' values was 28.87 (df=18) which is much less than the calculated ' $\aleph$ 2' i.e. 72.73 at 5% level of significance. Also the calculated 'p'=0.0001 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that educational

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This table no.4 shows the association of prevalence of nutritional anemia with demographic variable of adolescent girls. There is significant association with educational level of caretakers of adolescent girls. The tabulated ' $\aleph$ 2' values was 28.87 (df=18) which is much less than the calculated ' $\aleph$ 2' i.e. 72.73 at 5% level of significance. Also the calculated 'p'=0.0001 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that educational level of caretakers of adolescent girls is statistically associated with prevalence of nutritional anemia.

Table 2. Assessment with prevalence of nutritional anemia							
Prevalence of	Score Range	ore Range Level of perception Scor					
nutritional anemia		No of adolescent girls	Percentage				
No anemia	<12 gm/dl	96	43.6				
Mild anemia	11-11.9 gm/dl	38	17.3				
Moderate anemia	8-10.9 gm/dl	78	35.5				
Severe anemia	<8 gm/dl	8	3.6				
Total	220	100					





Figure 2: Assessment with perceived causes of nutritional anemia among those adolescent girls are anemic



Association of perceived causes of nutritional anemia among adolescent girls: This table no.5 shows the association of perceived causes of nutritional anemia with demographic variable of adolescent girls. There is significant association of perceived causes of nutritional anemia with type of diet of adolescent girls. The tabulated 'F' values was 1.98 (df=122) which is much less than the calculated 'F' i.e. 2.14 at 5% level of significance. Also the calculated 'p'=0.034 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that type of diet of adolescent

girls is statistically associated with perceived causes of nutritional anemia (Meenal et al., 2012).

The study was conducted to assess the prevalence and perceived causes of nutritional anemia among adolescent girls, the study was conducted among 220 adolescent girls in selected community area. In this study cross sectional survey design adopted. Hb estimation done by portable hemoglobinometer (Accusure HB meter) and interpretation done on WHO cut off value. Mild anemia >11gm/dl to <11.9gm/dl, moderate anemia >8gm/dl to <10.9gm/dl and severe anemia < 8gm/dl. Out of 220 adolescent girls that 43.6% of adolescent girls had no anemia, 17.3% of them had mild anemia, 35.5% of them had moderate anemia and 3.6% of them had severe anemia among adolescent girls was 56.4% (Khokhar 2012 & Kotecha 2011).

A similar cross-sectional study was conducted in western Maharashtra among 300 female students those studying at a health institute in western Maharashtra Their general information, knowledge about anemia signs and symptoms, and dietary patterns are all elicited using a standardized questionnaire. Using the spectroscopy process, each participant's basal metabolic index and hemoglobin are calculated. The result showing anemia rate of 86 percent (28.6 percent), according to the severity of anemia, approximately 54 (18%) had mild anemia and 32 (10.6%) had severe anemia (Mayura et al., 2014).

Another similar study done to assess the prevalence of anemia in girls who live in urban slum at Jaitala, Nagpur from 2009 June to 2010 February. The participants are the 272 adolescent girl's age between 10 to 19 years. The prevalence of anemia is found 90.1% in girls. 88.6 per cent of the majority of girls had mild to moderate anemia and just 1.5 per cent of girls were seriously anemic. Overall mean hemoglobin level was  $10.33\pm1.34.10$  Prevalence of anemia associate with education of caretaker. This present study show the association between the prevalence of nutritional anemia of adolescent girls with education of caretaker were significant i.e. p = 0.0001. Hence it is interpreted that there was significant association with education of

caretaker which explains its higher prevalence in high educated family (Melwani et al., 2018).

Table 2. Association of prevalence of nutritional anemia among adolescent girls n=220																	
Demogr aphic variable s	Frequ ency	No Anemia	Mild anemia	Modera	Severe anemia	K2-value	df	K2- tab	p-value								
			А	ge (y	rs)												
10 yrs	34	12	9	1 2	1												
11 yrs	28	14	5	8	1												
12 yrs	35	14	4	1 6	1	12	1	24	0.62,								
13 yrs	28	13	4	9	2	3	5	.9 9	NS, p>0.05								
14 yrs	43	24	3	5	1			-									
15 yrs	52	19	1 3	1 8	2												
		Educa	tion o	of add	lescer	ıt gir	ls										
4-5 <sup>th</sup> std	62	26	1 4	0	2												
6-7 <sup>th</sup> std	61	27	8	2 3	3	7		16 .9	0.58, NS, p>0.05								
8-9 <sup>th</sup> std	91	41	1 3	3 4	3	55	9	2									
10 <sup>th</sup> std	6	2	3	1	0												
Tilitarata	1	Edu	icatio	n of c	areta	kers											
niterate	22	6	1	1	3												
Seconda	~ -		~	2	-												
ry	27	2	6	7	2			28	0.0001								
SSC	51	12	5	1	3	72 .7 3	72	72	72	72 1	72	72	72	$\begin{bmatrix} 72 \\ 7 \end{bmatrix} 1$	1	.8	S, p>0.05
HSC	54	26	1 2	1 6	0		8										
Undergr aduate	42	32	2	8	0												
Graduat e and	23	18	2	3	0												
above		M	onthly	v Inco	ome (]	Rs)											
Rs. 5001- 10000	115	48	1 8	4 2	7												
Rs. 10001- 15000	82	33	1 5	3 3	1	11 .2 7	9	16 .9	0.25, NS, p>0.05								
Rs. 15001- 20000	18	12	4	2	0	,		2									
R20001 and above	5	3	1	1	0												
			Туре	e of fa	amily		· · · ·		·								
Joint	110	41	2	4	4												
Nuclear	102	48	1 7	3 3	4	8. 85	6	12 .5	0.18, NS, p>0.05								
Extende d	8	7	0	1	0			9									
			Ту	pe of	diet												
Vegetari an	77	28	1 0	3 4	5												
Non Vegetari an	0	0	0	0	0	8. 27	4	9. 48	0.082, NS, p>0.05								
Mixed	143	68	2 8	4 4	3												

A similar study was conducted in the year of 2003. This cross sectional study was conducted in Nagpur among adolescent females in the urban area. A total 296 adolescent females, age of 10–19 year were participated in the research. In result prevalence of anemia found

35.1% and a found a significant association of anemia with the literacy of parents.11 Association of perceived causes of nutritional anemia among adolescent girls in relation to type of diet Present study show the association between the perceived causes of nutritional anemia of adolescent girls with type of diet were significant i.e. p = 0.034. Hence it is interpreted that there was significant association with type of diet which explains

the adolescent girls having a good knowledge those are taking mix diet (Milman 2011).

Demographic variables	No. of adolescent girls	Mean Score ± SD	F-value	df	F- tab value	p-value	
		Age (yrs)					
10 yrs	22	3±1.02			1000		
11 vrs	14	2.64±0.84					
12 yrs	21	2.85±0.96	Constant 1	1000	2.29	0.45	
13 yrs	15	2.66±1.04	0.94	5,118	2.23	NS. p>0.05	
14 yrs	19	3.10±0.99	1	1000			
15 yrs	33	3.12±0.81	· · · · · · · · · · · · · · · · · · ·				
	E	lucation of adoles	cent girls				
4-5thstd	36	2.86±0.96	1. 0. 21	1		-	
6-7thstd	34	2.79±1.00					
8-9thstd	50	3.10±0.88					
10 <sup>th</sup> std	4	3.00±0.81	0.84	3,120	2.68	0.47 NS, p>0.05	
		Education of car	etaker				
Illiterate	1	3±0		· · · · · ·	-		
Primary	16	3.06±0.77		6 1 1 7			
Secondary	25	3.04±1.09					
SSC	38	2.73±0.86	0.77		1.02	41 - 124	
HSC	28	2.67±1.02	0.77	0,117	2.18	0.59,	
Undergraduate	11	3.18±0.75				NS, p>0.05	
Graduate and above	5	3±1.22				pro	
		Monthly incom	e(Rs)			_	
5001-10000 Rs	68	2.95±0.95					
10001-15000 Rs	47	2.85±0.85	1.000	10.00			
15001-20000 Rs	7	2.14±1.21	1.92	3,120	1		
20001 Rs and above	2	3.50±0.70			2.68	0.13, NS, p>0.05	
		Type of fam	ily		-		
Joint	70	2.87±0.99	1	1.1			
Nuclear	53	2.88±0.89	0.01	2,121	3.07	0.98, NS, p>0.05	
Extended	1	3±0					
		Type of die	t	-			
Vegetarian	48	3.10±0.88					
Non Vegetarian	0		2.14	122	1.98	0.034,	
Mixed	76	2.73±0.95				NS, p>0.05	

A cross sectional study was conducted to find prevalence of anemia and various factors influencing anemia among adolescent girls in urban and rural field practice areas of Osmania Medical College. In present study those who were taking meat more than once a week had less percentage of anemia 38 (36.9). Those respondents who never took green leafy vegetables have more prevalence of anemia in both areas.12

# **CONCLUSION**

There is found a significant association between prevalence of nutritional anemia among adolescent girls with education of caretaker and perceived causes of nutritional anemia among adolescent girls with the type of diet.

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# Force Degradation High Performance Liquid Chromatographic HPLC Assay Method of Apixaban in Pharmaceutical Preparations

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## **ABSTRACT**

The current paper describes the measure of *apixaban* was accomplished on a Thermo BDS, C8, 150 X 4.6, 5 $\mu$ , and buffer (pH 4.5) and Acetonitrile at 60:40%/v ratio as the mobile phase, at a stream pace of 1.0 ml min<sup>-1</sup>. HPLC recognition of elute was gotten by a photodiode cluster detector (DAD) which was set at 259nm. ICH rules were followed for approval of proposed strategy with respect to particularity, affectability, exactness, linearity, precision, framework appropriateness and vigor. Alignment bends of *apixaban* were made in the scope of 8.0-48  $\mu$ g.mL<sup>-1</sup> with LOD and LOQ of 0.20 $\mu$ g.mL<sup>-1</sup> and 0.24 $\mu$ g.mL<sup>-1</sup> separately. *Apixaban* strength was assessed under different ICH constrained corruption conditions and it was discovered to be effortlessly debased in acidic and basic conditions. The assurance of *apixaban* in drug measurements structures was directed with the portrayed technique and showed mean rate recuperation of 100.54 (n = 3), individually.

KEY WORDS: RP-HPLC, APIXABAN, STABILITY-INDICATING, STRESS DEGRADATION.

# **INTRODUCTION**

Apixaban, 1-(4-methoxyphenyl)-7-oxo-6-[4-(2-oxopiperidin-1-yl) phenyl]-4,5,6,7-tetrahydro- IH-pyrazolo [3, 4-c] pyridine- 3- carbo-xamide (Figure 1) is an oral anticoagulant used to treat the stroke caused by a blood clot with heart rhythm disorder (Atrial fibrillation) (Cada et al., 2013 (Apixaban, 2019 & 2021) (Raghavan et al., 2009). Scarcely only three insightful techniques (Prabhune et al., 2014) (Katari and Jonnalagadda 2020) (Ani et al., 2021) detailed in the writing for the substance assessment of apixaban in drug substances utilizing liquid chromatography (HPLC).The primary aim of introduced paper is to assess apixaban soundness in accordance with the relevant rules of ICH(ICH Q2 (R1) 2005) using a full approved RP-HPLC technique in exposing the examined medication to a wide scope of stress conditions.



# MATERIAL AND METHODS

**Instrumentation:** Agilent 1120 series consisting 2 channels. Auto sampler with one rack it has 100 vials. Auto injector has capacity to inject 0.1µL to 100µL. UV-Vis Detector. Thermostat column compartment connected it has a capacity to maintain 4°C to 80°C column temperature. Agilent 1120 HPLC System is equipped with Ezchrome Elite software. Orthophosphoric acid, Acetonitrile (HPLC grade), Milli-Q water. Hydrochloric acid (AR), sodium hydroxide (AR-grade), Hydrogen peroxide were procured from Merck-R, and Sigma -J.

**Mobile phase preparation:** Mix buffer (pH 4.5) and Acetonitrile at 60:40%v/v ratio was used. Prior to use it was sonicated and degassed sing vacuum filtration through 0.45 micron membrane filter.

**Buffer preparation (pH 4.5):** Prepare 1.625gm (0.02M) Potassium di hydrogen orthophosphate & 0.3gm of di-Potassium hydrogen orthophosphate in 550ml of HPLC water. The pH of the buffer adjusted to 4.5 with diluted orthophosphoric acid.

**Standard stock solution preparation:** Weigh and transfer 20mg of Apixaban working standard into 50mL



volumetric flask, add 25mL of diluent and sonicate to dissolve and dilute to volume with diluent.

**Standard preparation:** Transfer 1.0mL of standard stock solution into 10mL volumetric flask and dilute to volume with diluent. The concentration of apixaban was calculated by calibration graph prepared with stock solution.



**Sample Preparation:** No pretreatment like timeconsuming extraction or evaporation step was performed for specimen preparation. Finely grind pre weighed 20 tablets of apixaban. Transfer grinded sample quantitatively equivalent to 20mg of apixaban into 50mL volumetric flask add 25mL of diluent, sonicate to dissolve for 10 minutes and dilute to volume with diluent. Further filter the solution through filter paper. Dilute 0.8 ml of filtrate to 10ml with mobile phase. All solutions were filtered through 0.45 µm Millipore membrane filters before injections into the HPLC system. Experiments were realized under the same conditions as employed for the apixaban pharmaceutical preparations.



**Stress studies:** Stability indicating analytical method of apixaban has been developed according to the ICH guideline. Degradation was carried out in following conditions:

**Acidic** –Drug was subjected to 1 M HCl in a water bath at 100°C for 3 hrs. Solution was neutralized by sodium hydroxide and diluted with mobile phase. Peak area of apixaban was observed when chromatographed after exposing at 70°C for 8 hr.



**Alkaline** –Drug was also subjected to 0.5 M NaOH at 100° C for 3hrs. Solution was neutralized by 0.5 M HCl diluted with mobile phase.

**Oxidation** – Drug was subjected to 6 % hydrogen peroxide for 48 hrs at room temperature. Thermal – Drug was subjected to thermal degradation at 80°C for 8 days.

**Photo-stability condition-**Drug was subjected to degradation in photostability chamber for 8 days.

## **RESULTS AND DISCUSSION**

HPLC Development And Optimization: Several parameters that can affect chromatographic separation were evaluated and optimized. These parameters included scanning of different wavelengths, experimenting with various types of the aqueous phase, changes of the mobile phase pH, different types and ratio of organic modifier added and flow rate.

#### **Chromatographic conditions:**

: Thermo BDS, C8,
150 X 4.6, 5µ.
: 1.0 ml/min
: 259 nm
: 30°C
: 20 µL
: Mobile Phase
: Isocratic
: Water: Acetonitrile
(90:10%v/v)

**Strategy:** In our investigation, chromatographic separation was affected utilizing an isocratic mode with a C18 column. The mobile phase made out of combination

of buffer (pH 4.5) and Acetonitrile at 60:40%v/v ratio at a steady stream pace of 1.0mL/min. The eluate was checked at a set frequency of 259nm at RT. Every infusion run was repeated multiple times, with an infusion volume of 20µL. Absolute run season of each example infusion was roughly 8 min, and evaluation of the segments under investigation was accomplished utilizing the all out peak areas of the researched segments.





**Method validation:** To demonstrate appropriateness of method for the predetermined purpose, validation of the developed RP-HPLC method was done as per ICH guidelines (ICH Q2 (R1) 2005).

**System suitability:** The system suitability was checked by infusing six replicate injections of apixaban (40µg/ mL) under optimized chromatographic conditions. The system was deemed to be suitable for use, as the tailing factors and resolutions for apixaban were less than 1.4 and more than 4.0, respectively. System suitability results are given in Table 1.



Figure 4 d: Thermal degradation chromatogram



Table 1. System suitability studies						
Sample Name Blank	Rt -	Area -	Theoretical Plates	Asymmetry		
Apixaban, Standard	3.133	23535298	3941	1.38		
Placebo	-	-				
Sample	3.13	23546852				

**Linearity:** Accurately measured volumes of the apixaban standard solution  $(100\mu g/mL)$  were successively transferred into six 10mL volumetric flasks. 20µL aliquots of each solution were chromatographed three times and analysis was performed by optimized method. The regression equation was derived from the plot of average area of apixaban peak against the concentration of apixaban area were submitted to linear regression analysis to obtain the regression equation and correlation coefficient. Table 2 presents the data of linearity and Figure 3 shows calibration curve for apixaban. The calibration graph was linear over the concentration range 8.0-  $48\mu g/mL$  of apixaban (r2 = 0.9996). The

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calibration results revealed a good linear relationship of peak area of apixaban over the concentration range of 8.0-48  $\mu$ g/mL.

Table 2. Linearity studies					
Conc(mcg)	Area				
8.0	4849783				
16.0	9683579				
24.0	14371967				
32.0	18721575				
40.0	23462427				
48.0	28151143				
r2	0.9999				
LOD	0.600µg/ml				
LOQ	2.00µg/ml				

Table	3.	Stress	degradation	studies
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Degradation Studies	Assay	Assay Value	% Of Net Degradation
Acid	97.87	100.54	2.672
Base	97.114	100.54	3.426
H <sub>2</sub> O <sub>2</sub>	97.097	100.54	3.443
UV	96.307	100.54	4.233
Thermal	97.635	100.54	2.905

**Limit of Detection and Limit of Quantitation:** Standard deviation of y intercept of calibration curve of linear lower concentrations (N) and slope (S) of the calibration curve were calculated and using their values LOD and LOQ were estimated as per ICH guideline. LOD and LOQ were estimated as per ICH guidelines using mathematical formula. Obtained. value for LOD was 0.600µg/mL and obtained value for LOQ was 2.00µg/mL respectively.

**Stress studies:** The forced degradation studies in acid, alkaline, photolytic, heat, and oxidative conditions, resulted in non significant decrease of the area without any detectable eluting degradation product. Under these conditions, 97.87, 97.114, 97.097, 96.307 and 97.635% of apixaban were recovered, respectively. The results (Table 3) of HPLC method for stress samples, including separation of the degradation products produced of apixaban in indicated the proposed method is stability-indicating. Chromatograms of apixaban after degradation with acid, alkaline, oxidative, heat, and photolytic conditions are displayed in Figures 4a -4e.

**Repeatability:** To assess repeatability of the method, chromatographic analysis of six injections of 40µg/ mL apixaban solutions was performed. The average, standard deviation and % RSD for retention time and area of apixaban peak were estimated. Table 4 presents results of repeatability. % RSD of retention time and area of apixaban determination was found less than 2% that proves the repeatability of the developed HPLC method.

Table 4. Repeatability Studies						
S No	Name	RT	Area			
1	Method Precision-1	3.14	23522656			
2	Method Precision-2	3.163	23647919			
3	Method Precision-3	3.133	23549208			
4	Method Precision-4	3.113	23526105			
5	Method Precision-5	3.13	23436418			
6	Method Precision-6	3.157	23507797			
Avg		3.139	23531684			
Std Dev		0.018	68668.04			
%RSD		0.586	0.292			

Table 5. Accuracy studies						
80% accuracy	RT	Area				
Accuracy-80-1	3.13	18762329				
Accuracy-80-2	3.14	18741277				
Accuracy-80-3	3.107	18735915				
Avg	3.126	18746507				
		80.35				
amt added(mg)		16.00				
amt Recoverd(mg)		16.14				
%Recovery		100.86				
100%accuracy						
Accuracy-100-1	3.103	23307056				
Accuracy-100-2	3.102	23343824				
Accuracy-100-3	3.103	23372929				
Avg	3.103	23341270				
		100.04				
amt added(mg)		20.00				
amt Recoverd(mg)		19.99				
%Recovery		99.96				
120% accuracy						
Accuracy-120-1	3.12	28178075				
Accuracy-120-2	3.117	28117262				
Accuracy-120-3	3.123	28195873				
Avg	3.120	28163737				
		120.71				
amt added(mg)		24.00				
amt Recoverd(mg)		24.24				
%Recovery		101.01				

**Accuracy:** In the prepared test solution mixture, apixaban standard solution was added at 80%, 100% and 120% concentration level. 20µl of each solution were injected three times and were chromatographed.

When the method was used for analysis of apixaban from previously analysed laboratory mixture solution after spiking of 80, 100 and 120% apixaban standard, the recovery was found 99.96-101.01%. Table 5 presents the results of accuracy determination.

**Robustness:** The experimental conditions of the method were deliberately changed to determine the robustness. The wavelength ( $259nm\pm2\%$ ) and mobile phase flow rate ( $1.0\pm0.1mL/min$ .) were varied. In each case, and %RSD of area of apixaban peak and retention time was calculated. Comparison of the retention time and area of apixaban peak were done with that obtained under the optimized method, also. It was found that method was robust regarding any minor deviation in the column temperature. Table 6 shows the results of the robustness.

**Ruggedness:** A 20µl aliquot of fixation 10µg/ml was infused to consider the unpleasantness of apixaban by two particular sensible logical specialists (Analyst-1 and

Table 6. Robustness studies					
S No	Parameter	RT	Area		
1	Standard	3.17	23518790		
2	Robustness-Flow-1	3.883	29190915		
3	Robustness-Flow-2	2.620	19483082		
4	Robustness-nm-1	3.110	22787010		
5	Robustness-nm-2	3.117	23990725		

Analyst-2) and the results were recorded and are in the good reach for apixaban. The results (Table 7) exhibited the % RSD was less than 2% separately.

Table 7. Ruggedness Study					
S No	Ruggedness-Day-1 Name	RT	Area		
1	Ruggedness-Day-1-1	3.100	23604447		
2 3	Ruggedness-Day-1-2 Ruggedness-Day-1-3	3.143	23504066 23566316		
4	Ruggedness-Day-1-4	3.110	23532889		
6	Ruggedness-Day-1-6	3.100	23502240		
Avg		3.120	23540885		
Std Dev		0.019	39065.36		
KSD	Ruggedness-Day-2	0.021	0.100		
S No	Name	RT	Area		
1	Ruggedness-Day-2-1	3.127	23591751		
2	Ruggedness-Day-2-2	3.117	23589267		
3	Ruggedness-Day-2-3	3.113	23614793		
4	Ruggedness-Day-2-4	3.113	23623894		
5	Ruggedness-Day-2-5	3.143	23604438		
6	Ruggedness-Day-2-6	3.12	23588335		
Avg		3.122	23602080		
Std Dev		0.011	14851.38		
RSD		0.367	0.063		

Table 8. Assay Calculation for Apixaban								
23508743	20.1	1	50	10	99.8	120.5	mg/tab	% Of Assay
23534632	50	10	480.3	1	100		5.03	100.54

**Application To Pharmaceutical Preparations:** There is no chromatographic interference found for tablet dosage forms with internal standard, formulation components. The results given in Table 8 indicated good accuracy of apixaban for pharmaceutical preparations.

# CONCLUSION

The present work described the development of a validated stability-indicating assay HPLC approach to determine apixaban for pharmaceutical preparations using UV detection mode. The chromatographic conditions were finally optimized on Thermo BDS, C8, 150 X 4.6, 5 $\mu$ , and buffer (pH 4.5) and Acetonitrile at 60:40%v/v ratio as the mobile phase, at a stream pace of 1.0 ml min-1 and UV detection at 259nm. The developed method was found to be selective, sensitive, precise, linear, accurate, and reproducible and stability indicative for determining the apixaban in pharmaceutical preparations.

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# Real Picture of the World During COVID-19 Pandemic: Mental Health Matters

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### ABSTRACT

The present study focuses on the dangerous disease 'Coronavirus', which ruined the peaceful life of the universe. It started in the period from 2020 to 2021 and forced humans to think- 'where they went wrong 'and asked the question to himself/herself 'is nature taking its revenge?". The study aim is to portray the real grief, painful and horrific picture of the Universe- Developing countries like India and South African recording each day multiple new cases of Coronavirus, including the number of deaths climbing day by day. The group of survival is also undergoing a constant mental health problem. As the constant news of Coronavirus has plunged the world and disturbed each mental health especially youth who are experiencing a 'cage world' Thus, this study's main aim is not only to focus on the solution to the invisible pain but also will reveal the dark side of the young generation's mental health which is known as depression, anxiety, suppression, and ultimately how it takes its road into a horrific result as anorexia, insomnia, bipolar disorder, dementia, and suicide. The covid-19 situation has brought more complexities into the mind of adolescence and teenhood especially when they are confronting societal, personal, and educational issues. The major concern comes when a child suffers from the loss of childhood innocence during the pandemic and finds no space of their own due to parents' stressful relationship or having a terrible experience of losing both of their parents or close family member due to Covid disease. Moreover, asking for financial and emotional help in times of need became tough, and last but not least issue is a sharp rise in poverty when the covid-19 pandemic led to a strict nationwide lockdown and most of the youth are suffering from the loss of hope for any work opportunity.

KEY WORDS: COVID-19, DEPRESSION, CONFESSION, POVERTY, MENTAL TRAUMA.

## **INTRODUCTION**

Coronavirus pandemic situation has risen the significance of new word- 'Loss'. A sense of loss towards the world of Hope- Hope for a new opportunity, secure life, peaceful mind, re-opening of educational institutions, jobs or innovative opportunities, and survival. Coronavirus disease like a winter disrupted lives all around the world. Still, as a human, we should never forget that - *If Winter comes, can Spring be far behind*? (Shelley, 20)- there is always room for optimism (Brundha et al., 2019).

The Evolution of Coronavirus Disease in form of KAAL and The Horror Reality of 'The Disease': A novel coronavirus



first identified in Wuhan, China (2019). It is a transmissive disease which first came from animals and converted into a form of viral and spread it to human. In an interview with Fox News on Feb. 16, Sen. Tom Cotton, R-Ark., suggested that the coronavirus may have come from a virology laboratory in Wuhan, China, where the outbreak emerged. After this, there were numerous suggestions and supposition came up about the origin of 'Coronavirus 'disease. This disease another name can be considered as a zoonotic disease. Zoonotic diseases are caused by harmful germs like viruses, parasites, and fungus, and eating notveg can also be the major reason for the origin of the disease. Sometimes animal appears clean and healthy, but it can be covered with multiple germs.

Thus, safe consumption is important, if a human wants a happy and healthy long life. The World Health Organization has also given its report and pieces of evidence about the causing of several diseases due to the consumption of non-veg food. Though it was also being noted that well-cooked food is more secure and safe enough compare to eating raw meat.



According to the news report, countries like India and Italy did not release the actual figure of death of patients and hiding about the lack of oxygen facilities, ventilators, and ICU beds, especially when the second weave hit many of the developing countries. India Today reported '4,01993'- the number of new Covid cases in 2021, which was also based on the official figure- as several cities ground report indicates that the official number of death count is an understatement (Carey et al., 1996).

The question is not 'Who is accountable for the origin of **Covid but How to find a perfect solution to fight against** it: From the year 2020 to 2021, World has experienced enough about the number of infections that keep soaring around it swiftly and put each life as tumultuous. The American existential psychiatrist Irvin David Yalom, once stated in his well-known book entitled- Staring at the Sun: Overcoming the Terror of Death (2009) – "The more unlived your life, the greater your death anxiety. The more you fail to experience your life fully, the more you will fear death" (Lassale et al., 2019).

Coronavirus is an infectious disease that spread its symptoms from person to person. It causes respiratory illness in human, when an infected person cough, sneezes or stand next to you (within six feet) and smells, it can spread this disease easily. Even it lingers in the air for hours, no matters if an infected person has left the space or not especially in an enclosed place with poor ventilation. This is the major reason for an immediate reaction to mental health. Transmission of the disease forced humans to remain within four walls alone. Followings are the statement of some common people, which depicts their painful isolated situation and their desire to meet their close family member: -

Eighty-year-old Thresia, a native of Kerala's Pathanamthitta district, couldn't hold back her tears when she spoke about her little sister, Achamma, who is 75 years old. Achamma was living with a domestic worker in one of the villages in Pathanamthitta until her son took her with him to Ireland a few months ago. "I would visit her frequently or she would come to meet me as we lived within a radius of 10 to 12 kilometers. Because of the lockdown, I could not meet my sister for a long time. Once it was lifted, we were able to meet each other and I was happy. However, her son took her to Ireland with him as he did not want his elderly mother to live alone during the pandemic, although she never wanted to leave her house. Now, I heard that she is not well, which means, I won't be able to meet her again. This pandemic won't end, and we can never meet," says Thresia as weeps. It has been about five months since she last met her sister. (The News Minute, 12)

(2020-21) Lockdown has also witnessed an increasing number of cases in the domestic violence issues. Due to current pandemic situation, each individual is not only suffering from the idea of close-experiences of death, isolation, social-distancing, and various other restriction but the statics also shows that families who are living together have been suffering from the idea of stress relationship between husband and wife, which ultimately leading towards divorce. The major reason for the separation of the married couple are -living together for a long period in a close confined space, It also causes lack of interest between each-other and creates monotonous relationships, financial issues, when one of the spouses find themselves out of job- this creates a lot of stress within the relationship and various violent argument about financial decision confronted by the couples. Apart from this, financial infidelity, hidden financial decisions, secret purchase, gambling addiction, division of household labor such as household duties, children duties do also play an integral role in separation between a pure relationship like husband-wife.

The concept of a quarantine imposed on children and youth to confine them within four walls because of subsequent closure of schools and colleges. Teens are waiting desperately for a normal life routine. The effect of lockdown attacking directly on their mental health and their pleasurable life. More than 65 % of kids have become technology device addicted. They are unable to stay away from their mobile. Virtual tutoring increased this habit in kid's daily life. As a result, they are facing not only physical but mental problems such as lack of sleep, daytime tiredness, headache, annoying nature, weight gain, not interested in any outside games activities, and uncontrolled anger. College students are experiencing both family financial stresses and their parent's strained relationship (Ravichandran & Brundha 2016).

Lockdown made some of the teens' life as hell as a consequence of increment of stress and frustration- either they are leaving their education or forcing themselves towards child labor due to pandemics. Parents are involved in their problems that they have forgotten about their child's abnormal behavioral stage. Moreover, the second wave of covid-19 have devastated some families and left the youth without any guardians and some parents lost their child: - "Among them is the Gregory family of Meerut, who lost twin sons Joefred and Alfred to coronavirus. The twins had turned 24 a day before they were tested positive for the virus."Our family is broken. We are only three in the family now," lamented the twins' Father Gregory Rafael, adding that his sons Joefred Varghese GrAlfrednd Ralfred George Gregory died due to Covid." (Business Today)

**Psychological Health:** According to the above-mention reason and real facts shows that pandemic increases not only the number of death but also the number of mental health patients. If no direction has been given to them, they can risk their life too. At present, we are living in world of fear of death, self-protection or close family member's safety and above all the stage of isolation makes it worse. As Gautama Buddha stated-: "Your worst enemy cannot hurt you as much as your own thoughts, when you haven't mastered them". (204) Finding out the solution to restoring calm and peace in a chaotic world considers as a tough task in the present time. Inner peace amid negative environment, especially when electronic device or TV and social media apps like

Facebook, WhatsApp and many more has become a major part of our life (Shreya & Brundha 2016).

It helps to spread the number of pseudo-news and gives a slow poison to our belief system. Obsessed people to it, incline towards delusion world and diminishes all kind of self-control and discipline of life. Untrue stories mislead people and increase the rate of fear, anxiety, and paranoia- which are also known as a symbol of mental illness. Covid-19 has killed the traditional work environment, similarly, it has taken away child pleasurable and memorable school moments due to the closure of schools and has risen stress levels in each human mind. Families, who are not able to cover the mortgage, car lease, kid's study loan and it increased the number of unemployment, people have lost jobs due to pandemic and deep poverty especially when you are self-isolated. Among all these situations, how can even one advise to remain peaceful? But Peace of mind is an essential tool (Samadarshi et al., 2020).

Most people are suffering from adverse times and they commit suicide, but 'SUICIDE' is not the last solution. Better to self-harming, one should ask for help, speak openly and bravely about their stress and have faith in the word 'HOPE'. As it is truly said- "Where there is a will there is a way" (Kael, 141). Further added this line with English romantic poet P.B Shelley's well-known poem-Ode to the West Wind (1819)- - If Winter comes, can Spring be far behind? (Shelley, 20)- BEING OPTIMISMis the best medicine, when the world around is not as hopeful as they should be. This is the only way to challenge all kind of obstacles. Apart of it, following all health protocol as the pandemic has led to the adoption of particular hygienic behaviours (e.g., wearing masks, washing hands), which is important to save the world by minimizing the spread of covid-19 and other infectious disease (Varshini et al., 2020).

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# Assessment of the Effectiveness of Patterned Breathing Technique in Reduction of Pain During First Stage of Labour Among Primigravida Mothers

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## ABSTRACT

Labour is an emotional phenomenon that encompasses both psychological and physiological processes. The active method of delivering a foetus is labour, which is characterized by frequent, painful uterine contractions that increase in frequency and intensity. (Dutta, D.C., 2004). There are different types of options to relieve work-related pain and assisting relaxation. Comfort techniques that provide natural pain relief during labour and childbirth can be highly helpful. Quantitative Research Approach and Non-randomized control group design was used, 56 subjects (28 experimental & 28 control group) were allotted. The breathing technique was given to the experimental group during each and every contraction at a rate of 30 mins interval 3 times whereas the control group was given conventional care & the pain level was assessed by using Wong weber's facial pain scale. The result showed that the tabulated value for n=28-1 i.e. 27 df was 2.05. The calculated 't' value i.e. 15 are higher than the tabulated value at 5% level of significance for overall pain score of primigravida mothers which is statistically acceptable level of significance. As a result, statistically, the Patterned Breathing Technique was helpful during the initial stage of labour among primigravida mothers in the experimental group. Hence the breathing technique was effective according to the present study and it could be useful to reduce the labour pain and also the pain perception.

KEY WORDS: PRIMIGRAVIDA MOTHERS, LABOUR, BREATHING EXERCISE, EXPERIMENTAL GROUP, CONTROL GROUP

# **INTRODUCTION**

Every birth comes from the pains of labour. The most difficult challenge is not to be pregnant with visions; it is to have an influence that encourages life. (Abd ELaziz et al., 2019). Pregnancy is a great and natural disease. Nine transformative months of suspense, preparing and peering at the amazing life unfolding. (Waghmare et al., 2018). Comfort in the sense of the pain of childbirth is a fascinating idea. The sense of comfort is an expression of having fulfilled present or imminent requirements or needs in three areas: body, mind and spirit. (Lowe 2002).



In order to improve their satisfaction with the delivery, it is important to inform future mothers about the process of natural delivery and potential pain relief techniques. Most of the parturient hope to receive adequate pain relief during childbirth and the aim of obstetrics practice is to select a procedure that will reduce the pain to a degree in which the parturient can cope with it and at the same time allow the parturient the opportunity to engage in the experience of birth. (Konlan et al., 2021).

In our nervous system, pain is a warning that something might be wrong. It's an awkward sensation, like a pinch, tingle, pain, burn, or ache. Maybe the pain is acute or dull. It might come and go, or it might be persistent. (Grahek, 2011). The pain of labour is intense, but his memory decreases over time, despite this. Labour is an emotional phenomenon that encompasses both psychological and physiological processes. The active method of delivering a foetus is labour, which is characterized by frequent, painful uterine contractions that increase in frequency and intensity. (Labor et al., 2008).



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During labour, pain is caused by contractions of the uterine muscles and pressure on the cervix. This discomfort, as well as an achy feeling, can be felt as heavy cramping in the abdomen, groin, and back. Some women often suffer from pain in their sides or thighs. (Murphy & 2018). There are many ways, both pharmacological and non-pharmacological, to relieve work pain and help to relax. During labour and childbirth, comfort measures that offer natural pain relief can be very effective. (Leeman et al., 2003). Patterned techniques of breathing offer relaxation and concentration while improving the progress of labour. This increases the supply of oxygen to your baby and is also essential for the contracted uterus. (Waghmare et al., 2018).

The aim of the study is to assess the effectiveness of patterned breathing technique in reduction of pain during first stage of labour among primigravida mothers. The objectives of the study were to assess the pain during first stage of labour among primigravida mothers in control group, to assess the effectiveness of patterned breathing technique during first stage of labour among primigravida mothers in experimental group after intervention, to compare the pain level among primigravida mothers in experimental & control group, to find out the association between patterned breathing technique in reduction of pain during first stage of labour among primigravida mothers with selected demographic variables in control & experimental group.

## **METHODS**

In this study, the Quantitative Research approach and non- randomized control group design was used. The population was primigravida mothers during the first stage of labour; the samples consisted of 56(28 control Et 28 experimental group) of selected hospital of Wardha who have fulfilled the sample selection criteria according to the Non-Probability Convenient Sampling technique. The tool used in this study was Numeric Pain Intensity Scale specifically Wong Baker's Faces Pain Rating Scale. The validity of the tool was done by 10 experts. To achieve the study's goal, the investigator approached primigravida mothers in a designated location during the initial stage of labour and described the study's purpose as well as how it would benefit them. Her questioned about their desire to take part in the study and gained their agreement. During the initial stage of labour, the individuals were divided into two groups: experimental and control, soon when the cervical dilation was at 4cm, the pain was assessed in both group and the patterned breathing technique was given among experimental group, three times, 30 mins interval and the pain was assessed again after the intervention and without intervention in both group.

Demographic	Contro	1 Group	Experimental Group		
Variables	Frequency(f)	Percentage(%)	Frequency(f)	Percentage(%)	
	Age in y	ear		10000	
18-22 yrs	14	50%	8	28.6%	
23-27 yrs	10	35.7%	15	53.6%	
28-32 yrs	3	10.7%	5	17.9%	
33-37 yrs	1	3.6%	0	0%	
the second s	Residen	ice		1	
Rural	15	53.6%	15	53.6%	
Urban	13	46.4%	13	46.4%	
	Type of f:	amily		1-0-0-	
Joint	20	71.4%	20	71.4%	
Nuclear	8	28.6%	8	28.6%	
	Educati	on			
Primary	5	17.9%	3	10.7%	
Middle School	8	28.6%	2	7.1%	
High School	7	25%	8	28.6%	
Higher Secondary	6	21.4%	9	32.1%	
Graduate	2	7.1%	6	21.4%	
	Occupat	ion		1	
Homemaker	18	64.3%	15	53.6%	
Govt Servant	2	7.1%	3	10.7%	
Private Employee	5	17.9%	6	21.4%	
Others	3	10.7%	4	14.3%	

# Table 1 Section A Distribution of primigravida mothers according

#### RESULTS

The above table shows that 3(10.7%) of primigravida women in pre-test had hurts a little bit more i.e., face - 4, 16(57.1%) at pre-test and 3(10.7%) at post-test had hurts

even more(face-6), 8(28.6%) at pre-test and 16(57.1%) at post-test had hurts a whole lot (face - 8) and 1(3.6%) of primigravida mothers in pre-test and 9(32.1%) in posttest had hurts worst(face-10) level of pain score. Range

of pain score in pre and post were 4-10 & 6-10. Mean score in pre and post were  $6.50\pm1.40$  &  $8.42\pm1.25$ 

The above table shows that 4(14.3%) of primigravida women in post-test had hurts a little bit i.e., face - 2, 12(42.9%) of primigravida mothers in post-test had hurts a little bit more (face - 4). 4(14.3%) at pre-test and 9(32.1%) at post-test had hurts even more (face – 6), 15(53.6%) at pre-test and 3(10.7%) at post-test had hurts a whole lot(face-8) and 9(32.1%) of primigravida mothers in pre-test had hurts worst(face-10) level of pain score. Range of pain score in pre & post were 6-10 & 2-8. Mean pain score in pre & post were  $5.35\pm1.33$  &  $4.78\pm1.55$ .

Table 2. Section B : Assessment with level of pain score in control group n=28					
SR. NO	Level of pain	Pre-test		Post-test	
		Frequency	Percentage	Frequency	Percentage
1	Doesn't hurt at all (Face - 0)	0	0%	0	0%
2	Hurts just a little bit (Face-2)	0	0%	0	0%
3	Hurts a little bit more (face-4)	3	10.7%	0	0%
4	Hurts even more (Face – 6)	16	57.1%	3	10.7%
5	Hurts a whole lot (Face – 8)	8	28.6%	16	57.1%
6	Hurts worst (Face – 10)	1	3.6%	9	32.1%
Range	4-10		6-10		
Mean <u>+</u> SD	6.50±1.40		8.42 <u>+</u> 1.25		



SECTION B.2: Assessment with level of pain score in experimental group n=28

SR.NO	Level of pain	Pre-test	Post-test
1	Doesn't hurt at all (Face - 0)	0(0%)	0(0%)
2	Hurts just a little bit (Face – 2)	0(0%)	4(14.3%)
3	Hurts a little bit more (face – 4)	0(0%)	12(42.9%)
4	Hurts even more (Face – 6)	4(14.3%)	9(32.1%)
5	Hurts a whole lot (Face – 8)	15(53.6%)	3(10.7%)
6	Hurts worst (Face – 10)	9(32.1%)	0(0%)
Range	6-10	2-8	
Mean±	SD 5.35 <u>+</u> 1.33	4.78±1.55	

This table shows that the mean, standard deviation & mean difference values are compared & student's paired 't' test is applied at 5% level of significance. The tabulated value for n=28-1 i.e. 27 degrees of freedom was 2.05. The calculated 't' value i.e. 15 are much higher than the

tabulated value at 5% level of significance for overall pain score of primigravida mothers which is statistically acceptable level of significance. Hence it is statistically interpreted that the Patterned Breathing Technique during first stage of labour among primigravida mothers in experimental group was effective. Thus, the H1 is accepted.



SECTION C: Significance of difference between pain score in pre and post test of primigravida mothers in experimental group

Pain Score	Mean	SD	Mean Difference	t- value	p- value
Pre Test	8.35	1.33	3.57±1.25	15	0.0001 S,p<0.05
Post Test	4.78	1.75			

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The mean, standard deviation, and mean difference values are compared in this table, and the student's unpaired t test is used at a significance level of 5%. The tabulated value for n=28+28-2 i.e. 54 degrees of

SECTION D: Comparison of post test pain score among primigravida mothers in control and experimental group

Group	Mean	SD	Mean Difference	t- value	p- value
Control Group	8.42	1.25	3.64±0.40	8.93	0.0001 S.p<0.05
Experimental Group	4.78	1.75			

freedom was 2.00. The calculated 't' value i.e. 8.93 are much higher than the tabulated value at 5% level of significance for overall pain score of primigravida mothers which is statistically acceptable level of significance. Hence it is statistically interpreted that the Patterned Breathing Technique during first stage of labour among primigravida mothers in control group was effective. Thus, the H1 is accepted.

There is no significant association between age, family, or occupation but there is a significant association with residence in the experimental group.

	No. of primigravida mothers		Mean post-test pain score	F-value	p-value
	Frequency(f)	Percentage(%)			
		Age in year			
18-22 yrs	14	50%	8.42±1.15		
23-27 yrs	10	35.7%	8.20±1.47	0.63	0.59 NS,p>0.05
28-32 yrs	3	10.7%	8.66±1.15	0.63	
33-37 yrs	1	3.6%	10±0	Anne and the second	
		Residence			
Rural	15	53.6%	8.26±1.03	0.70	0.47
Urban	13	46.4%	8.61±1.50	0.72	NS,p>0.05
		Type of family			
Joint	20	71.4%	8.20±1.10	1.55	0.13 NS,p>0.05
Nuclear	8	28.6%	9±1.51	1.55	
1	1	Educational leve	i		
Primary	5	17.9%	8.40±0.89		
Middle School	8	28.6%	8.75±1.03	1	0.29
High School	7	25%	8±1.63	1.35	0.28
Higher Secondary	6	21.4%	8±1.26	5,1220	NS, p=0.05
Graduate	2	7.1%	10±0		
		Occupation			
Homemaker	18	64.3%	8.44±1.29		-
Govt Servant	2	7.1%	10±0	1.40	0.26
Private Employee	5	17.9%	8±1.41	1.40	NS, p>0.05
Others	3	10.7%	8±0	1	

ith their demographic	variable in experimental group. n = 28       No. of primigravida mothers		Mean post-test	F-value	p-value
	Frequency(f)	Percentage(%)	pant score		
	The factory (1)	Age in year		-	
18-22 yrs	8	28.6%	5.75±2.25		
23-27 yrs	15	53.6%	4.40±1.35	1.80	0.18 NS, p>0.05
28-32 yrs	5	17.9%	4.40±1.67	1.80	
33-37 yrs	0	0%	10±0		
		Residence			
Rural	15	53.6%	5.46±1.59	2.20	0.024
Urban	13	46.4%	4±1.63	2.39	s,P<0.05
		Type of family	y		
Joint	20	71.4%	4.90±1.77	0.50	0.59 NS,p>0.05
Nuclear	8	28.6%	4.50±1.77	0.53	
		Educational lev	vel		
Primary	3	10.7%	5.33±2.30		
Middle School	2	7.1%	3±1.41		0.50
High School	8	28.6%	5.25±1.48	0.72	0.58
Higher Secondary	9	32.1%	4.66±2		NS, p=0.05
Graduate	6	21.4%	4.66±1.63		
		Occupation			
Homemaker	15	53.6%	5.33±1.79		
Govt Servant	3	10.7%	4.66±1.15	1.10	0.33
Private Employee	6	21.4%	4±2.19	1.19	NS, p>0.05
Others	4	14.3%	4±0		

SECTION E.2: Association of post test pain score among primigravida mothers with their demographic variable in experimental group, n = 28

# DISCUSSION

In this study, the distribution of primigravida mothers after post test shows that 3(10.7%) had hurts even more(face-6), 16(57.1%) had hurts a whole lot (face – 8), 9(32.1%) had hurts worst(face-10) level of pain score. While in experimental group 4(14.3%) had hurts a little bit i.e., face – 2, 12(42.9%) of primigravida mothers had hurts a little bit more (face – 4). 9(32.1%) had hurts even more (face – 6), 3(10.7%) had hurts a whole lot(face-8) level of pain score. In assessment of effectiveness of patterned breathing technique. The tabulated value for n=28-1 i.e. 27 degrees of freedom was 2.05. The calculated 't' value i.e. 15 are much higher than the tabulated value at 5\% level of significance for overall pain score of primigravida mothers which is statistically acceptable level of significance.

The similar study conducted Jose KE states that the mean value of pre and post intervention score were 14.09, 8.03 respectively and the mean difference was 6.057 & t value of 35.8 and was found to be significant at 0.001 level among interventional group. The mean value post intervention score was 8.03 with SD of 1.014 among interventional group and the mean post intervention score was 12.34 with standard deviation of 1.679 among control group. The mean difference was 4.314. The t-value 13.010 was found to be significant at 0.001 level between interventional and control group. (JOSE, K.E., 2012) In the this study, there is no significant association

in control group. While in experimental group, the significant association was found with residence.

The findings was supported by the study conducted by Shruti. L at a selected hospital in Mangalore. The experimental and control group post-assessment levels of labour pain perception showed no statistically significant association with chosen demographic characteristics such as age, religion, family type, education, and residential location, as well as employment pattern. (Sruthi, L., 2013)

# CONCLUSION

The breathing technique was effective according to the present study and it could be useful to reduce the labour pain and also the pain perception.

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# Uplifting the Grassroots Through Community Entrepreneurship Development: A Case Study of Sualkuchi Handloom Town of Assam, India

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## ABSTRACT

A strong foundation of the economy lies in strengthening the grassroots. A robust rural economy and sound financial health at the grassroots is imperative for a balanced economic growth of any region. This Covid-19 pandemic and resultant lockdown showed the helplessness of industrialization with 10 million immigrant workers in India rushing back to their native places in search of food and shelter. A sustainable income that provides adequate stability to not just one but future generations is the need of the hour. After agriculture, the largest labour intensive sector in India is handloom. It employs around 4.3 million people, contributes 2.3 % to the country's GDP and 12% to earnings from exports. Total handloom export stood at US\$ 176.97 million (April 2020 to January 2021) as per Ministry of Textiles, Government of India. So this sector has potential for an increased GDP and per capita rural income. Some facts about India's rich history of trade and commerce give an insight into the high demand of Indian textiles all across the globe. Apart from spices, herbs and minerals, India exported silk and cotton textiles to Central Asia, Southeast Asia and even Europe as early as in the 3rd - 4th centuries. Silk rearing and weaving are skills that are passed on from one generation to the other in rural areas of our country. Investments in terms of infrastructure and skill training would be extremely minimal if this tradition is taken up as an entrepreneurial venture within a geographical community. This paper attempts to study the handloom weavers of Sualkuchi town of Assam, their problems and future growth plans. This paper would also try to understand the possibilities of developing a community entrepreneurial programme for these weavers. This would be an initiative to motivate the younger generation to take up this tradition and enjoy a healthy sustainable living within their geographical boundaries rather than contributing towards growing urban slums.

**KEY WORDS:** COMMUNITY; ENTREPRENEURSHIP DEVELOPMENT; SUALKUCHI; HANDLOOM WEAVERS.

## INTRODUCTION

Soul of a nation rests in the villages. India is largely an agricultural country with around 65 percent population still living in the villages. Agriculture is the biggest employment provider even today. Handloom and handicrafts are the offshoots or ancillary activities of the agricultural sector, that all villagers, especially women are involved in the rural areas. These are certain skill sets that are being passed over from one generation to



another since very early times. However, because of low financial returns and time consuming work, the new generation of workers prefer to leave the traditional jobs behind and look for more lucrative career opportunities in the urban areas. Thus they end up doing petty work for quick money. COVID 19 pandemic was a major deathblow to these workers who fled to their villages due to loss of work and livelihood during nationwide lockdown.

This can be taken as a wakeup call to the government as well as the policy makers to think about enhancing job opportunities at the grass root level and ensure sustainability and growth. Developing entrepreneurial skills at a community level to practice and earn profit from their traditional skills could be a very practical decision to not only overcome the current crisis situation but also move closer to the government policies of Atmanirbhar Bharat (self sufficient India). Community



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entrepreneurship would ensure sustainable livelihood for the entire community residing within a particular geographical boundary (Ahom 2017).

**Research Question:** India witnessed a scary picture of 10 million (Government of India) workers migration from urban to rural areas during COVID 19 pandemic resultant lockdown. There arose a situation of unemployment, hunger and hopelessness. This situation led us to rethink about a balanced economic growth with an all inclusive model ensuring equal urban-rural growth. In this context can the traditional handloom industry be developed to such an extent that a good percentage of rural population is engaged within a certain geographical boundary earning a sustainable income? (Anand 2017)

#### **Research Objectives**

- 1. To study the socio-economic condition of handloom weavers of Sualkuchi in present times.
- 2. To study the reasons of lack of interest of young generation in traditional handloom business.
- 3. To study the possibility of developing community entrepreneurship to ensure grassroots development.

# **RESEARCH METHODOLOGY**

**Nature of Research:** The nature of research is qualitative. Inductive approach is used to study the data collected through interviews. Narrative analysis is used.

**Sampling Method:** The study has been carried out mainly through Primary research in the Sualkuchi town of Assam. Survey has been conducted through questionnaire as well as personal interview. Purposive sampling was done. Field study was conducted in the month of January-February 2021. The nature and condition of work of the weavers was observed from close quarters. For this a focused group of 50 respondents were selected for personal interview. These 50 respondents include both contract and master weavers. Secondary data has been collected from available literature like media reports, government reports, research papers, books and internet sources, etc (Chand et al., 2012).

Literature Review: Peredo & Chrisman, 2006, rightly says community-based entrepreneurship involves a process through which new enterprises are created and operate in a community's existing social structure. It means it is possible to develop a community as an entrepreneurial community and help them work towards achievement of a common goal. Phukan.R,(2012) gave a comparative picture of total households involved in handloom in the northeastern states and that of the country as a whole. In his study, he found that the northeastern states of India together accounts for almost 60% of the total handloom households of the country. It is 16.83 lakh household in northeast alone in comparison to 27.83 lakh units in the country as a whole. Even among the northeastern states, Assam alone houses 12.41 lakh, that is, 44.6% handloom households which is indeed a great number.

However, he points out that in spite of this huge involvement in handloom, only 13.4% of the commercial looms of India are in Northeast which amounts to a meager 20% of the country's total handloom fabric output. To quote Phukan.R, "In 2009-10, a total of 1403484 weavers are found engaged in this profession in Assam of whom 147042 are full time weavers while 1256442 are part time weavers." So, the difference between the part time and fulltime weavers is also huge. This definitely implies that the earnings from the sector are inadequate to motivate the workers. Chakravartty. P & Basumatary.K,2018 says that Sualkuchi, situated on the bank of Brahmaputra, about 35 kms west from Guwahati city, also known as "Manchester of Assam" and was developed by Momoi Tamuli Barbaruah, a great administrator of the Ahom kingdom. A large number of master weavers from all over the region were shifted to this village during that period.

(Bajpeyi et al., 2010), rightly points out that handloom weaving is such an integral part of Assam that every women weaves for household as well as commercial purposes. According to (Bajpeyi et al.,), Assam has around 13 lakh looms that engages roughly 23 lakh people, out of which 91 per cent are women. However, only 1.50 lakh looms are used commercially at present. It is obvious from this research that production potential is not optimally utilized. The paper further says that Assam is the only state where all the commercial varities of silk are available. These include Mulberry silk, Muga, Eri and Tasar silk. From the review of literature it is evident that there is ample scope of developing the traditional handloom weaving as a commercial venture, however, it has not been used optimally as yet. In this paper an attempt is being made to study the problems of the weavers of Sualkuchi town and seek solutions these problems through development of community entrepreneurship (Bortamuly et al., 2013).

#### **RESULTS AND DISCUSSION**

Grassroots are the very essence of any society. Especially for a country like India which is so vast in size and population that it is the 7th largest country in the world and 2nd most populous country after China. With 1.2 billion people India also provides the largest marketplace to international brands and products. Our rural population stands at around 66% and urban population stands at 34% in 2019 (internet sources). With this huge number of rural population it is humanly not possible for any government to provide employment to all. Out of a total of 501 million workers of India, only 17.3 million are engaged in government jobs according internet sources. So it is well understood that it is a very less number. With a huge population of unskilled workers, how much employment can be provided by the government? Most of the government sector organizations are facing losses due to innumerable causes. We are not going into the details of this (Kaushik 2020).

Even in terms of multinational corporations, it is the manufacturing plants that can provide maximum

employment to the unskilled workforce. The white-collar jobs are limited to the urban areas. In the last 5 to 6 years, our country has made good progress in inviting multinational corporations to start manufacturing plants in India. Such an initiative would ensure higher employment opportunity for both skilled and unskilled workers. There is no denying the fact that for growth, every country needs Unicorns. But for overall balanced growth of the economy and society, developing the grassroots is a priority (Ana & James 2006).

This research paper explored various skills and indigenous entrepreneurial ventures that have been passed over from one generation to the other in our county since ancient times. These skills have become part of the DNA of the people of India. Such skills include handicrafts like brassware work, glassware work, bell metal work, carpet making, jewellery making, bamboo and jute furniture, kagzi work, silk and handloom work, etc, that used to be the mainstay of our people prior to the advent of British colonialists. Gradually, with time, India became the biggest market for the machine made goods from England and led to the natural death of the indigenous industries.

This paper focuses on the handloom sector, particularly that of the traditional silk workers of Assam. Even within Assam, this research pin points to one of the earliest handloom clusters of the region, that Sualkuchi town, just 35 kms from the main city Guwahati. Sualkuchi has stood the test of time from the 7th century CE to present day. For primary study, field trips to Sualkuchi was taken several times during the period January 2019 to December 2020. A focused group of 50 weavers were taken belonging to different age groups, gender, castes, educational levels and status of residence. 'We have learnt weaving from our parents and grandparents. From us our children learn. We don't go to any training institute, this is in our blood,' [translated from local language].

50 out of 50 weavers say that weaving is a tradition for them. It is a way of life that is being passed on from one generation to the other. All of them agree that they do not require any formal training in this profession. It is so true that in Sualkuchi in particular and in rural Assam in general, every household has a handloom in their front yard. It said that in ancient times, a bride needs to weave a piece of garment herself for her groom. It was an essential qualification for a girl of marriageable age. However, most of the handlooms are used for domestic use. For commercial purpose the weavers generally work under a master weaver who pays them commission on per piece basis. A master weaver is a person who owns more than 5 handlooms and takes weaving projects from retailers.

'We are poor and uneducated, so we do not have connections in the cities to get either projects or raw materials. We are only having a hand-to-mouth living with the commission we earn from master weavers. Normally for an ordinary mehkla-sador (2 piece Assamese traditional wear) we earn anything between Rs1200 – Rs1500. Even this is not a regular income.' [translated from local language]. 30 out of 50 weavers agree to this statement and express their grief over lack of job security, unstable income and no medical insurance. These weavers also said that this is seasonal work. Only during the marriage season or during festivals people buy traditional wear. It is not guaranteed that the same weavers are going to get the assignment in the next season as well. Moreover, in case of any health issues, they are left without any help. So, it means, no . work no pay (Shaw 2019).

The remaining 20 weavers are master weavers who run shops in Sualkuchi town. They informed that middlemen take orders from retailers from Guwahati city (35 kms away) and give to these master weavers. They procure raw material and ask the contract weavers to complete the work for a certain amount of commission. 50 out of 50 weavers agree that the COVID 19 pandemic has ruined their business and they are almost devastated. There are no new assignments as people are not buying products. Their existing stock is getting destroyed by rats and no customers coming in. Personal visit of the researcher during the first wave of pandemic proved beyond doubt that almost all weavers and retailers are sitting idle with markets displaying deserted looks. Marriages are either postponed or conducted without any pomp and show. Moreover people are losing jobs and nobody wants to use their savings for buying handloom silk which are quite premium products.

'We have not seen any government initiative. We are not even aware of what government is giving us. We only get to hear in television news but nothing in our lives have changed. The government has built a training institute here but it is of no use to us.' [translated from local language]. 40 out of 50 weavers are unaware of government policies regarding promotion of handloom. Only few of the master weavers know about some of the government initiatives. However, 50 out of 50 respondents share the opinion that none of the government policies have touched their lives. They are on their own. All the respondents also agree that the Sualkuchi Institute of Fashion Technology is non existent for them. Only outside students come and study there. Local people is not at all benefitted by the institute. 'Most of us do not have bank accounts. We get paid by cash. We do have what sapp and facebook but that it only to stay connected with friends and for entertainment, [translated from local language].

45 out of 50 respondents share this opinion of not using banking services or social networking for business purpose. Everybody is using these sites for entertainment and personal chat only. However, 5 out of 50 respondents all of whom are master weavers use net banking and social media for contacting customers. This helps us to understand the level of backwardness and ignorance of the developments of the weavers. It also clarifies the fact that government policies are far away from the real beneficiaries. 'Our livelihood is very unstable. We

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are surviving on very limited income. So our children do not want to pursue this tradition of weaving. Once they are educated they move out of Sualkuchi forever and settle down in bigger cities to earn money. Even we do not want them to stay here and struggle,' [translated from local language]. 48 out of 50 respondents are of the opinion that the young generation is looking for greener pastures in bigger cities. It is a fact that under the present state of affairs, there is no point in people continuing with the tradition of weaving and struggle for a good living. People want a sustainable income, growth and development in life. So it is quite justified.

# **FINDINGS/CONCLUSION**

The following are the findings of this research:

- The weavers are quite well skilled and traditionally trained. They are capable of creating attractive products.
- They do not have knowledge of the market trends. They are simply listening to middlemen.
- Only master weavers have knowledge of costing, rest are just working as workers.
- Most of them need knowledge of banking and usage of social networking for business purpose.
- Young generation is moving out for a better life leading to dearth of labour force in handloom sector and natural dying away of the industry.

So, it can be concluded that a well planned entrepreneurial initiative can offer sustainable living to These unorganised workforce of our country.

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# On the Effectiveness of Pelvic Floor Exercise for the Stress Urinary Incontinence Among Women

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# ABSTRACT

The aim of the study to determine the efficacy of pelvic floor exercise for stress urinary incontinence. In this study interventional evaluatory approach & time series research design were utilized. This research was carried out in a rural community area of Sawangi (Meghe) Wardha were 30 women who fulfill the criteria of sample selection that women selected as a sample according to non-probability purposive sampling technique. Significant difference were found before & after pelvic floor exercise. The findings of the severity of stress urinary incontinence were 14 (46.70 %) of women had grade I in pre assessment whereas, 12 (40%) of women had grade I in post assessment. A 16 (53.3%) of women had grade 0 in post assessment whereas, 6 (20%) of women had grade II in post assessment. A 12 (40%) of women had grade 0 in post assessment whereas, 0(0%) of women had grade 0 in pre assessment. Significant association was found between the history of mode of delivery of first attempt with stress urinary incontinence (p = 0.022) & also, significant association was found between age (p=0.031), marital status (p = 0.001) & history of mode of delivery of second attempt (p = 0.016) with severity of stress urinary incontinence is the main problem that may develop due to weak pelvic floor muscles & only pelvic floor exercise is a primary treatment to improve pelvic muscle strength.

**KEY WORDS:** EFFECTIVENESS, PELVIC FLOOR EXERCISE, STRESS URINARY INCONTINENCE, SEVERITY OF STRESS URINARY INCONTINENCE, INGELMAN-SUNDBERG SCALE.

# **INTRODUCTION**

Urinary incontinence is a medical disease in which the urinary bladder loses its control, which can range from a small amount of urine loss during sneezing, coughing, laughing, to a total loss of bladder control. It is a problem of involuntary leakage of urine & classification according to symptoms and incidence of pathophysiological mechanisms. (Norton, Brubaker, 2006) Urinary stress incontinence is also known as a medical problem in which uncontrollable leakage of urine due to stress, effort, heavy exercise, sneezing, or coughing and urinary stress incontinence is a unique type of urinary incontinence. Urinary stress incontinence have a great effect on the standard of living of women & can restrict professional



and individual activity and physical activity among women. (Montgomery, 2014.) Stress urinary incontinence is the commonest issue among females because of internal abdominal pressure like coughing, sneezing, laughing, running, exercises, and exertion. It is commonly found in females above the age of 15 years, stress urinary incontinence affecting certain age ranges and severity will be increased with age. This is a serious social health problem in young females which decreases the standard of living. (Sangsawang, 2013)

The study aims to determine the efficacy of pelvic floor exercise for the prevention and treating stress urinary incontinence. The objective was to assess the stress urinary incontinence among women before & after pelvic floor exercise, to assess the severity of stress urinary incontinence among women before & after pelvic floor exercise, to find out the association between stress urinary incontinence & severity with selected demographic variables. Urinary incontinence can damage the standard of living of an individual, & it will lead to a disturbing social relationship, depressive symptoms from embarrassment, and hospital stay because of urinary tract



infection, skin breakdown. Stress urinary incontinence may affect sexual function. (Palmer, 1996) Urinary stress incontinence is a common issue, experiencing discomfort, guilt, or complete lack of self-esteem, including significant social and human consequences. It has an impact not only on the standard of living but also on the costs. (Lenderking et al., 1996)

# MATERIAL AND METHODS

In this study time series research design & an interventional evaluatory approach was used. The research was carried out in the rural community area of Sawangi Meghe, Wardha were 30 females who have fulfill the sample selection criteria that selected as a study sample according to the non-probability purposive sampling technique. Permission was taken from institutional ethical committee. The tools were a structured questionnaire on demographic variables and stress urinary incontinence, Ingelman-Sundberg scale for assessing the severity of stress urinary incontinence, Checklist of pelvic floor exercise used for data collection. The tool was supplied to 12 specialists from various fields of medical surgical nursing, obstetrical & gynecological nursing. Expert suggestions & recommendations were used to make changes in tools. Before collecting data, authorization was received from the relevant authorities in the chosen community area. Consent was received from the sample (Bokne et al., 2019).

Pelvic floor exercise was given by the researcher to the participant. Pilot research was carried out on 3 samples in a selected rural community area salod, Wardha. Data collection process on 1st day pre-assessment of stress urinary incontinence & severity of stress urinary incontinence was done. On the same day, pelvic floor exercise was explained and demonstrated to those women who have grade I and II stress urinary incontinence. Instructed them to empty their bladder. They can sit, stand, and half lie with the leg slightly apart closed & draw around the anal passage as through preventing a bowel action. Then they have to draw up around the vagina and urethra as if to stop the flow of urine in midstream hold for 10 seconds then relax and repeat 10 times. Instructed them to do pelvic floor exercise 3 times/ day for 2 weeks (morning, afternoon, night). Researcher monitor activities on 1st,4th,7th, 10th& 13th day after that post-assessment was done after 2 weeks to determine the efficacy of pelvic floor exercise by using tools.

# **RESULTS AND DISCUSSION**

Grades of stress urinary incontinence are compared by using the Chi-square test. Significant difference was found in pre & post assessment. Significance of difference between the severity of stress urinary incontinence before & after pelvic floor exercise.

The above table shows the association of severity of stress urinary incontinence with age in years of women, marital status of women, and history of mode of delivery of women in the second attempt.

Section A	Percentage-wise	distribution	$\mathbf{of}$	women
according	to demographic varia	ables. n=30		

Demographic Variables	Number of	Percentage
Demographic Variables	Women (f)	(%)
A colume)		
Age(y15)	12	42.2
41 50 yrs.		45.5
41-50 yrs.	4	15.5
51-60 yrs.	δ	20.7
>00 yis.	5	10.7
Married	10	62.2
Married	19	03.3
Unmarried	0	0
Widow	11	36.7
Number of children	0	
No children	0	0
Une	2	6.7
Iwo	19	63.3
Three or more	9	30
H/O birth canal injury		
Yes	1	3.3
No	29	96.7
H/O mode of delivery		
1stattempt		
Normal Delivery	28	93.3
LSCS	2	6.7
2ndattempt		
Normal Delivery	24	85.7
LSCS	4	14.2
3rd attempt		
Normal Delivery	6	66.7
LSCS	3	33.3
4th attempt		
Normal Delivery	2	66.7
LSCS	1	33.3
H/O previous abdominal		
surgery		
Yes	22	73.3
No	8	26.7

# DISCUSSION

In this present study, the stress urinary incontinence is identified when unintentional leaking of urine with sudden pressure on the abdomen. According to analysis, it is found that 17(56.7%) of women had urine leak during running or picking up heavy objects in pre assessment whereas, 6 (20%) of women had urine leak during running or picking up heavy objects in post assessment. 13(43.3%) of women had urine leak when cough and sneeze in pre assessment whereas, 11(36.7%) of women had urine leak when cough and sneeze post assessment. 13 (43.3%) of women had urine never leak in post assessment whereas, 0(0%) of women had urine never leak in pre assessment. 9(30%) of women had urine passed suddenly during the day in pre assessment whereas, 2(6.67%) of women had urine passed suddenly during the day in post assessment. 21(70%) of women had urine never passed suddenly during the day in pre assessment whereas, 28(93.33%) of women had urine never passed suddenly during the day in post assessment.

	Pre assessment	Post assessment	χ2-value		
When I	)oes urine le:	ak			
Never	0(0%)	13(43.3%)			
Leak while running or picking up heavy objects.	17(56.7%)	6(20%)	10.42		
Leak when you cough and Sneeze	13(43.3%)	11(36.7%)	p=0.0006,S		
Leak all the time	0(0%)	0(0%)			
Have you ever suddenl	y passed uri	ne during the day	ř.		
Yes	9(30%)	2(6.6%)	5.04 p=0.019,8		
No	21(70%)	28(93.3%)			
Do you pass urine	by continuo	ous dribbling			
Yes	7(23.3%)	1(3.3%)	5.19		
No	23(76.7%)	29(96.6%)	p=0.022,S		
How much does leaking urin	e interfere v	vith yours everyd	ay life		
Not at all	0(0%)	10(33.3%)	1.		
A little	9(30%)	17(56.7%)	27.46		
Somewhat	9(30%)	3(10%)	p=0.0001,S		
A lot	12(40%)	0(0%)			
If you need to go to the toilet to	o pass urine,	how long can you	i hold on		
0-1 minutes	17(56.7%)	0(0%)			
1-5 minutes	10(33.3%)	11(36.7%)	20.05		
5-10 minutes	3(10%)	9(30%)	p=0.0001 S		
>10 minutes	0(0%)	10(33.3%)	p 0.0001,5		

Section C Significance of difference between the severity of stress urinary incontinence among women before &after pelvic floor exercise. n = 30

	Pre assessment	Post assessment	¥2-value
Grade 0	0(0%)	12(40%)	16.70
Grade I	14(46.7%)	12(40%)	p=0.0002,S
Grade II	16(53.3%)	6(20%)	



7(23.30%) of women had urine lost by continuous dribbling in pre assessment whereas, 1(3.33%) of women had urine lost by continuous dribbling in post assessment. 23(76.7%) of women had urine never lost by continuous dribbling in pre assessment whereas, 29(96.67%) of women had urine never lost by continuous dribbling in post assessment. 9(30%) of women had urine leaking interfere a little in their everyday life in pre assessment. 9(30%) of women had urine leaking interfere a little in their everyday life in post assessment. 9(30%) of women had urine leaking interfere a little in their everyday life in post assessment. 9(30%) of women had urine leaking interfere a little in their everyday life in post assessment. 9(30%) of women had urine leaking interfere somewhat in their everyday life in pre assessment whereas, 3(10%) of women had urine leaking interfere somewhat in their everyday life in post assessment.

12(40%) of women had urine leaking interfere a lot in their everyday life in pre assessment whereas, 0(0%) of women had urine leaking interfere a lot in their everyday life in post assessment. 10(33.30%) of women had urine leaking not at all interfere in their everyday life in post assessment whereas, 0(0%) of women had urine leaking not at all interfere in their everyday life in pre assessment.10(33.3%) of women are holding urine for 1-5 minutes in pre assessment whereas, 11(36.7%) of women are holding urine for 1-5 minutes in post assessment. 3(10%) of women are holding urine for 5-10 minutes in pre assessment whereas, 9(30%) of women are holding urine for 5-10 minutes in post assessment. 0(0%) of women are holding urine for more than 10 minutes in pre assessment whereas, 10(33.3%) of women are holding

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urine for more than 10 minutes in post assessment. 17(56.7%) of women are holding urine for 0-1 minutes

in pre assessment whereas, 0(0%) of women are holding urine for 0-1 minutes in post assessment.

Demographic variables	No. of women(f)	Mean stress urinary incontinency	F- value/ t- value	Df	F- tab value/ t-tab value	p-value
		Age (yrs	5)			-
31-40 yrs.	13	$10.30\pm0.75$		3,26	2.98	0.19 NS,p>0.05
41-50 yrs.	4	$10.75 \pm 1.50$	1.70			
51-60 yrs.	8	$11.12 \pm 0.64$				
>60 yrs.	5	$10.20 \pm 1.09$				
		Marital sta	tus			
Married	19	$10.63 \pm 1.01$	0.49	28	2.05	0.62 NS,p>0.05
Unmarried	0	0±0				
Widow	11	$10.45 \pm 0.82$	12 A 4 4			
		Number of ch	nildren			
No children	0	0±0		2,27	3.35	
One	2	$11.50\pm2.12$	1.30			
Two	19	10.57±0.83				0.28 NS,p>0.05
Three or more	9	10.33±0.86				
		H/O birth cana	1 injury			
Yes	1	11±0	0.46	28	2.05	0.64 NS,p>0.05
No	29	10.55±0.94				
		H/O mode of c	lelivery			and the second se
		1 <sup>st</sup> attem	pt			
Normal Delivery	28	10.46±0.83	2.42	28	2.05	0.022
LSCS	2	$12\pm1.41$				S,p<0.05
		and attem	unt l	_	1	
Normal Delivery	24	10.62+0.87	0.27	28	2.05	0.78
LSCS	4	10.50±0.57	0.27			
Loco	-	3rd attem	nt		1	110,0-0.00
Normal Delivery	6	10.33±0.81	136	28	2.05	0.21
LSCS	3	11±0	1.50			NS.p>0.05
2.500	5	4 <sup>th</sup> attem	nt		1	1
Normal Delivery	2	11±0	· · ·	-	-	-
LSCS	1	11±0				
2.200	н	O previous abdon	ninal surgers	~	1	1
Yes	22	10.50±0.96	0.64	28	2.05	0.52 NS.p>0.05
No	8	10 75±0 88				

Demographic variable	Severity of stress urinary incontinence			v2 volue	Df	Tabulated 'x2'	n volue
	Grade 0	Grade I	Grade II		Di	values	p value
			Age (yrs.)				
31-40 yrs.	10	2	+ 1 + 1		6	12.59	
41-50 yrs.	1	2	1	10.00			0.031
51-60 yrs.	1	5	2	13.88			S,p<0.05
>60 yrs.	0	3	2				
and the second se			Marital Status		- 10	10 mm	and the second sec
Married	12	6	1	13.49	2	5.99	0.001 S,p< 0.05
Unmarried	0	0	0				
Widow	0	6	5	- 1			
	and the second sec		Number of child	lren	a de la companya de l		
No children	0	0	0			9.49	0.66 NS,p>0.05
One	1	1	0	2.38	4		
Two	9	6	- 4				
Three or more	2	5	2				
	-		H/O birth canal inju	rv			
Yes	0	1	0	1.55	2	5.99	0.46
No	12	11	6				NS,p >0.05
			H/O mode of de	liverv			
			1st attempt				
Normal Delivery	12	11	5	1.87	2	5.99	0.39 NS,p >0.05
LSCS	0	1	1				
			2nd attempt				and the second sec
Normal Delivery	10	11	3	8.32	2	5.99	0.016 S,p<0 .05
LSCS	1	0	3				
			3rd attempt				
Normal Delivery	2	3	1	1.35	2	5.99	0.50 NS,p >0.05
LSCS	0	2	1	and the second se			
			4th attempt				
Normal Delivery	1	1	0	0.75	1	3.84	0.38 NS,p >0.05
LSCS	0	1	0				
		1	T/O previous abdomin	al surgery			
Yes	10	7	5	2.30	2	5.99	0.31
No	2	5	1				NS, p>0.0

A study was supported by a parallel group randomized controlled trial which was conducted in twenty three community & secondary care centers providing continence care in Scotland & England where 600 women were selected as samples. Mean ICIQ-UI SF scores at 24 months were 8.2 in the biofeedback pelvic floor muscles training group & 8.5 in the pelvic floor muscle training group.( Neumann, Grimmer, Deenadayalan, 2006) In this present study, 14 (46.70%) of women had grade I severity of stress urinary incontinence in pre assessment whereas, 12 (40%) of women had grade I severity of stress urinary incontinence in post assessment. 16 (53.3%) of women had grade II severity of stress urinary incontinence in pre assessment whereas, 6 (20%) of women had grade II severity of stress urinary incontinence in post assessment. 12 (40%) of women had a grade 0 severity of stress urinary incontinence in post assessment whereas, 0(0%) of women had a grade 0 severity of stress urinary incontinence in pre assessment.

The research were supported by a prospective longitudinal observational study which was carried out in Tertiary referral urogynecology center, France. This shows, 17 (20%) of women stress urinary incontinence grade 1 was cured whereas, 4 (20%) of women were not cured. 20 (24%) of women stress urinary incontinence grade 2 cured whereas, 4 (20%) of women was not cured. 36 (42%) of women stress urinary incontinence grade 3 cured whereas, 6 (30%) women were not cured. (Bokne, Sjöström, Samuelsson, 2019) In this present study, the history of mode of delivery of women in the first attempt was significantly associated with their stress urinary incontinence and severity of stress urinary incontinence is significantly associated with age, marital status, & history of mode of delivery of women in the second attempt. A supportive cross-sectional study were conducted in Iran. In this study, 90 married women were selected randomly. This study revealed that stress urinary incontinence is significantly associated with vaginal delivery (p = 0.035, p<0.05). (Langa, Fultz, Saint et al 2002)

## CONCLUSION

Stress urinary incontinence is the main problem which may develop due to weak pelvic floor muscles. This research reveals that the assessment of stress urinary incontinence & severity among females is significantly associated with before & after pelvic floor exercise. This research has proven that pelvic floor exercise is beneficial for stress urinary incontinence. Association of severity of stress urinary incontinence found with age in years of women, marital status of women, and history of mode of delivery of women in the second attempt & association of stress urinary incontinence found with the history of mode of delivery of women in the first attempt.

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# **Text Document Clustering with Negative Noun Attributes**

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# ABSTRACT

High-dimensional feature space is the biggest challenge for all its mining duties. People who used automatic document representation methods based on statistics and information theory had dealt with the issue of high dimensions. The efficiency of HCL K-Means clustering and clustering with Flocking algorithm was analysed in this article with noun characteristics chosen by chi-square and CHIR techniques with positive and negative noun characteristics. It was noted that the clustering efficiency rises with the noun attributes with favourable noun characteristics selected by the CHIR techniques.

KEY WORDS: NOUN ATTRIBUTES, CHI, CHIR, HCLK-MEAN AND FLOCKING ALGORITHM.

# **INTRODUCTION**

Representation of bags of nouns is a vector of unordered set of noun word information in the document. The vectors can be either numerical or Boolean. A Boolean vector indicates the existence or lack of each noun phrase in a document. Numerical value in the vector indicates the strength of the calculated noun word based on its frequency, theory of information or statistics. The representation has been commonly used in the processing of natural language and in the retrieval of data. The drawback of BOW illustration is that the context of words, occurrences, and order of occurrences of words is neglected.The drawback of BOW representation is that it ignores the context of the words, place of occurrences and order of occurrences of the words (Asha et al., 2010).

Still, this is the most widely used document representation, but BoN is used to extract the noun word and it brings the concept and shows good clustering results. Yang and Pedersen , made a comparative study on the feature selection techniques proposed for text classification and



reported that the features chosen based on the  $x^2$  value are better than other techniques. CHIR is a variant of chisquare method proposed by Li et al, which consider the relevancy of feature to the category for feature selection (Abusamra 2013).

**Related Work:** The term discrimination model of Salton provides significance to the depiction of text by specifying a good text attribute as the one that improves the average range of all pairs of document vectors. Bag of words is the most common representation of documents Significant improvements were achieved by Tzeras and Hartmann[4] using noun phrases acquired by combining syntactic and statistical criteria, where a statistical filter complemented the "crude" syntactic technique.Only syntactic sentences in the category were maintained that happened at least three times. Its high-dimensional word space is the most difficult problem in text clustering (Huiqing et al., 2002).

Mitra et al used new indexes to evaluate similarity of attributes in order to detect redundancy attributes. Huiqing Liu et al conducts a comparative research using distinct methods of choice of features such as entropy, Chi Squared method, T-Statistics and MIT correlation and correlation-based technique of choice of features using Profiles of Gene Expression and Proteomic Patterns. He suggested extracted characteristics significantly enhance the classifier's efficiency. Tao Liu et al suggested a new technique of selecting attributes, called Term Contribution,



which ranks the attribute through its full contribution to the similarity of records in a data set.



Yi Hong et al suggested an unsupervised feature selection algorithm called Guided unsupervised Ensembles feature selection algorithm and is dimension-unbiased. Yanjun Li et al launched a feature selection technique called CHIR to evaluate the word goodness. Ridvan Saracoglu et al explore the document belonging to more than one category and used to determine the records belonging to which categories. Fuzzy similarity ( $\alpha$ -FCM) and multiple categories vector method (MCVM) to their objectives. Asha Gowda Karegowda et al uses two filter approaches, namely Gain ratio and Correlation-based feature selection methods used to elucidate the significance of feature subset selection for Pima Indian Diabetic Database (PIDD) classification, and its experimental results show that the information gain method provides better classification accuracy. It is also shown that by using a feature selection method, classification precision can be considerably improved by a tiny amount of genes.

#### 1.2 Bag of Nouns (Bon) Model:

Documents are represented as dimensionality vectors in this representation, which is equal to the number of noun words in the training corpus. In the training corpus, each component in the vector reflects a noun phrase. Figure 1.1 demonstrates an illustration of the building of the Noun Index. It can be noted that the document contains 30 phrases. In the representation model of Bag-of-Nouns (BoN),11 words (37.67%) can be obtained as Nouns using RiTa WordNet ontology and can be included in the list of characteristics as shown in the table (Figure 1.1). Only nouns are considered in this article to decrease their dimension. Clustering is not able to perform well in a high dimension. All the word in the document is not important and some are irrelevant and redundant.

**1.3 Attribute Selection Methods Used:** This article discusses some of the techniques of choosing existing attributes used in this study (Mitra & Murthy 2002).

#### 1.3.1. The Concept of $\chi^2$ Statistic (CHI)

The  $\chi^2$  term-category independence test is a popular attribute selection technique for text mining retrieval

problems. This is a two sided attribute selection metric.  $\chi^2$ value for a term is obtained by comparing the observed frequencies with expected frequencies, when the occurrence of the terms is assumed to be independent. In a corpus that contains n labelled documents, which fall in m categories, Noun (N) X Document (D) contingency table is formed for each term (Jinxin et al., 2010).

Expected frequency E (i, j), where i represents the presence or absence of an attribute and j represents whether the document belongs to a category, calculated using Equation (1.1).

$$E(i,j) = \frac{\sum_{a \in (N1,N2)} O(a,j) \sum_{b \in (D1,D2)} O(i,b)}{n}$$
(1.1)

 $\chi^2$  Value for a noun words (N) in the training corpus, with respect to the document (D) is defined in the Equation (1.2):

$$\chi_{n,d}^2 = \sum_{i \in (N1,N2)} \sum_{j \in (D1,D2)} \frac{(O(i,j) - E(i,j))^2}{E(i,j)}$$
(1.2)

In statistics, "degree of freedom" is used to describe the number of values in the final calculation of a statistic that are free to vary. The "degree of freedom" for a contingency table of dimension is (r-1) X (c-1). The value obtained with Equation (1.2) is compared with the value in the standard  $\chi^2$  tabulation for the determined degrees of freedom with a confidence level.

Null hypothesis has to be rejected when the  $\chi^2_{n,d}$  calculated using Equation (1.2) is greater than the tabulation and alternative hypothesis has to consider. When it is assumed that there is a dependency good-of-fit is used to decide the dependency. Measures of the goodness of fit typically summarize between the observed values and expected values under the model in question. For a corpus with m classes, term goodness is calculated as either the average as defined in Equation (1.3) or the maximum as defined in Equation 1.4

$$\chi^{2}_{avg}(W) = \sum_{j=1}^{m} p(c_{j})^{2}_{\chi^{n}_{n,d_{j}}}$$
(1.3)  
$$\chi^{2}_{max}(W) = \sum_{i=1}^{m} \max_{j} \left\{ \chi^{2}_{n,d_{j}} \right\}$$
(1.4)

 $p(c_j)$  is the probability of documents to be in the category  $c_j$ . In this research, maximum value is used for comparison. Noun terms were ranked by their  $\chi^2$  value and terms having strong dependency to the categories were selected as attributes (Meedeniya et al., 2009).

**1.3.1.1. Drawback of**  $\chi^2$  **Statistics:** CHI algorithm determines only whether there is dependency between term and a category and not the type of dependency. Hence  $\chi^2$  value does not distinguish positive and negative attributes of a document. Li et al varied by the CHI method by introducing the relevancy of the term to a

document and disguised the attributes into positive and negative (Ridvan 2008).

**1.3.2. The Concept Of CHIR Method:** CHIR is a supervised attribute selection algorithm based on  $\chi^2$  statistics, which not only determines whether there is a dependency between noun and a document but also the type of dependency. To determine the type of dependency, a new relevancy measure  $R_{n,d}$  is defined in CHIR as shown in Equation (1.5):

$$R_{n,d} = \frac{O(n,d)}{E(n,d)}$$
(1.5)

If there is no dependency between the noun n and the documents d, then the value of  $R_{n,d}$  is close to 1. If there is a positive dependency then the observed the frequency is larger than the expected frequency, hence value of  $R_{n,d}$  is larger than 1 and when there is a negative dependency  $R_{n,d}$  is smaller than 1. Based on  $\chi^2$  statistics and  $R_{n,d}$  a new definition for term goodness for corpus with m classes in given in Equation (1.6):

$$r\chi_{n,d}^{2}(n) = \sum_{j=1}^{m} p(R_{n,d_{j}})\chi_{n,d_{j}}^{2} \text{ wit } \Box R_{n,d_{j}} > 1$$
(1.6)

Wherep(R<sub>n,dj</sub>) is the weight of  $\chi^2_{n,d,j}$  in the corpus. In terms of R<sub>n,d,j</sub>, pR<sub>n,d,j</sub> is defined as Equation (1.7):

$$p(R_{n,d_j}) = \frac{R_{n,d_j}}{\sum_{j=1}^m R_{n,d_j}} \quad wit \square R_{n,d_j} > 1$$
(1.7)

Larger value of  $r\chi^{2}$  (n) indicates that the noun word is more relevant to the document. The attribute selection procedure first calculates  $rx^{2}$  value for each unique noun word in the corpus, sorts them in descending order based on their  $r\chi^{2}$  value and then selects the top 'q' terms. In this research, same number of attributes was selected for each document (Vijayalakshmi & Manimegalai 2014).

**1.4 Algorithm to Select Positive Words Using Chir:** The dataset includes records such as news article, multiple high court judgments, and discussion group posts. They comprise a lot of metadata like date, location, writer, and so on. Therefore, by removing such meta data, the first stage in the algorithm is to clean up the benchmarks. All papers contain non-clustering phrases such as articles and prepositions. Hence, Stanford University's listed stop words (571) were removed from the training corpus. Stemming is the method by which derived words are reduced to their root form. The phrases like "stemmer", "stemming", and stemmed, for instance, are based on the root term "stemmer". Since 1968, several researches on the stemming of phrases in English can be carried out (Vijayalakshmi & Manimegalai 2013.

No stemming algorithm does a ideal stemming; either by streaming or by streaming a phrase. The most common porter stemming algorithm is used in these studies. In

the stemming algorithm, there are some minor mistakes such as; for certain words, it provides more than one stem. For example, the algorithm "communicate" for the word "communicates" gives two stems. By selecting only the terms that appear in the dictionary, these mistakes can be eliminated.

Contingency table is built for each unique word in the training corpus and  $R_{n,d}$ , the relevancy of the noun word to document d is determined. Words with R(n,d) value less than 1 are eliminated and noun – goodness ( $r\chi^2$ ) is calculated for all positive words using Equation (1.6). Then the noun words are sorted based on their  $r\chi^2$ 2 value and the top 'p' words are chosen as features.

**1.5 Time Complexity of Chir for Bon Representation:** The suggested algorithm pre-processes the records and selects from the training corpus unique non-stop nouns. The algorithm that uses BoN representation to depict records, the first step is to link to WordNet to determine the vocabulary POS in the training corpus. This algorithm's complexity is 0 (V), where V is the amount of vocabulary terms. The CHIR algorithm is used to calculate its relevance score for each noun. The complexity of the entire selection algorithm for the attribute is therefore (V + V\*m + V\*log V), where m is the amount of documents in the database. The word V may be ignored because, compared to V\*m, it has less development. The simplified complexity of the algorithm is 0 (V \*m + V\*logV).

**1.6 Experimental Setup:** The tests were performed with a single Intel core i5 duo processor with 2.40 GHz velocity, 4 GB RAM, and 64-bit operating system from Windows7. WordNet was linked to the English dictionary during testing to understand the phrases. Experiments with randomly selected training papers were performed 10 times. The K-Means algorithm based on Hard CompetitiveLearning and flocking algorithm clustering were used for testing. The findings shown in this paper's tables and numbers are the average clustering performance during testing. The clustering performance was first analysed by selecting the top ' q ' positive characteristics and then included in addition to the positive characteristics few appropriate adverse characteristics of the document

**1.6.1 Connecting to Wordnet:** RiTa WordNet is intended to be a user-friendly toolkit for natural language and generative literature experiments. RiTa is introduced with a single API in Java and JavaScript and integrated with Processing as an option. This study utilizes Javabased RiTa WordNet. It is free / free and open-source through a GPL license. JWNL (Java WordNet Library) is a WordNet dictionary access Java API. It groups English words into Noun, verb, adjective, adverb, etc., gives brief, general definition, and documents the different semantic relationships between these sentences. This grouping helps to readily use WordNet for automatic text assessment and implementation of artificial intelligence (Salton et al., 1975; Tao et al., 2003).

1.	6.2	Data	Sets	Used	for	Ex	perime	ntatio	n:
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Table 1.1 Summary of data sets used in experiments						
Dataset	No. Of. Docs in Dataset	Classes	Dataset size			
DS1	5000	5	11.3 MB			
DS2	5000	5	9.91 MB			
Reuter	5000	5	8.61 MB			
SCJC	500	5	4.07 MB			

This research work utilizes four distinct datasets created from the two common text clustering benchmarks 20Newsgroups, Reuter-21578, and Specific Crime Judgement Corpus (SCJC). The First dataset (DS1) is made up of five types of documents: alt.atheism, sci. med, sci.space, rec.sport.hockey, comp.windows.x of 20Newsgroup. The second dataset (DS2) is made up of five classifications of documents: alt.atheism, comp. graphics, comp.sys.ibm.pc.hardware, comp.sys.mac. hardware, comp.windows.x. It can be noted that the subjects of the first dataset are distinct while computer science is associated with four subjects out of five in DS2. Documents in both alt.atheism classifications are commonly used in both datasets. The third dataset (Reuter) consisted of five classifications of documents: acquisition, crude, earnings, grain, money-fx of Reuter 21578 (Tzeras & Hartmann 1993).

Finally, the fourth dataset is the Specific Crime Judgment Corpus (SCJC) synthetic dataset. It involves five categories: offence against state, offence against property, offence against human body, offence relating to religion, offence relating to marriage. There are 100 true judgments in each category. These judgments are gathered at distinct phases of time from the internet and have been classified by human specialists and grouped manually into five classifications. Table 1.1 lists the entire corpus used for this research. In this research, 50% of the corpus is considered to be a training dataset and is used for extraction of noun attributes and the remaining 50% is used to test data sets. The test dataset is used to assess the quality of BON representation characteristics and the quality of the cluster (Yanjun et al., 2008).

# MATERIAL AND METHODS

The characteristics chosen by the suggested noun document representation algorithm were assessed using well-known clustering metrics such as precision, recall, F- Measure, entropy, purity, overall F-Measure, overall Entropy, and overall purity (Yanjun et al., 2008).

# **RESULTS AND DISCUSSION**

This section describes the outcomes of tests performed using noun-document representation with and without negative attributes for different attribute selection algorithms. 1.8.1 Results of The CHI, CHIR, and CHIR NEG With HCLK-Mean Clustering Algorithm: The HCLK-Mean clustering's high precision shows that all returned by clustering was a appropriate outcome. But high precision at low rates of recall shows that not all appropriate items could have been discovered by the cluster. Table 1.2 and Table 1.3 illustrate the precision and recall of the clustering of HCLK-Means for separate datasets of distinct sizes when experimenting with attributes selected for BON representation by various attribute selection methods.Clustering precision and recall improved with the positive attributes chosen by the CHIR technique. When negative features were included in the space attribute, a decrease in the metrics was noted. It was noted that, when negative attributes were included, there was a slight rise in accuracy than CHI.

Table 1.2 Comparison of precision of HCLK-Mean
clustering with CHI, CHIR, and CHIR NEG methods for
text various datasets

Dataset	СНІ	CHIR	CHIR NEG
DS1	0.73	0.99	0.79
DS2	0.71	0.84	0.81
Reuter	0.66	0.88	0.87
SCJC	0.74	0.61	0.60

Table 1.3 Comparison of recall of HCLK-Mean clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	CHI	CHIR	CHIR NEG
DS1	0.83	0.99	0.41
DS2	0.75	0.93	0.68
Reuter	0.98	0.89	0.88
SCJC	0.67	0.79	0.68

Figure 1.2 demonstrates the HCLK-Mean clustering F-measure with different attribute selection techniques for the different datasets. When selected attributes were observed, it was observed that nouns are related to the dataset to the attributes selected for the different datasets with CHIR. That's why clustering efficiency was always high for all datasets. Attributes selected from datasets were more general terms and were unable to efficiently discriminate against documents (Hong et al., 2007).

Figure 1.3 displays overall HCLK-Mean clustering F-measure with CHI, CHIR, and CHIR NEG techniques for different datasets of text. The clustering algorithm HCLK-Mean could efficiently cluster the files as each dataset must have distinctive noun phrase for each dataset category. An increase in Overall F-Measure with all data set with CHIR method's positive attributes.







Figure 1.4 Comparison of purity of HCLK-Mean clustering with CHI, CHIR, and CHIR NEG methods for text various datasets



Figure 1.4 shows the comparative results of Purity of the HCLK-Means clustering for various datasets. The HCLK-Means clustering was able to effectively cluster the documents of the categories alt.atheism, comp. graphics, comp.sys.ibm.pc.hardware, comp.sys.mac. hardware, comp.windows.x in DS2 dataset. Analysis of attribute chosen by the CHIR method showed that there were number of common noun words between the above categories (Yiming et al., 1997). Figure 1.5 Comparison of overall entropy of HCLK-Mean clustering with CHI, CHIR, and CHIR NEG methods for text various datasets









The overall purity of the HCLK-Mean clustering for different datasets is shown in Table 1.4. It was noted that HCLK Mean clustering's overall purity rises when the choice of attributes includes the relevance of the attributes identified in CHIR. Clustering efficiency decreased when the negative attributes for clustering were included. A tiny rise with negative attributes was noted compared to the technique of choice of CHI characteristics (Zong 2010).

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Table 1.5 and Figure 1.5 demonstrate the HCLK-Mean clustering entropy and overall entropy for different datasets. It was noted that HCLK Mean clustering's overall entropy declines when the attribute choice includes the relevance of the attributes identified in CHIR. Clustering efficiency decreased when the negative attributes for clustering were included. There was a tiny rise in efficiency with negative attributes compared to the selection method for CHI attributes.

Table 1.4 Comparison of overall purity of HCLK-Mean clustering with CHI, CHIR, and CHIR NEG methods for text various datasets							
Dataset CHI CHIR CHIR NEG							
DS1	0.62	0.86	0.77				
DS2	0.61	0.65	0.60				
Reuter	0.53	0.72	0.64				
SCJC	0.50	0.49	0.48				

1.8.2 Results of the CHI, CHIR, and CHIR NEG with Flocking-based clustering algorithm

Table 1.6 and Table 1.7 demonstrate the precision and recall of flocking-based clustering with CHI, CHIR and

Table 1.5 Comparison of entropy of HCLK-Mean clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	CHI	CHIR	CHIR NEG
DS1	0.24	0.04	0.06
DS2	0.37	0.20	0.23
Reuter	0.04	0.06	0.03
SCJC	0.39	0.32	0.45

Table 1.6 Comparison of precision of Flocking-based clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	СНІ	CHIR	CHIR NEG
DS1	0.50	0.82	0.51
DS2	0.71	0.79	0.45
Reuter	0.50	0.54	0.51
SCJC	0.51	0.57	0.53

Table 1.7 Comparison of recall of Flocking-based clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	CHI	CHIR	CHIR NEG
DS1	0.52	0.83	0.39
DS2	0.81	0.81	0.36
Reuter	0.64	0.61	0.43
SCJC	0.50	0.59	0.49

Table 1.8 Comparison of overall purity of Flocking-based clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	CHI	CHIR	CHIR NEG
DS1	0.42	0.50	0.53
DS2	0.53	0.57	0.33
Reuter	0.39	0.47	0.42
SCJC	0.36	0.49	0.39

CHIR NEG attributes for DS1, DS2, Reuter and SCJC corpus. An increase in clustering precision and recall with the positive attributes chosen by the CHIR method was noted. When negative attributes were in the space of the attribute, there was a drop in both precision and recall for all datasets.

Figure 1.6 illustrates the F-measure of Flocking-based clustering with different attribute selection techniques for the different datasets. When selected attributes were

observed, it was observed that nouns are related to the dataset to the attributes selected for the different datasets with CHIR. That's why clustering efficiency was always high for all datasets. Attributes selected from datasets were more general terms and were unable to efficiently discriminate against documents.

Figure 1.7 demonstrates overall F-measurement of CHI, CHIR, and CHIR NEG clustering with different text datasets. The clustering algorithm based on Flocking could efficiently cluster the files as each dataset must have a distinctive noun phrase for each dataset category. An increase in Overall F-Measure with all data set with CHIR method's positive attributes.

Figure 1.8 demonstrates the HCLK-Means clustering's relative purity outcomes for different datasets. The clustering of HCLK-Means has been able to efficiently cluster the alt.atheism, comp.graphics, comp.sys.ibm. pc.hardware, comp.sys.mac.hardware, comp.windows.x in DS2 dataset categories. Analysis of the attribute chosen by the CHIR technique showed that between the above categories there were numerous common noun words.

The overall purity of the HCLK-Mean clustering for different datasets is shown in Table 1.8. It was noted that HCLK Mean clustering's overall purity rises when the choice of attributes includes the relevance of the attributes identified in CHIR. Clustering efficiency decreased when the negative attributes for clustering were included. A tiny rise with negative attributes was noted compared to the technique of choice of CHI attributes.

Table 1.9 Comparison of entropy of Flocking-based clustering with CHI, CHIR, and CHIR NEG methods for text various datasets

Dataset	CHI	CHIR	CHIR NEG
DS1	0.52	0.31	0.40
DS2	0.29	0.25	0.46
Reuter	0.18	0.16	0.41
SCJC	0.37	0.21	0.49

Table 1.9 and Figure 1.9 demonstrate the Flocking-based clustering entropy and overall entropy for different datasets. It was noted that the Flocking-based clustering's overall entropy reduces when the attribute selection includes the relevance of the attributes identified in CHIR. Clustering efficiency decreased when the negative attributes for clustering were included. There was a tiny rise in efficiency with negative attributes compared to the selection method for CHI characteristics.

# CONCLUSION

In this article, the clustering performance was analysed using an attribute chosen by the CHI techniques and BON Representation was used by CHIR. Then the attribute set included negative attributes recognized by the CHIR technique to analyse their effect on clustering results. It was noted that clustering efficiency increases very well with the incorporation of positive attributes for all datasets using CHIR technique and dropswhen negative features were included. It was observed that when negative attributes were included, there was a slight rise in accuracy than CHI, and also noted that the clustering efficiency differs greatly while working with datasets. It was observed that attributes supplied to tightly associated categories are more essential for clustering documents.

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# Design, Optimization, Development of a New RP-HPLC Method For Simultaneous Estimation of Thiocolchicoside and Diclofenac in Bulk and Tablet Formulations

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#### ABSTRACT

A reversed-phase high performance liquid chromatography technique has been effectively designed, produced for the concurrent assurance of thiocolchicoside and diclofenac in a medication detailing. The RP-HPLC strategy utilized a Phenomenex C18 reversed phase column (Luna 5µ, 250 × 4.6 mm) with an isocratic combination of methanol Ammonium acetic acid buffer (pH:4.2), acetonitrile and methanol in the proportion 40:40:20 %v/v as the versatile phase. The column temperature was kept at 30 °C. The stream rate was 1.0 mL/min and discovery was through an UV finder at frequency of 263nm. Every one of the dynamic segments was effectively eluted with mean maintenance seasons of 2.833and 4.263min for thiocolchicoside and diclofenac separately. The strategy was discovered to be direct (R2 > 0.99), exact (RSD < 2.0 %), precise (recuperations 99.8.9–100.9 %), explicit, straightforward, delicate, fast and vigorous. The approved technique can be utilized in routine quality control investigation of fixed portion blend tablets.

KEY WORDS: RP-HPLC, THIOCOLCHICOSIDE, DICLOFENAC AND METHOD DEVELOPMENT.

# **INTRODUCTION**

Thiocolchicoside (Kamath, A.. 2013; Pedro, GB., et al., 2009; Trellua M, et al., 2004; Janbroers, JM., 1987) (Figure 1), (s)-N-[3-(B-D-gluco pyrano xyloxy)-5, 6, 7, 9-tetrahydro-1, 2- dimethoxy-10-(methylthi o)-9-oxobenzo (a) heptalen-7yl] acetamide, is a muscle relaxant employed in the symptomatic treatment of painful muscle spasms.

Diclofenac Sodium (Indian Pharmacopoeia, 2010; The United State pharmacopoeia, 2005; Chlao CSL and Robinson JR., 1995; Hardman, JG., et al., 2001) (Figure 2), is a non-steroidal quieting drug (NSAID) taken to reduce irritation and a torment easing, lessening distress in conditions like joint aggravation or extraordinary injury. The blend of thiocolchicoside and diclofenac for oral use in treating rheumatic joint aggravation osteoarthritis,

musculoskeletal injuries and continuous torture related with sickness. Composing outline uncovered a couple of logical methods (Rajan,V.Rele.,2016; Samanthula,G., et al., 2014;A.R.Umarkar,AR., et al., 2011;Deshpande, S., et al., 2014 Jadhav, SD., ,2015; Satyanarayana, MV., 2014) for the examination of thiocolchicoside and diclofenac in blends represented. Till today no details were established for affirmation of thiocolchicoside and diclofenac by RP-HPLC process in predetermined mix.



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#### Experimental

**a. Instrumentation:** The chromatographic method executed on a Shimadzu LC20-AT Liquid chromatography with SPD-20A conspicuousness UV-noticeable locator and Spinchrom programming, turned around phase C18 column (Phenomenex 5µ, 250 mm × 4.6 mm) as fixed phase. Thermo electron partnership twofold shaft UV-obvious spectrophotometer (vision favorable to programming), Ultrasonic cleaner, Shimadzu logical equilibrium AY- 220,Vaccum miniature filtration unit with 0.45µ film channel be utilized inthe examination.

b. Reagents and Chemicals: Pharmaceutically unadulterated sample of thiocolchicoside and diclofenac, were acquired as blessing samples from Chandra Labs, Prashanthinagar, Kukatpally, and Hyderabad, India. The immaculateness of these medications was assessed by acquiring its softening point and bright (UV) and infrared (IR) spectra and was utilized minus any additional filtration. Acetonitrile, Methanol and water of HPLC grade was gotten from merck substance division, mumbai and ammonium acetic acid derivation (AR-grade) and orthophosphoric acid (GR grade) was acquired from qualigens ltd., mumbai. Every one of the weakenings in the current measure were performed with standard class-A, volumetric flasks. Tablet definition in the brand name of Thioguest-D Capsues (Alkem Labs) name guarantee; thiocolchicoside 5.0mg and diclofenac 50mg for oral utilization was acquired from the neighborhood pharmacy.

**c. Mobile Phase:** Prepared a degassed combination of Ammonium acetic acid buffer(pH:4.2), acetonitrile and methanol in the proportion 40:40:20 %v/v separately. Buffer Preparation: Weigh precisely about 3.85gms of Ammonium acetic acid derivation made up with 200ml of HPLC Grade water and lastly to 1000 ml with HPLC grade water. The at that point change the pH:4.2 with Orthophosphoric acid and sifted through a 0.45µ film channel.

**d. Standard Solutions:** Standard stock arrangements of thiocolchicoside (50µg/mL) and diclofenac (500µg/mL) were set up by dissolving 5.0mg and 50mg in two 100mL volumetric flasks at first containing 10 ml of mobile phase separately. Afterward, the volumes were made sufficient by means of mobile phase to acquire stock concentrations of 50µg/mL and 500µg/mL. From the

above stock arrangements, aliquots of every arrangement were pipetted into a progression of 100mLvolumetric flasks containing 25mL ofthe mobile phase and made sufficient with diluent to get a last centralization of 5.0 – 15µg/mL and 50-150µg/mL for thiocolchicoside and diclofenac individually.

**e. Sample Solutions:** Weighed and finely powdered 10 Thioquest-D Capsues (A1chem restricted) [label guarantee; thiocolchicoside 5.0mg and diclofenac 50mg] was obtained from the neighborhood pharmacy. Precisely gauge and move the grounded powder comparable to 5.0mg of thiocolchicoside and 50mg of diclofenac into a 100mL volumetric flagon, added 70mL of diluent, and sonicated for 30minutes with irregular trembling at controlled temperature and weakened to volume by diluent and blended altogether. Sifted the arrangement through 0.45µm film channel. Move aliquots of the above arrangement into a progression of 25mL volumetric flask and weakened to volume by diluent to get a centralization of thiocolchicoside and diclofenac that comply inside the standard fixation restricts individually.

# **RESULTS AND DISCUSSION**

**i. Method Development:** In building up the proposed method different streamlining considers were completed, basing on the synthetic idea of the above referred to drugs. First and foremost the assurance of working frequency ( $\lambda$ max) was made in the current examination. For this 5.0mg of the thiocolchicoside and diclofenac drug were taken in various 10ml volumetric jar and broke down in methanol and volume made sufficient. The above arranged arrangements be checked in the UV range amid 200-400nm utilizing methanol as clear. From the above investigations the isosbestic point for thiocolchicoside and diclofenac were discovered to be 263nm and this frequency was chosen as the recognition frequency for the above referred to drugs in the current test.



Besides preliminaries on utilizing diverse creation of the above said mobile phase [Ammonium acetic acid buffer (pH:4.2), Acetonitrile and Methanol in the proportion 45:45:10%v/v, 50:30:20%v/v and 40:40:20%v/v]

were conveyed to acquire best detachment for the present chosen drugs. From these investigations it was deduced that ammonium acetic acid derivation buffer (pH:4.2), Acetonitrile and Methanol inthe proportion of 40:40:20%v/v was chosen as a the best mobile phase as it brought about brilliant elution of the chose drugs with sharp and all around settled peaks and additionally with low maintenance and run times. The column choice in the current test has been done based on back pressure, goal, peak shape, hypothetical plates and everyday reproducibility of the maintenance time and goal amid thiocolchicoside and diclofenac peaks (Figure 3).

Subsequent to assessing every one of these components, Phenomenex, C-18 column (250mm×4.6mm, 5µm) was discovered to be reasonable as it gave good outcomes.

During these investigations the infusion volume and the stream pace of the mobile phase were made at 20µL and 1.0mL.min-1 separately.

**ii. Method Legalization:** The created RP-HPLC method is approved as per ICH rules (ICH.,2005) for the synchronous examine of thiocolchicoside and diclofenac utilizing the accompanying boundaries.

**a. System Suitability:** For framework reasonableness, six repeats of standard sample were infused and examined the boundaries like plate number (N), following element (k), goal (R) and relative maintenance time ( $\alpha$ ), HETP, limit factor (kI), plates per meter and peak evenness of samples. The aftereffects of this investigation were inside the ICH standards (Table 1).

Table 1. System suitability parameters							
Compound	Retention Time	Tailing factor	Theoretical plates	USP Resolution			
Thiocolchicoside	2.833	1.44	3267	-			
Diclofenac	4.263	1.36	3525	5.940			

**b. Specificity:** Specificity was set up by infusing dluent and fake treatment arrangements into the previously mentioned chromatographic framework utilizing the beyond chromatographic provisions and the clear and fake treatment chromatograms be documented. Chromatograms of clear and fake treatment arrangements illustrated no peaks at the maintenance season of thiocolchicoside and diclofenac peaks demonstrating with the aim of the diluent and the blank treatment utilized in the standard and sample readiness didn't meddled in the assessment of thiocolchicoside and diclofenac individually.

**c. Linearity:** Standard arrangements of thiocolchicoside and diclofenac at various working fixations [5.0-15µg/ml for thiocolchicoside and, 50-150µg/ml diclofenac] were readied and 20µL of the above standard medication arrangements were infused with the mobile phase under the chromatographic clauses depicted above at encompassing temperature and their individual chromatograms were recorded.Calibration bends were developed by plotting the convergence of portrayed medications as opposed to comparing peak areas acquired at 240nm (Figures 4 &5). The outcomes showed a superb connection among's

absorbance and focus level of medication inside the fixation range thiocolchicoside and diclofenac uncovering linearity that is addressed by a direct relapse condition as follows and their outcomes are given in Table 2. Y(Thiocolchicoside) = $18.81x+42.60[R^2$ = 0.9995], Y (Diclofenac) =  $34.60x - 40.20[R^2 =$ 0.9959] From these outcomes it was uncovered that the relationship coefficients for the above said drugs were more noteworthy than 0.999 and were inside the acknowledgment models there uncovering the great linearity of the proposed RP-HPLC technique.







**d. LOD and LOQ:** The LOD and LOQ values were 0.011 and 0.038µg/ml for thiocolchicoside and 0.029 and 0.099µg/ml for diclofenac, revealing good sensitivity of the proposed method respectively.

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**e. Precision:** Exactitude of the present RP-HPLC process is judged via six reproduce insertions of 100% test and the results were expressed in terms of standard deviation and %RSD. The % RSD values of method precision were found to be 0.502 for thiocolchicoside and for diclofenac 0.507 for respectively and these results indicated that the current RP-HPLC method was highly precise. The method precision results were specified within Table 3 respectively.

**f. Accuracy:**Identified measures of standard arrangements thiocolchicoside and diclofenac be adjoined by 10% focus to pre evaluated sample arrangements of thiocolchicoside (5.0, 10, 15.0µg/ml), and diclofenac (50, 100, 150µg/ml). The measure of thiocolchicoside and diclofenac recuperated was determined and the outcomes were summed up in Table 4. From the outcomes the % recuperation esteems for thiocolchicoside and diclofenac were gone from 99.75-100.9% and 100.1-100.6% separately making the proposed strategy precise.

	Thiocolchicoside		Diclofe	nac
% Level	Conc. µg/mL	Area	Conc. µg/mL	Area
50	7.5	179.857	50	1749.894
75	10	231.025	75	2550.984
10.0	15	331.489	100	3401.012
12	20	418.244	125	4100.687
150	25	510.546	150	5300.248
Ş	Slope	18.81	Slope	34.60
Intercept		42.6	Intercept	-40.20
R	SQ(r2)	0.9995	RSQ(r2)	0.9959
LOD	(mcg/ml)	0.011	LOD (mcg/ml)	0.029
LOO	(mcg/ml)	0.038	LOQ (mcg/ml)	0.099

Thiocolchico	oside	I	Diclofenac	
Technique Exactitude (Inter &Intra Day)		Technique Exactitude (Inter &Intr Day)		
100.1	100.2	99.4	99.99	
100.7	100.4	99.7	100.1	
99.47	99.68	98.7	98.89	
99.39	99.75	98.7	99.08	
99.28	99.57	98.6	99.07	
100.5	99.69	99.2	99.28	
Overall Avg.	99.98		99.25	
Overage Std Dev.	0.514		0.497	
Over all %RSD	0.502		0.507	

Table 4. Recuperation Studies					
Thiogolahigosido					
Thiocolenicoside					
% Level	Recovery Range	% RSD			
50	100.6-100.9	0.1			
100	99.3-100.0	0.4			
150	99.7-99.8	0.1			
Diclofenac					
% Level	<b>Recovery Range</b>	% RSD			
50	100.2-100.5	0.1			
100	100.1-100.6	0.3			
150	100.3-100.5	0.1			

**g. Sturdiness:** Vigorness of the current proposed method was done by altering the experimental surroundings that include (i) effect of alter in flow rate  $(1.0)\pm 0.2$ mL/min

and (ii) effect of detection wavelength(263nm) varied by  $\pm 2.0nm$ . The consequences of vigor investigation of the proposed strategy are introduced in Table 5 and these outcomes showed that the measure estimation of the test readiness arrangement was somewhat influenced and was as per that of genuine during the above said fluctuation conditions. And more over the system suitability parameters were also found satisfactory concluding the developed method as robust.

**h.** Analysis of pharmaceutical formulations: Analysis of marketed tablets (Thioquest-D; Label claim- Capsules (A1chem limited) [label claim; thiocolchicoside 5.0mg and diclofenac 50mg] was done utilizing the above said upgraded mobile phase and HPLC conditions. The % drug substance of tablets got by the projected technique pro thiocolchicoside and diclofenac be

discovered designated 99.43 and 99.97% individually. These outcomes uncovered that the assessment of the

present chosen drugs in their measurement structures was precise inside the acknowledgment level. The outcomes are given in Table 6.

Constraint	% RS	D	%RSD
	Thiocolchicoside		Diclofenac
	261nm	0.35	0.38
Wavelength ±2.0nm	265nm	0.45	0.67
	0.8 mL/min	0.24	0.31
Flow Rate mL /min	1.2mL.min	0.64	0.75

Table 6. Outcomes in formulations					
Brand (Thioquest-D)	Quantity assert in mg per tablet	Thiocolchicoside	Diclofenac		
Thiocolchicoside	5.0	4.954	99.43		
Diclofenac	50	49.97	99.97		

# **CONCLUSION**

An isocratic, synchronous and HPLC technique with photodiode exhibit identification for the assessment of thiocolchicoside and diclofenac medicine has been created. The created strategy holds an adequate level of framework appropriateness, selectivity, power, exactness and precision as per worldwide rules. The chromatographic elution is done in a brief time frame (< 5 min) with great affectability. Consequently, the present HPLC strategy can be useful for assessing the grouping of thiocolchicoside and diclofenac medicine at the same time in tablet dose structures and mass medications in quality control research facilities.

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# **Biodegradation of Household Waste Using Micro-Organisms For Production of Important Products**

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## ABSTRACT

Household waste generated in towns has emphasized on the area for research due to increasing concern about pollution ecosystem and human health. Everyday a huge quantity of waste materials generated from houses. Various type of waste causing adverse effect on living organisms and environment that giving rise to human as well as animal diseases , spoilage in air and soil ecosystem lead to total imbalance in natural ecology. Aerobic biodegradation of organic matter by microbes (aerobes) is most rapid and fast degradation process. No pungent gas produced. Large disposable waste generated. The present study showed vegetable waste was rich source of enzymes, carbohydrates, fats, moisture and phytochemicals and best substrate for Microbial Biodegradation purpose. Analysis of individual enzymatic activity of mixed microbial species on household waste and production of industrially important products.

**KEY WORDS:** BIODEGRADATION, CELLULASE, AMYLASE, MICROBIAL CONSORTIA.

# **INTRODUCTION**

Biodegradation is the process by which organic substances are broken down into smaller compounds by the enzymes produced by living microbial organisms. The microbial organisms transform the substance through metabolic or enzymatic processes. Biodegradation processes vary greatly, but frequently the final product of the degradation is carbon-dioxide or methane. Organic material can be degraded aerobically with oxygen or anaerobically without oxygen. The microbial population of soil possessed mainly bacteria, fungi, actinomycetes, algae and protozoa. Among these groups, bacteria are most prominent and abundant group. Bacteria use waste for their own metabolism and finally they produce hazardous toxic chemicals into non-toxic or less toxic substances which are important for soil health, plant growing and over all to keep well balance of natural ecosystem.

The genera Bacillus, Corynebacterium, Staphylococcus, Streptococcus, Shigella, Alcaligens, Acinetobacter,



*Escherichia, klebsiella* and *Enterobacter* were the best hydrocarbon degrading bacteria.Mixed microbial communities have the most powerful biodegradative potential because the genetic information of more than one organism is necessary to degrade the complex mixture of organic compounds present in contaminated areas (Bird et al., 1954; Bruckner 2016).

Fungi are an important part of degrading micro biota because like bacteria they metabolized dissolved organic matter, they are principle organisms responsible for the decomposition of carbon in the biosphere. But fungi unlike bacteria can grow in low moisture areas and low pH. Solutions which aids them in the breakdown of organic matter. Filamentous fungi participating in aliphatic hydrocarbons degradation are *Cladosporium* and *Aspergillus* whereas a fungus belongs to penicillin; *Fusarium* and *Aspergillus* can take part in aromatic hydrocarbon decomposition (Chapman et al., 1999).

## MATERIAL AND METHODS

1) Sterilization of All glassware's and culture media were sterilised in an autoclave for 15 minutes.

2) Preparation of Sieved Sample of Vegetables waste, then determine the physical parameters of sieved sample of vegetable waste such as colour, weight, pH, temperature, and moisture and water absorption capacity.



3) Isolation of Bacteria: The Bacteria were isolated using standard serial dilution of soil and sewage water sample and characterised using the specificity of the substrate and gram nature of the organism. They are maintained on Nutrient agar slant at  $4^{\circ \odot}$  for further use.

4) Isolation and collection of fungi: Aspergillus niger was isolated from onion skin on Potato dextrose agar. The plate were incubated for 5-7 days at  $28^{\circ}$ .Black colonies of *Aspergillus niger* was maintained on potato dextrose agar at  $4^{\circ}$ .The collected pure culture of *Trichoderma viride, Bacillus subtilis* were maintained on selective media and subculture on Sabouraud dextrose agar slant individually at  $4^{\circ}$  (Gautam et al., 2012).

5) Screening of Amylase Activity (Starch Hydrolysis Test: In this test, starch agar is inoculated with bacteria and fungi. After incubation at an appropriate temperature, iodine is added to the surface of the agar. Iodine turns blue-black in the presence of starch. Absence of the blueblack colour indicates that starch is no longer present in the medium (Gautam et al., 2010).

6) Screening of Cellulase Activity: Cellulase-producing bacteria and fungi were inoculated by the streak plate method using Carboxy methyl cellulose agar media. The plates were incubated at 37 degree centigrade for 24 hours for bacteria and 3-4 days for fungi at 37 °°. The plates were flooded with 0.1% of Congo red solution for 15min and washed with 1M NaCl, and the zone of hydrolysis was recorded. The zone of hydrolysis shows positive test (Indumathi 2017).

7) Preparation of microbial consortia: Take three test tubes containing 5ml nutrient broth and inoculate loopful of pure culture of selected microbes separately and incubate for 37degree centigrade for 24 hours. Transfer 3 ml (1-1-1) of 24 hour grown nutrient broth in 27 ml freshly prepared broth that is equal to 30 ml. Again incubate the 30ml broth for 24 hr and store for further use (Ingale et al., 2014).

8) Preparation of experimental test samples (N, BC, ABC, FC, AFC) and enzymatic activity assayed calorimetrically.

9) Estimation of Amylase activity :( DNSA 3,5Dinitro-salicylic acid method).

## Procedure:

- a) 1% starch solution was prepared for performing the test.
- b) 1ml of 1% starch solution and different dilutions of extract of enzymes along with 1ml of citrate phosphate buffer was incubated for 30mins at 50
- c) 2 ml of DNS solution was added to stop the reaction.
- d) Tubes were kept for boiling in water bath for 10 minutes.
- e) Absorbance was recorded at 540nm against glucose standard.
- The amount of enzyme, which releases 1 micromole of reducing sugar as glucose per minute is called as one unit of enzyme activity.

10) Estimation of Cellulase activity:

- Procedure:
- a) 1% of carboxy methyl cellulose was prepared
- b) 0.45 ml of the above was taken as a substrate and incubated with 0.05 ml of enzyme extract
- c) 0.05 ml of Citrate Phosphate buffer was added to it and incubated at 55 C for 15 minutes.
- d) 0.5 ml DNS was added to stop the reaction and kept in boiling water bath for 5 min
- e) Absorbance was recorded at 540nm against standard glucose.

11) Assay of total protein by Folin-Lowry method

Table 1. Determination of Physical Parameters of Test Samples						
Test	SampleRate C	)f Degradation In	gm/ Moisture Con	tent In gm/day		
	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>st</sup>	28 <sup>th</sup>		
1) N	80/3.2 gm	60/ 5.6 gm	28/6.7 gm	18/7 gm		
2) BC	96/3.8 gm	58/ 6.1 gm	41/4.5 gm	32/ 3.3 gm		
3)ABC	100/4 gm	93/ 3.7 gm	53/5.8 gm	47/ 4 gm		
4) FC	93/3.7 gm	85/ 3.4 gm	72/2.8 gm	41/ 1.6 gm		
5)AFC	100/4 gm	86/ 3.4 gm	66/ 2.6gm	46/ 1.8 gm		

**Procedure:** Into a series of test tubes pipette out 0.2 ml to 1ml working standard solution (concentration between 20 to 100 ug. Makeup unknown sample solution to 50ml distilled water and pipette out 0.5 ml into a test tube. Add NaOH to all tubes to make up volume uniformly to 1ml. Pipette out 1ml NaOH into a separate tube to

serve as blank. To all tubes add 5ml ml alkaline copper reagent. Mix well and incubate at room temperature for 10 minutes. Into all the tubes pipette out 0.5 ml of Folin's - Ciocalteau Reagent, mix well reaction contents and incubate at temperature 37 °© of for 30 minutes Measure absorbance of color blue formed calorimetrically at 750 nm. The intensity of color is directly proportional to amount of protein present in sample. Draw a standard calibration curve by plotting the concentration of protein on X - axis and the absorbance on Y-axis. Calculate the concentration of unknown protein from the graph.



Figure: Rate Of Degradation Within 28 Days Of Incubation Period

12) Assay of Free Reducing Sugars by 3, 5 -Dinitrosalicylic Acid Method. Same as amylase activity assay.

13) Estimation of Total an Antioxidant Capacity by Phosphomolybdenum Method (Janarthanan et al., 2014).

**Procedure:** The tubes containing 0.2 ml of extract (100-1000 ug/ml) is mixed with, 1.8 ml of distilled water, 2 ml of phosphomolybdenum reagent solution. Incubate it at 95°® for 90 minutes. The mixture is cooled to room temperature and the absorbance is measured at 695 nm against a reagent blank. The antioxidant capacity is expressed as Ascorbic Acid Equivalent (AAE).

Enzyme Activity	Substrate	Name Of Microbe s	Observations	Results
Amylase Activity	Starch Agar	Escherichi a coli	Clear Zone Of Inhibition Was Not Observed After Addition Of Iodine Solution	Negative
		Bacillussubtilis	Clear Zone Of Inhibition Was Observed After Addition Of Iodine Solution	Positive
		Aspergillus niger	Clear Zone Of Inhibition Was Not Observed After Addition Of Iodine Solution	Negative
		Trichoderma viride	Clear Zone Of Inhibition Was Not Observed After Addition Of Iodine Solution	Negative
Cellulase Activity	Carboxy methyl Cellulose [CMC]	Escherichia coli	Clear Zone Of Inhibition Was Observed After Addition Of Congo Red Dye Solution	Positive
		Bacillussubtilis	Clear Zone Of Inhibition Was Observed After Addition Of Congo Red Dye Solution	Positive
		Aspergillus niger	Clear Zone Of Inhibition Was Observed After Addition Of Congo Red Dye Solution	Positive

#### **Experimental Results**

#### 1. Estimation of Amylase activity

**Results and Discussion:** 

2. Estimation of Cellulase activity

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Table 3. Star	ndard Glucose concentra	ation curve	Figure: 1: Standard Glucose Concentration Curve
Test Tube	Standard Solution Of Glucose (ug/ml)	Optical Density (At 540 Nm)	Amylase Activity 0.5 0.5 0.4 0.4
1	0	0.00	0.26
2	200	0.13	0.13
3	400	0.26	
4	600	0.40	5
5	800	0.51	0 100 200 300 400 500 600 700 800 900
6	1000	0.64	Glucose concentration ug/ml

Table 4. Amylase Activity Chart						
Test	Rate Of Degradation In gm/ Moisture Content In gm/day					
Sample	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>st</sup>	28 <sup>th</sup>		
Ν	0.19	0.21	0.16	0.14		
BC	0.10	0.14	0.02	0.01		
ABC	0.04	0.07	0.13	0.10		
FC	0.09	0.08	0.07	0.12		
AFC	0.02	0.04	0.06	0.08		





- 3. Estimation of Protein Concentration
- 4. Estimation of Reducing Sugar Concentration high
- 5. Antioxidant Activity

Table 5. Standard Glucose concentration curve					
Test Tube	Standard Solution Of Glucose (ug/ml)	Optical Density (At 540 Nm)			
1	500	0.01			
2	2500	0.015			
3	5000	0.03			
4	7500	0.045			
5	10,000	0.06			

# **RESULTS AND DISCUSSION**

Enzymes are large biological molecules responsible for the thousands of metabolic processes that sustain life. They are important product obtained for human needs from several sources are generally used in industries. An enzyme remains a major cost factor for the lignocellulose fuels and chemical industries. Enzymatic screening carried out on specific selective medium of microbes. Bacillus subtilis gives clear zone of inhibition after addition of iodine solution on starch agar i.e. it shows positive amylase activity. The positive cellulase activity screened on Carboxymethyl cellulose agar. Clear zone around growth after addition of Congo red dye solution on CMC agar given by E. coli, B. subtilis and A. niger. The experimental sample N shows highest degradation rate at high acidic condition and moisture content after 28th day. A colour changes from light green to Blue green at pH 8.5 and the volume reduces to 18 gm. with 7 gm. moisture content (Krishna et al., 2016).

Table 6. Cellulase Activity Chart					
Test	Rate Of D	egradation In gm/	Moisture Content	In gm/day	
Sample	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>st</sup>	28 <sup>th</sup>	
Normal	0.02	0.03	0.04	0.01	
BC	0.06	0.05	0.04	0.02	
ABC	0.04	0.06	0.03	0.02	
FC	0.03	0.02	0.01	0.01	
AFC	0.01	0.02	0.03	0.02	



Table 7. Standard Glucose concentration curve					
Test Tube	Standard Solution Of Glucose (ug/ml)	Optical Density (At 750 Nm)			
1	200	0.13			
2	400	0.20			
3	600	0.40			
4	800	0.53			
5	1000	0.70			



Table 8. Cellulase Activity Chart					
Test	Rate Of D	egradation In gm/	Moisture Content	In gm/day	
Sample	7 <sup>th</sup>	14 <sup>th</sup>	21 <sup>st</sup>	28 <sup>th</sup>	
Ν	0.31	0.17	0.11	0.07	
BC	0.01	0.28	0.08	0.05	
ABC	0.18	0.17	0.15	0.11	
FC	0.01	0.13	0.18	0.26	
AFC	0.16	0.08	0.04	0.01	

Various assay carried out to measure the amount of enzymes and other nutrients present in selected test samples by taking standard. After incubation period, it was observed that Amylase concentration was increases after 14th day of incubation. In test sample N, The maximum amylase production was observed on 14th day of incubation which is 330 ug/ ml .BC shows maximum amylase concentration of 220 ug/ml within 14 days of incubation. But in case of FC it was just 200 ug/ml after

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21days of incubation. ABC and AFC possess 200 ug/ml after 21th day and 130 ug/ml after 28th day of incubation respectively (Laufenberg et al., 2003).



Table 9. Standard Glucose concentration curve					
Test Tube	Standard Solution Of Glucose (ug/ml)	Optical Density (At 520 Nm)			
1	200	0.13			
2	400	0.20			
3	600	0.40			
4	800	0.53			
5	1000	0.70			

The substrate Carboxy methyl cellulose required for cellulase production. The maximum cellulase production observed after 21th day of incubation in N and AFC, which is 6700 ug/ml and 5000 ug/ml respectively. Both BC and FC shows maximum cellulase production is 10000 ug/ml after 7th day. ABC shows substrate utilization is 5000 ug/ml after 21th day of incubation. The maximum protein Concentration observed in N test sample is 460 ug/ml after 7th day of incubation. 420 ug/ml concentration observed in test sample BC after 14th day and 270 ug/ml in test sample ABC after 7th day of incubation. Test sample FC and AFC Shows maximum protein concentration are 390 ug/ml after 28th day and 240 ug/ml after 7th day of incubation period.



Table 10. Cellulase Activity Chart						
Test	Rate Of D	egradation In gm/	Moisture Content	In gm/day		
Sample	7 <sup>th</sup>	$14^{\text{th}}$	21 <sup>st</sup>	28 <sup>th</sup>		
Ν	0.13	0.07	0.05	0.01		
BC	0.17	0.13	0.05	0.04		
ABC	0.09	0.04	0.03	0.01		
FC	0.13	0.08	0.03	0.02		
AFC	0.05	0.03	0.02	0.01		



Table 11. Sta	Table 11. Standard Glucose concentration curve					
Test Tube	Standard Solution Of Glucose (ug/ml)	Optical Density (At 700 Nm)				
1	100	0.10				
2	300	0.27				
3	500	0.45				
4	700	0.70				
5	1000	0.90				



Table 12. Cellulase Activity Chart					
Test		Optical I	Density at 700 nm	[days]	
Sample	7 <sup>th</sup>	$14^{\text{th}}$	21 <sup>st</sup>	28 <sup>th</sup>	
Ν	0.34	0.53	0.57	0.60	
BC	0.64	0.41	0.32	0.31	
ABC	0.79	0.83	0.51	0.40	
FC	0.52	0.41	0.26	0.24	
AFC	0.72	0.33	0.26	0.22	



The high reducing sugar concentration observed in test sample N, BC and ABC are 1800 ug/ml, 2350 ug/ ml and 1250 ug/ml after 7th day of incubation period. The test sample FC and ABC shows maximum glucose concentration are 1800 ug/ml and 700 ug/ml after 7 days of incubation period. Antioxidant activity of test sample estimated calorimetrically at 695 nm, it shows maximum antioxidant production after 7th day of incubation from BC, FC, AFC are 710 ug/ml, 570 ug/ ml, 800 ug/ml respectively. The maximum antioxidant production by Control and ABC shows 660 ug/ml after 28th day and 930 ug/ml after 14th day of incubation. The present study concluded that Microbial conversation of vegetables waste to bio fertilizer is a feasible and potential technology in the future to maintain the natural resources and to reduce the impact on environmental quality. It is a simple biotechnological process of composting in which certain species of bacteria are used

to enhance the process of waste conversion and produce a better end product (Mussatto et al., 2011; Novinsak et al., 2011; Pothiraj & Eyini 2007; Panda et al., 2016; Steger et al., 2017).

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# On the Knowledge Regarding ill Effects and Attitude towards using High Heel Foot Wear among Adolescent Girls

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#### ABSTRACT

Adult hood is a transitional stage of physical and psychological in human life. An adult is exposed to number of images and ideas of what they are "supposed" to look like and act like. Health is the level of functional or metabolic efficiency of a living being. In human, it is the general condition of a person's mind and body, usually meaning to be free from illness, injury or pain. High heels are a fashionable foot ware; every woman loves to look tall, sexy, having long legs but after putting the high heels she is compromising her foot as well as on her posture. Fashion is like a circle; it keeps on changing and reaches the same position after some time. So is the foot ware it also changes with time. Present time is of high heels, a person wearing high heels, the center of gravity changes to forward and the buttocks and spine is out of alignment. assess the knowledge and attitude regarding ill effects of using high heel footwear among adolescent girls. correlate knowledge regarding ill effects and attitude towards using high heel footwear among adolescent girls. associate the knowledge and attitude score with selected demographic variables. Descriptive research design is used in this research Setting is the physical location and condition in which data collection takes place. This study is conducted in selected colleges of Wardha city. findings show the correlation coefficient 'r' 0.017 is a poor level of correlation. The correlation coefficient r, always lies between -1 and +1. i.e.  $-1 \le r \le 1$ . The 'r' for given data is calculated as 0.017. Hence, it is statistically interpreted that there is a poor positive correlation between knowledge and attitude of adolescent girls regarding ill effects of high heels footwear. Findings suggest that adolescent girls are not sufficiently aware about the ill effects of using and somewhat their attitude is positive towards use of high heels footwear.

KEY WORDS: TRANSITIONAL, PSYCHOLOGICAL, COMPROMISING, HIGH HEELS, BUTTOCKS

# INTRODUCTION

High heels are a fashionable foot ware; every woman loves to look tall, sexy, having long legs but after putting the high heels she is compromising her foot as well as on her posture. Fashion is like a circle; it keeps on changing and reaches the same position after some time. So is the foot ware it also changes with time. Present time is of high heels, a person wearing high heels, the center of gravity changes to forward and the buttocks and spine is out of alignment. Long use of High heels tends to increase the



size of buttocks. A high heel also pushes the buttocks of women high and with time the figure changes.

High heels are worn by many women worldwide to enhance their professional and physical appearance, yet their damaging effects, exceeds the discomfort, many women bear to tolerate while wearing such elevated shoes. The American Podiatric Medical Association provides statistics that 39 per cent of the female population wears high-heeled shoes every day, and that doesn't count those who wear them now and again. The results are that, three quarters of this group of women suffer with a type of foot problem caused by high-heeled shoes. A study was done to examine the gait of regular heel wears compared to non wears in the year 2012, recruiting 10 non wearers and 9 regular heel wears (40+hours per week) clear gait and biomechanical difference become evident.

High-heeled footwear (often abbreviated as high heels or simply heels) is footwear that raises the heel of the wearer's foot significantly higher than the toes. When



both the heel and the toes are raised equal amounts, as in a platform shoe, it is technically not considered to be a high heel; however, there are also high-heeled platform shoes. High heels tend to give the aesthetic illusion of longer, more slender legs. High heels come in a wide variety of styles, and the heels are found in many different shapes, including stiletto, pump (court shoe), block, tapered, blade, and wedge.

According to high-fashion shoe websites like Jimmy Choo and Gucci, a low heel is considered less than 2.5 inches (6.4 centimeters), while heels between 2.5 and 3.5 inches (6.3 and 8.9 cm) are considered mid heels, and anything over is considered a high heel. The apparel industry would appear to take a simpler view; the term high heels cover heels ranging from 2 to 5 inches. Extremely highheeled shoes, such as those exceeding 6 inches, strictly speaking, are no longer considered apparel but rather something akin to jewellery for the feet. They are worn for display or the enjoyment of the wearer. Wearing high heels (HH) places the calf muscle-tendon unit (MTU) in a shortened position. As muscles and tendons are highly malleable tissues, chronic use of high hills might induce structural and functional changes in the calf MTU. To test this hypothesis, 11 women regularly wearing HH and a control group of 9 women were recruited.

Gastronomiesmedialis (GM) fascicle length, pinnation angle and physiological cross-sectional area (PCSA), the Achilles' tendon (AT) length, cross-sectional area (CSA) and mechanical properties, and the plantar flexion torque-angle and torque-velocity relationships were assessed in both groups. They conclude that long-term use of high-heeled shoes induces shortening of the GM muscle fascicles and increases at stiffness, reducing the ankle's active range of motion. High heels are bad for body as they throw weight onto the ball of the foot; lead to Callus, painful bunions, corns and deformity. They may also push the center of mass in the body forward, causing the spine to bend backwards to recompense, which can lead to back problems. Other problems with high heels are that the position of the foot in the shoe and narrow heel width can cause the ankle to become unstable, resulting in ankle sprains or the calf muscles shortening. This is especially true for those wearing high heels for over 6 months and the body compensating for this tightness by lowering the arch of the foot, or affecting the knee, hip or back (Kumar et al., 2015).

A study was done to assess the effect of the use of highheeled shoes on static balance in young adult women in the year 2012. Fifty-three women between 18 and 30years of age and accustomed to wear high-heeled shoes participated in the study. None of the participants had any orthopedic or neurologic alterations. Static balance was assessed using a force plate. Heels force the thigh muscles to work harder, putting extra strain on the knee joint and tendon that runs from the knee cap to the thigh bone. Compared with walking barefoot, high heels increase the pressure on the inside of the knee by 26 percent. Over time, this increased pressure on the knee can lead to osteoarthritis. As a result, heels can lead to bunions, heel pain, toe deformities, shortened Achilles's tendons, and trapped nerves. In fact, women account for about 90% of the nearly 800,000 operations each year for bunions, hammertoes (a permanent deformity of the toe joint in which the toe bends up slightly and then curls downward, resting on its tip), and trapped nerves, and most of these surgeries can be linked back to their high-heeled shoe choice (Blanco et al., 2015).

Reasons for wearing high heels, which are almost exclusively aesthetic reasons, include: They change the angle of the foot with respect to the lower leg, which accentuates the appearance of calves; they change the wearer's posture, requiring a more upright carriage and altering the gait in what is considered a seductive fashion. They make the wearer appear taller, foot appears smaller and toes appear shorter. Reasons of wearing high heels, which are almost exclusively health and practicality reasons, include: they can cause foot pain, increase likelihood of sprains and fractures. They can cause an unsteady gait. They can shorten the wearer's stride. Women who wear high heels frequently have a higher incidence of degenerative joint disease of the knees. This is because they cause a decrease in the normal rotation of the foot, which puts more rotation stress on the knee. A high heel also puts pressure on the inner side of knees. Study by the health experts says women wearing high heels put 26% of pressure more on the knees. As a result, the osteoarthritis is seen common in women wearing high heels (Cronin 2014).

# **MATERIAL AND METHODS**

**Research Design:** Descriptive research design is used. Descriptive design involves the accurate description of characteristics of individual, situation, or group, and the frequency with which a certain phenomenon occurs in natural setting without imposing any control or manipulation (Pazhoohi et al., 2018).

**Setting Of the Study:** This study is conducted in selected colleges of Wardha city. The investigator found the setting appropriate to conduct the study as adequate numbers of adolescent girls were available who could be taken as sample for the study (Steele 2015).

**Sampling Technique:** The sampling technique used in the study was non-probability convenience sampling. Convenience sampling is a non- probability sampling technique where subjects are selected just because of their convenient accessibility and proximity to the researcher (Tedeschi et al., 2012).

# **RESULTS AND DISCUSSION**

Table no. 2 shows that No one have excellent knowledge. 1(0.5%) of them had poor level of knowledge, 137(68.5%) of them had average level of knowledge and 62(31%) of them had good level of knowledge score and 0(0%). The

minimum score was 5 and the maximum score was 18, the mean score for the test was  $11.31 \pm 2.555$  and mean

percentage of knowledge was 47.125. Therefore, H1 is accepted (Wade 2013).

Table 1. Percentage wise distribution of adolescent girls according to their demographic variables n=200				
Sr. no.	Demographic Variables	Frequency	Percentage (%)	
1.		Age (Yrs)		
	16	42	21%	
	17	123	61.5%	
	18	28	14%	
	19	7	3.5%	
2.		Residential area		
	Urban	100	50%	
	Kural	100	50%	
3.		Family income in Rs.		
	< 5000	103	51.5%	
	5001 - 10000	63	31.5%	
	10001 - 15000	22	11%	
	15001<	12	6%	
4.		Do you wear high heels footwear?		
	Yes	100	50%	
	No	100	50%	

Table 2. Level of knowledge score of adolescent girls regarding ill effects of using high heels footwear n=200

0					
Level of knowledge	Score	Percentage score	Knowledge score		
score			Frequency	Percentage	
Poor	0-6	0-25%	1	0.5%	
Average	7-12	26-50%	137	68.5%	
Good	13-18	51-75%	62	31 %	
Excellent	19-24	76-100%	0	0%	
Minimum score	5				
Maximum score	18				
Mean score	11.31 ± 2.555				
Mean Percentage	47.125				







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adolescent girls. n=200					
Level of Attitude	Score	Attitude score			
score		Frequency	Percentage		
Strongly disagree	1-18	0	0%		
Disagree	19-36	0	0%		
Neutral	37-54	36	18%		
Agree	55-72	159	79.5%		
Strongly agree	73-90	5	2.5%		
Minimum score	44				
Maximum score	78				
Mean score	60.74 ± 6.413				
Mean Percentage	67.48				

Table 3. Level of attitude score of using high heels footwear among adolescent girls. n=200

Figure 3: Correlation between knowledge regarding ill effects and attitude towards using high heels footwear among adolescent girls.



Table no. 3 shows the frequency and percentage wise distribution of adolescent girls according to level of attitude towards using high heels footwear. The levels of attitude were seen into 5 categories, strongly agree, agree, neutral, disagree and strongly disagree. None of the adolescent girls were "Strongly disagree" and none of the adolescent girls were "Neutral", 159 (79.5%) of the adolescent girls were "Agree" and 5 (2.5%) of the adolescent girls were "Strongly agree" about attitude score. The minimum score was 44 and the maximum score was 78, the mean score for the test was  $60.74 \pm 6.413$  and mean percentage of knowledge was 67.48. Therefore, H2 is accepted.

Table 4. Correlation between knowledge scores and attitude scores of ill effects of using high heels footwear among adolescent girls. n=200				
Mean	SD	Mean Percentage	Correlation coefficient 'r' value	
11.28 60.70	2.555 6.492	47 67.44	0.017	
	elation be eels footw Mean 11.28 60.70	elation between k eels footwear amo Mean SD <u>11.28 2.555</u> 60.70 6.492	elation between knowledge scores and att eels footwear among adolescent girls. n= Mean SD Mean Percentage <u>11.28 2.555 47</u> 60.70 6.492 67.44	

Table no. 4 shows the correlation coefficient 'r' 0.017 is indicate a poor level of correlation. (The correlation coefficient r, always lies between -1 and +1. i.e.  $-1 \le r \le 1$ .) The 'r' for given data is calculated and it is 0.017. Hence, it is statistically interpreted that there is a poor positive correlation between knowledge regarding ill effects and attitude towards using high heels footwear among adolescent girls.

A study on High Heels Footwear Causes Heel Pain and Back Pain: Myth or Reality? The study showed footwear is defined as the footwear having a heel that is higher than the toe. Throughout the history, this footwear is considered as a symbol of sexuality, class and gender. When the foot slants forward, a much greater weight is transferred to the ball of the foot and toes, which increases the likelihood of damage to the underlying soft tissues that supports the foot. When the wearer tips the foot forward, this in turn puts pressure on the lower back and hence causes back pain. This particular study on post adolescent volunteers was aimed to study the correlation between heeled footwear and heel and back pain. study was conducted on 100 female patients who attended orthopedic outpatient department at institution during the period from July 2014 to December.

Walking is the most common form of human locomotion from a motor control perspective, human bipedalism makes the task of walking extremely complex. One condition known to compound the difficulty of walking is the use of heeled shoes, which alters the natural position of the foot-ankle complex. This thereby produces a chain of reaction effects that travels up to the lumbar vertebrae. Heeled footwear has been in use by women for centuries and has now become an integral part of the wardrobe not only in the west but also in India. Recent research suggests that up to one third of women suffer from permanent problems as a result of their prolonged wearing of heels. One in 10 women wear it at least for 3 days a week, and a recent survey found that one-third of them had permanent problems. Whether the high heel wear is the actual cause of back pain is not yet clear. Literatures vary in their results regarding the same.

Table 5. Association of Knowledge Score with Selected Demographic Variable n=200						
Age (yrs)	No. of adolescent girls	Mean knowledge score	F-value	p-value		
16 yrs	42	11.24 ± 2.721	0.106	0.956 NS, p>0.05		
17 yrs	123	11.33 ± 2.635				
18 yrs	28	11.43 ± 1.874				
19 yrs	7	10.86 ± 2.911				
Residential Area	No. of adolescent girls	Mean knowledge score	t-value	p-value		
Urban	100	11.44 ± 2.337	0.719	0.52		
				NS, p>.0.05		
Rural	100	11.18 ± 2.761				
Family Income (Rs.)	No. of adolescent girls	Mean knowledge score	F-value	p-value		
<5000	103	11.50 <u>+</u> 2.715	0.914	0.435		
				S, p<0.05		
5001 - 10000	63	10.87 ± 2.345				
10001 - 15000	22	11.45 ± 1.765				
15001 <	12	11.67 ± 3.339				
Wearing High heels	No. of adolescent girls	Mean knowledge score	t-value	p-value		
Yes	100	11.44 ± 2.337	0.719	0.052		
				NS, p>0.05		
No	100	11.18 ± 2.761				

Table 6. Association of Attitude Score with Selected Demographic Variables.						
Age (yrs)	No. of adolescent girls	Mean knowledge score	F-value	p-value		
16 yrs	42	60.45 <u>+</u> 6.946	0.241	0.867		
17 yrs	123	60.66 ± 6.198		NS, p>0.05		
18 yrs	28	61.14 ± 6.587				
19 yrs	7	62.80 ± 7.727				
Residential Area	No. of adolescent girls	Mean knowledge score	t-value	p-value		
Urban	100	60.53 ± 6.247	0.410	0.253		
Rural	100	60.94 ± 6.599		NS, p>.0.05		
Family Income (Rs.)	No. of adolescent girls	Mean knowledge score	F-value	p-value		
<5000	103	60.68 ± 6.219	2.583	0.055		
5001 - 10000	63	61.71 ± 6.798		NS, p>0.05		
10001 - 15000	22	60.68 ± 5.186				
15001 <	12	56.17 ± 6.726				
Wearing High heels	No. of adolescent girls	Mean knowledge score	t-value	p-value		
Yes	100	60.53 ± 6.247	0.451	0.253		
No	100	60.94 ± 6.599		NS, p>0.05		

Hence, the present study was done to assess this cause and effect. The study was conducted at the orthopedic outpatient department of a tertiary care hospital, from July 2014 to December 2014.100 female patients who were using heeled shoes and who volunteered to participate in the study were included. The heel height was measured using measuring tape and was classified into three groups (5 cm). A Performa with a questionnaire was given to all the participants and their responses were noted. Out of the 100 female volunteers, who participated in the study, 44 had complaints of heel pain regardless of the heel height, 56 had back pain, and many had both heel pain

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and back pain complaints, based on the questionnaire evaluation. We were further able to distinguish both heel pain and back pain, based on the heel height worn, duration of wear (in years) and duration worn/day. There was a positive correlation between duration of wear and height of footwear with regards to both heel and back pain. However, a definitive cause and effect could not be established because of smaller sample size.

# CONCLUSION

Much of the previous research on high heels footwear has focused on the clinical and technical processes and has not sought out the views of adolescent girls, despite this age group is more concerned with the fashion and inclined to the high heel's footwear. Findings suggest that adolescent girls are not sufficiently aware about the ill effects of using and somewhat their attitude is positive towards use of high heels footwear.

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# Assessment of the Effectiveness of Self Instructional Module on Knowledge Regarding Hazard of Plastic Waste and Its Safe Disposal among People

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## **ABSTRACT**

plastic are the integral part of the society and have a valid application. Plastics are composed of network of molecule bound together to form a micromolecules plastic waste management is the critical issue plastic found in the electrical and cooking appliance are the mixture of thermosetting plastic. plastic waste rules 2016 of a directives to gram panchayat on segregation collection transportation processing and disposal of plastic waste in their areas of jurisdiction. To assess the existing knowledge of self instructional module on Knowledge regarding hazards of plastic waste and its disposal among people. 2) To assess the effectiveness of self instructional module on Knowledge regarding hazards of plastic waste and its disposal among people. 3) To associate knowledge with the selected demographic variable. Research approach-Quantitative research approach Pre experimental- one group pre test post test research design. Research Setting- The study will be conducted in Arvi naka, wardha. Sampling technique: Non Probability-convenient sampling technique. Sample size:100 Structured questionnaire were used to collect the data. The content validity of the tool was done by various experts from different fields. pre test, 15% of people in pre test had poor level knowledge score, 83% had average and only 2% had good level of knowledge score. In post test 13% of people in post test had good level of knowledge score, and 87% had excellent level of knowledge score. After the detailed analysis, the study lead to the following conclusion that there was a lack of knowledge among people regarding hazards of plastic waste and its safe disposal.

KEY WORDS: KNOWLEDGE, SELF INSTRUCTIONAL MODULE, HAZARDS, PLASTIC WASTE, SAFE DISPOSAL.

#### INTRODUCTION

The word "plastic" comes from the Greek word "plastikos" meaning "to form". Plastics is any of a group of synthetic or natural organic materials that may be shaped when soft and then hardened, including many types of resins, resinoids, polymers, cellulose derivatives, casein materials, and proteins: used in place of other materials, as glass, wood, and metals, in construction and decoration, for making many articles, as coatings, and, drawn into filaments, for weaving. The material



called Parkesine was an organic material derived from cellulose that once heated could be molded, and retained its shape when cooled. Celluloid is derived from cellulose and alcoholised camphor. He first tried using collodion a natural substance, after spilling a bottle of it and discovering that the material dried into a tough and flexible film. However, the material was not strong enough to be used as a billiard ball, until the addition of camphor, a derivative of the laurel tree. The new celluloid could be molded with heat and pressure into a durable shape. Almost all plastics are made from petroleum, except a few experimental resins derived from corn and other organic substances (Alabi et al., 2019).

Plastics are polymers, very long chain molecules that consist of subunits (monomers) linked together by chemical bonds. The monomers of petrochemical plastics are inorganic materials (such as styrene) and are not biodegradable. Plastic has many properties which has



made it a raw material of choice for Manufactures of plastic Bags and packing materials. Cost of production, light weight, strength, easy process of manufacture. There is nothing wrong with plastic as a material. Man has simply not put the plastic to the right use/ or using it without taking proper care of other related norms of usage. It is very difficult to release how important plastics have become to our everyday lives. We always seem to have known these materials, and we tend to take it for granted that they occur every day and all around us, for example in our clothing, Plastic are the integral part of the society and have varied application plastics are composed of network of molecular monomers bound together to form micro molecule." Plastic waste management is the critical issue" plastic found in the electrical and cooking appliance are the mixture of thermo setting plastic Plastic waste rules 2016.

offer directives to gram panchayat on segregation, collection, transportation, processing and disposal of plastic waste in their areas of jurisdiction. A study of the environment on the cusp of the twenty-first century is an exciting end devour as we attempt to move from confrontation to co-operative problem-solving and place the study of the environment on a sound scientific basis.4 At the dawn of creation there was a perfect balance between man and his environment. Due to human activities on earth the stable equilibrium between man and his environment was broken and hence the resultant environment and the way we interact with the environment influences the quality of our lives.

# MATERIAL AND METHODS

A interventional study was conducted in Wardha city to assess the effectiveness of self instructional module on knowledge regarding hazard of plastic waste and its safe disposal among people. Duration of study was one year. Approval had been taken from Institutional Ethics Committee (under protocol number DMIMS (DU)/ IEC/2018-19/7619). The participants people of Wardha district. Total 100 people was participated in this study. Non Probability – convenient sampling technique was used to select sample. Modified structured questionnaire was used to assess knowledge regarding hazard of plastic waste and its safe disposal. Question was divided in two sections. Section one includes demographic variable such as age .gender, education, occupation, Monthly Income, Section two includes knowledge based 20 multiple choice questions in that 10 questions on plastic waste related health hazards and 10 questions related to safe disposal of plastic waste One mark is given for right answer and zero mark is given for wrong answer. The data was collected from 22thjanuary 2019 to 7th February 2019.

The investigators visited to the different area of Wardha city and assess the knowledge by taking pre test regarding hazard of plastic waste and its safe disposal after that self instructional module was administered at the end of the pre-test. The post-test was carried out after 7 days, In advance obtained the necessary permission from the ward member of Wardha city 20 minutes were allotted to solve the questions. Study was conducted according to ethical guidelines given by central ethics committee on human research. The collected data was entered and analyzed in MS Excel. Descriptive statistics like frequencies and percentages were used for representing the analyzed data (Lebreton & Andrady 2019).

# **RESULTS AND DISCUSSION**

The table no 2 shows the frequency and percentage wise distribution of people according to pre- test level of knowledge regarding hazard of plastic waste and its safe disposal among people. The levels of knowledge were seen into 4 categories, poor, average, good and excellent. 15% of people in pre test had poor level of knowledge score, 83% had average and only 2% had good level of knowledge score. Mean knowledge score of the people in pre test was 7.20  $\pm$  1.84.

Table 1. Percentage wise distribution of people according

to their demographic characteristics N=100					
Demographic Variables	No of people	Percentage			
	Age in years				
21-30 yrs	21	21			
31-40 yrs	27	27			
41-50 yrs	42	42			
≥51 yrs	10	10			
	Gender				
Male	39	39			
Female	61	61			
	Residence				
Rural	32	32			
Urban	68	68			
	Educational Status				
Primary	10	10			
Secondary	59	59			
Higher Secondary	23	23			
Graduate and above	8	8			
	Occupation				
Service	8	8			
Private	36	36			
Student	11	11			
Housewife	45	45			
Monthly Income(Rs)					
10000-15000 Rs	12	12			
16000-20000 Rs	34	34			
21000-30000 Rs	29	29			
>30000 Rs	25	25			

The table no 3 shows the frequency and percentage wise distribution of people according to post test level of knowledge regarding hazard of plastic waste and its safe disposal among people. The levels of knowledge were seen into 4 categories, poor, average, good and

excellent. 13% of people in post test had good level of knowledge score, and 87% had excellent level of

knowledge score. Mean knowledge score of the people in post test was  $17.05 \pm 1.46$  (Manuel et al., 2015).

Table 2. Distribution of people with regards to pre test knowledge regarding hazard of plastic waste and its safe disposal n=100					
Level of knowledge	Score Range	Percentage score	Level of Pre Test Knowledge Score		
score			No of people	Percentage	
Poor	1-5	0-25%	15	15	
Average	6-10	26-50%	83	83	
Good	11-15	51-75%	2	2	
Excellent	16-20	76-100%	0	0	
Mean±SD			7.20 ± 1.84		
Mean %			36 ± 9.23		
Range			3 to 11		

Table 3. Distribution of people with regards to post- test knowledge regarding hazard of plastic waste and its safe disposal n=100

Level of knowledge	Score Range	Percentage score	Level of Post Test Knowledge Scor		
score			No of people	Percentage	
Poor	1-5	0-25%	0	0	
Average	6-10	26-50%	0	0	
Good	11-15	51-75%	13	13	
Excellent	16-20	76-100%	87	87	
Mean±SD			17.05 ± 1.46		
Mean %			85.25 ± 7.32		
Range			12 to 20		

# DISCUSSION

The present interventional study focuses on. assess the effectiveness of self instructional module on knowledge regarding hazard of plastic waste and its safe disposal among people. The population of the study consists of people of Wardha city . The sample size included 100people . Modified structured questionnaire used to assess the baseline information and knowledge regarding hazard of plastic waste and its safe disposal.

The study result are discussed under the following headlines –

- Environmental hazards and health issues due to plastic.
- Disposal of plastic waste and its safe disposal
- Effectiveness of self instructional module on knowledge regarding disposal of plastic wastes.

A similar study the findings of the study were discussed with reference. A detailed review of literature indicated that most of the studies indicating that after self instructional module improve knowledge regarding hazards of plastic waste among people. The overall mean pre- test and post -test knowledge scores of people which reveals that mean post knowledge score was higher i.e. 17.05 with SD of  $\pm$ 1.46 when compared with mean pre- test knowledge score which was 7.20 with SD of  $\pm$ 1.84. The statistical Student's paired t test implies that the difference in the pre- test and post- test knowledge among people was found to be 43.53 which is statistically significant at 0.05% level of significance. The findings of the preset study reveal that many of the peoples do not have adequate knowledge regarding hazards of plastic waste and its safe disposal. thus the above studies support the findings of the present study.

A similar study is conducted by Bangalore in rural community area on Hazards of plastic waste and its safe disposal a total 100 rural community people in the all age group where included in the study. The investigator found that the people were co-operative in the study. The investigator collected the demographic data from the people A detailed review of literature indicated that most of the studies indicating that after self instructional module improve knowledge regarding hazards of plastics and its safe disposal among people. Self instructional module is effective method of transforming knowledge. This study was the modest effort to increase the knowledge regarding hazards of plastics and its safe disposal among people (Moharir & Kumar 2019).

#### Sawarkar et al.,

A similar study conducted survey to assess the quantity and composition of household solid waste as well as household habits and behaviors of plastic waste discharge. conducted a survey to assess the quantity and composition of household solid waste as well as household. The data was collected from130 households using interview technique. The average household solid waste generation rate was 281.27 g/cap/day. The compostable and recyclable shared 80.74% and 11% respectively. Plastic waste discharge indicating Inappropriate practices and unhygienic disposal methods. The study indicates the need to adopt right disposal and recycling techniques to avoid hazards. thus, above study support to present study (Panda et al., 2010).

A similar study conducted at ullal to assess the knowledge of nursing personnel on plastic waste management by using a structured knowledge questionnaire. The study revealed that among 100subjects, 64% had poor knowledge, 36% had average knowledge and none of the subjects had good or excellent knowledge on plastic waste. Based on these, the students gave health teaching using A.V. aids and post test revealed 18% of subjects with excellent knowledge and 34% with good knowledge. The investigators then concluded saying that continuing nursing education on plastic waste management was effective in improving the knowledge of subjects on waste management. thus, above study support to present study (Puncochár et al., 2012).

Conducted a descriptive survey at 62 Zehrs shopping centre at Ontario to assess knowledge of people of all age groups regarding reuse of plastic bags. It is evident that majority of people's knowledge was in line with the desired behavior of using reusable bags; they believe that the behavior of using plastic bags is harmful to the environment and unsustainable. Hence, efforts should be made to decrease or eliminate this behavior. The investigator further said that the reuse of the bag has not become a permanent habit. Hence, the need to build up strategies to encourage the public for using reusable bags. thus, above study support to present study. The overall mean pre- test and post-test knowledge scores of people which reveals that mean post knowledge score was higher i.e. 17.05 with SD of  $\pm 1.46$  when compared with mean pre- test knowledge score which was 7.20 with SD of  $\pm 1.84$  (Rochman et al., 2013).

A similar study the statistical Student's paired t test implies that the difference in the pre-

test and post- test knowledge among people was found to be 43.53 which is statistically

significant at 0.05% level of significance.

The findings of the present study reveal that many of the peoples do not have adequate knowledge regarding hazards of plastic waste and its safe disposal

#### Nursing Implications

#### Nursing administration

- Nurse administrators can utilize the educational material while organizing classes and workshops related to the topic.
- Findings of the study can be used by the Nursing Administrator in creating policies and plans for educating community member regarding dispose of plastic waste.
- The study will help the nursing administrator to plan and organize to give continuing education for nurses regarding Hazards of plastic waste and its safe disposal.

#### **Nursing education**

- This study will help the nursing students in improving knowledge regarding Hazards of plastic waste and its safe disposal.
- Findings of this study will help the nursing student to understand about the necessity of hazards of plastic waste and its safe disposal.
- Teachers can utilize the tools and study findings to teach students about research methodology in the class room (Singh & Ruj 2015).

#### Nursing research

- The study provides a baseline data for conducting other research studies.
- The study will be a motivation for the budding researchers to conduct similar studies in large scale.
- Similar studies can be conducted in various other settings and in other groups after making necessary modifications in the tools.
- This study can be utilized as a reference material for future researchers (Sen & Mishra 2010).
- The tools us

#### **Nursing practice**

- The staff and student nurses can use the knowledge towards hazards of plastic waste and its safe disposal.
- The Self instructional module on hazards of plastic waste and its safe disposal is a resource material to build up a general awareness campaign and spread the message of hazards and safe disposal of plastic in community (Shahnawaz et al., 2019).

**Recommendations**: On the basis of findings of the study it is recommended that the following studies can be conducted (Verma et al., 2016).

- The study can be repeated by taking more sample of community people.
- The study can be repeated by assessing the effectiveness of self instructional module.
- A similar study should be done by using control group.
- A comprehensive study to assess the knowledge urban and rural community people should be done (Singh & Sharma 2016).

## CONCLUSION

After the detailed analysis, the study lead to the following conclusion that there was a lack of knowledge among people regarding hazards of plastic waste and its safe disposal.

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# **Effectiveness of Planned Teaching on Knowledge Regarding Contraceptive Methods among Postnatal Mothers Admitted in Maternity Hospitals**

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# ABSTRACT

Mother's health affects the health of her children, being a healthy mother is the best way to have healthy children. Women who are in poor health, poorly nourished or ignorant are more likely to give birth to unhealthy babies and often cannot provide adequate care, diminishing the chance the children will survive and thrive. Birth spacing, planned pregnancy can be improved and unwanted pregnancy; abortions can be avoided by proper use of contraceptive methods. Family planning is a method of thinking and a life style which is chosen voluntarily and according to the attitudes and responsible determination of the couples in order to promote the hygiene and convenience of the family. To assess the existing knowledge regarding contraceptive methods among postnatal mothers.2.To evaluate the effectiveness of Planned teaching on knowledge regarding contraceptive methods among postnatal mothers.3.To find out association between knowledge score and selected demographic variables. 100 samples were selected from post natal wards in selected hospitals of Maharashtra by Non probability convenient sampling technique. Pre Experimental research design one group Pre test and post test without control group design was used. Result: Findings revealed that in pre test majority of post natal mothers (66%) had average knowledge regarding Contraceptive Methods. Mean percentage of knowledge score was (33.84%) and in post test majority of postnatal mothers (48%) had very good knowledge regarding Contraceptive Methods. Mean percentage of knowledge score was (70.56%). Education, occupation and were found to be associated with knowledge of postnatal mothers none of the other variable were found significantly related with the knowledge of postnatal mothers. Thus it shows education also may be one of the contributing factor for the post natal mothers to acquire knowledge regarding Contraceptive Methods,. Contraceptive Methods is the most important method to all the postnatal mothers for spacing between the children, so the health education is very essential to all the antenatal and postnatal mothers and also mothers should be aware about contraceptive method during pregnancy to prevent the complication. The mean post-test knowledge score was found to be significantly higher than the mean pre-test knowledge scores.

KEY WORDS: CONTRACEPTIVE METHODS, POSTNATAL MOTHER, PRIMIPARA, MULTIPARA, ABORTION

# **INTRODUCTION**

#### Assumptions:

• Postnatal mother may have inadequate knowledge regarding Contraceptive Methods.

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#### Hypothesis:

- 1. H1:- There will be significant difference between the pre-test and post test knowledge score regarding Contraceptive Methods among postnatal mothers
- 2. Ho :- There will be no significant difference between the pre-test and post test Knowledge score regarding Contraceptive Methods among postnatal mothers.

#### **METHODOLOGY**

Research Design:- Pre experimental one group pretest and posttest design

Setting of the study:- The study was conducted in selected hospitals of wardha



Sampling techinque: - Non probability convenient sampling

Sample : - Postnatal mothers Sample size:- 100 samples Criteria for sample selection:-

# I) Inclusion Criteria

- 1. All postnatal mothers who are willing to participate in the study.
- 2. Those who are available at the time of data collection

## II) Exclusion Criteria

1. Those having maternal complication.

# **Description Of The Tools**

Section A :- Demographic variable

Table 1. Percentage wise distribution of postnatal mothers according to their demographic characteristics. $n = 100$						
Demographic Variables	Frequency	Percentage(%)				
Age(yrs)						
19-21 yrs	21	21				
22-24 yrs	34	34				
25-27 yrs	24	24				
28-38 yrs	21	21				
P	lace of residen	ce				
Urban	46	46				
Rural	54	54				
	Type of family	T				
Nuclear	31	31				
Joint	55	55				
Extended	14	14				
	Religion					
Hindu	61	61				
Boudha	21	21				
Muslim	4	4				
Other	14	14				
Educational status of mother						
Illiterate	3	3				
Primary	22	22				
Secondary	63	63				
Graduate	9	9				
PG	3	3				
Occupation of the mother						
Housewife	50	50				
Service in Govt/Private	14	14				
Daily Wages	36	36				
Others	0	0				
Monthly family income(Rs)						
2000-5000 Rs	46	46				
6000-9000 Rs	27	27				
10000-13000 Rs	15	15				
14000 & above	12	12				

Section B:-Structured Questionnaire regarding knowledge on Contraceptive Methods.

## **Result:- Major Finding Of The Study And Discussion**

The following are the major findings of the study.

- Distribution of postnatal mothers with regards to demographic variables.
- Distribution of postnatal mothers according to their age reveals that 21(21%) in 19-21 years, 34(34%) in 22-24 years, 24(24%) in 25-27 years and 21(21%) in 28-38 years.
- Distribution of postnatal mothers according to their place of residence reveals that 46(46%) in urban area and 54(54%) in rural area.
- Distribution of postnatal mothers according to their type of family reveals that 31(31%) in nuclear family, 55(55%) in joint family and 14(14%) in extended family.
- Distribution of postnatal mothers according to their religion reveals that 61(61%) in hindu, 21(21%) in boudha, 4(4%) in muslim and 14(14%) in others.
- Distribution of postnatal mothers according to their educational status of mother reveals that 3(3%) in illiterate, 22(22%) in primary, 63(63%) in secondary, 9(9%) in graduate and 3(3%) in post graduate.
- Distribution of postnatal mothers according to their occupation of the mother reveals that 50(50%) in housewife, 14(14%) in service in govt. / private, 36(36%) in daily wages and 0(0%) in others.
- Distribution of postnatal mothers according to their monthly family income reveals that 46(46%) in 2000-5000 Rs., 27(27%) in 6000-9000 Rs., 15(15%) in 10000-13000 Rs. And 12(12%) in 14000 & above.

Table 2. Knowledge on Contraceptive Methods among postnatal mothers in Pre test n = 100

Level of knowledge	Score	Percentage	Pre Test	
score	range	score	Frequency	Percentage
Poor	0-5	0-20%	15	15
Average	6-10	21-40%	66	66
Good	11-15	41-60%	17	17
Very Good	16-20	61-80%	2	2
Excellent	21-25	>80%	0	Ô
Minimum score	1			
Maximum score	19			
Mean score	8.46 ± 2.76			
Mean %	$33.84 \pm 11.04$			

The above table shows that 15(15%) of postnatal mothers were having poor level of knowledge score, 66(66%) of them had average and 20(20%) of them had good level of knowledge score, 17(17%) had good and only2( 2%) of them had very good level of knowledge score. The minimum score was 1 and the maximum score was 19, the mean score was  $8.46 \pm 2.76$  with a mean percentage score of  $33.84 \pm 11.04$ .

Assessment of knowledge regarding Contraceptive Methods among postnatal mothers in selected hospital at wardha: The pre test findings shows that 15(15%) of postnatal mothers were having poor level of knowledge score, 66% of them had average and 20% of them had good level of knowledge score, 17% had good and only 2% of them had very good level of knowledge score. The minimum score was 1 and the maximum score was 19, the mean score was  $8.46 \pm 2.76$  with a mean percentage score of  $33.84 \pm 11.04$ . The post test findings shows that 3(3%) of postnatal mothers were having average level of

knowledge score, 24% had good, 48% had very good and 25% of them had excellent level of knowledge score. The minimum score was 10 and the maximum score was 25, the mean score was 17.64 $\pm$ 3.45 with a mean percentage score of 70.56  $\pm$  13.81. After assessing pre test and post test it shows that after planned teaching there was increase in post test knowledge score (Chandhick 2003).

Table 3. Knowledge on Contraceptive Methods among postnatal mothers in Post test $n = 100$					
Level of knowledge score	Score range	Percentage score	Post Frequency	Test Percentage	
Poor	0-5	0-20%	0	0	
Average	6-10	21-40%	3	3	
Good	11-15	41-60%	24	24	
Very Good	16-20	61-80%	48	48	
Excellent	21-25	>80%	25	25	
Minimum score		10			
Maximum score		25			
Mean score		17.64 ± 3.45			
Mean %		70.56 ± 13.81			

The above table shows that 15(15%) of postnatal mothers were having poor level of knowledge score, 66(66%) of them had average and 20(20%) of them had good level of knowledge score, 17(17%) had good and only2( 2%) of them had very good level of knowledge score. The minimum score was 1 and the maximum score was 19, the mean score was 8.46  $\pm$  2.76 with a mean percentage score of 33.84  $\pm$  11.04.

Table 3a. Effectiveness of planed teaching on Contraceptive						
Methods of postnatal mothers $n = 10$						
Level of knowledge score	Score range	Percentage score	Post Test Pre Test Post Test			
Poor	0-5	0-20%	15(15%)	0(0%)		
Average	6-10	21-40%	66(66%)	3(3%)		
Good	11-15	41-60%	17(17%)	24(24%)		
Very Good	16-20	61-80%	2(2%)	48(48%)		
Excellent	21-25	>80%	0(0%)	25(25%)		
		Minimum score	1	10		
		Maximum score	19	25		
		Mean score	8.46 ± 2.76	17.64 ± 3.45		
		Mean %	33.84 ± 11.04	70.56 ± 13.81		

The above table shows that 3(3%) of postnatal mothers were having average level of knowledge score, 24(24%) had good, 48(48%) had very good and 25(25%) of them had excellent level of knowledge score. The minimum score was 10 and the maximum score was 25, the mean score was  $17.64\pm3.45$  with a mean percentage score of  $70.56\pm13.81$ .

Association Of Knowledge Score In Relation To Demographic Variables.

# **RESULTS AND DISCUSSION**

A study on contraceptive knowledge, practice and utilization of service in rural area of India was conducted among 1,17,465 eligible women from selected 28 districts, out of 1,17,465 eligible women 14,276 were using contraceptives and 17,082 were not using any family
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methods (Jain et al., 1999). Among contraceptive users only 26 percent of women were using spacing methods. Almost all women (98.8%) were using a contraceptive method with the knowledge of their husband and had their support for continuing the same. The most common reason given for not using any family planning method was 'family not completed (34.6%), and fear of side effects (10%).10 (Hiller et al., 2002).

Graph 1. Effectiveness of planned teaching in pre and post test of knowledge on Contraceptive Methods among postnatal mothers



Table 4. Association of knowledge score in relation	to age
in years of the postnatal mothers n=100	

Age(Years)	No. of postnatal mothers	Mean knowledge score	F-value	p-value
19-21 yrs	21	17.23±3.76	0.47	0.700 NS,p>0.05
22-24 yrs	34	17.38±2.77		
25-27 yrs	24	17.70±3.62		
28-38 yrs	21	18.38±4.01		

This table shows the association of knowledge scores with the age in years of postnatal mothers. The tabulated 'F' values was 2.68(df=3,96) which is higher than the calculated 'F' i.e. 0.47 at 5% level of significance. Also the calculated 'p'=0.700 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that age in years of postnatal mothers in selected hospitals of Wardha is not associated with their knowledge scores.

Table 5. Association of knowledge score in relation to place of residence of the postnatal mothers n=100				
Place of residence	No. of postnatal mothers	Mean knowledge score	t-value	p-value
Urban	46	17.95 <u>+</u> 3.88	0.84	0.40 NS,p>0.05
Rural	54	17.37 <u>+</u> 3.04		

This table shows the association of knowledge scores with the place of residence of postnatal mothers. The tabulated 't' values was 1.98(df=98) which is higher than the calculated 't' i.e 0.84 at 5% level of significance. Also the calculated 'p'=0.40 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that place of residence of postnatal mothers in selected hospitals of Wardha is not associated with their knowledge scores.

Table 6. Association of knowledge score in relation to type of family of the postnatal mothers $n=100$				
Type of family	No. of postnatal mothers	Mean knowledge score	t-value	p-value
Nuclear	31	16.61±4		
Joint	55	18.12 <u>+</u> 3.09	2.03	0.13
Extended	14	18±3.21		NS,p>0.05

This table shows the association of knowledge scores with the type of family of postnatal mothers. The tabulated 'F' values was 3.07(df=2,97) which is higher than the calculated 'F' i.e 2.03 at 5% level of significance. Also the calculated 'p'=0.13 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that type of family of postnatal mothers in selected hospitals of Wardha is not associated with their knowledge scores.

Table 7. Association of knowledge score in relation to religion of the postnatal mothers n=100				
Religion	No. of postnatal mothers	Mean knowledge score	t-value	p-value
Hindu	61	17.65 <u>+</u> 3.25		
Boudha	21	18.33±3.95	0.78	0.50
Muslim	4	17.75 <u>+</u> 2.75		NS,p>0.05
Others	14	16.50 <u>+</u> 3.75		

This table shows the association of knowledge scores with the religion of postnatal mothers. The tabulated 'F' values was 2.68(df=3,96) which is higher than the calculated 'F' i.e 0.78 at 5% level of significance. Also the calculated 'p'=0.50 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that religion of postnatal mothers in selected hospitals of Wardha is not associated with their knowledge scores.

Table 8. Association of knowledge score in relation to educational
status of the postnatal mothers n= 100

Educational Status	No. of postnatal mothers	Mean knowledge score	t-value	p-value
Illiterate	3	13.66±3.21	5.35	0.001
Primary	22	17.77±3.10		S,p<0.05
Secondary	63	17.11±3.26		
Graduate	9	21.44 <u>+</u> 2.87		
PG	3	20.33 <u>+</u> 2.51		

This table shows the association of knowledge scores with the educational status of postnatal mothers. The tabulated 'F' values was 2.45(df=4,95) which is less than the calculated 'F' i.e 5.35 at 5% level of significance. Also the calculated 'p'=0.001 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that educational status of postnatal mothers in selected hospitals of Wardha is statistically associated with their knowledge scores

Table 9. Association occupational status	Table 9. Association of knowledge score in relation to occupational status of the postnatal mothers $n=100$				
Religion	No. of postnatal mothers	Mean knowledge score	t-value	p-value	
Housewife	50	18.26±3.31			
Service in Govt/	14	19.57±2.56	7.87	0.001	
Private					
Daily Wages	36	16.02±3.34		S,p<0.05	
Others	0	0±0			

This table shows the association of knowledge scores with the educational status of postnatal mothers. The tabulated 'F' values was 3.07(df=2,97) which is less than the calculated 'F' i.e 7.87 at 5% level of significance. Also the calculated 'p'=0.001 which was much less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that occupational status of postnatal mothers in selected hospitals of Wardha is statistically associated with their knowledge scores

A randomized controlled trial on 139 adolescents teenage mothers was conducted to assess their knowledge of contraception, infant vaccination, and breastfeeding .A structured postnatal home visits by nurse-midwives (n=65) or not (n=71) assessment interviews were done for 6 months postpartum (Ramachandran et al., 1983). Study concluded that postnatal home visits were associated with a reduction in adverse neonatal outcomes and a

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significant increase in contraception knowledge was improved, This study supported to present study sot he planned teaching was effective in improving the knowledge of postnatal mothers Contraceptive Methods (Rastak et al., 2005).

Table 10. Association family income of th	ı of knowledge score in rela e postnatal mothers n=100	tion to	monthly		
Monthly family income(Rs)	No. of postnatal mothers	Mean	knowledge score	t-value	p-value
2000 5000 Pa	40		17.15.2.57		
2000-5000 RS	46		17.15 <u>+</u> 3.57		
6000-9000 Rs	27		17.85±3.63	1.33	0.26
10000-13000 Rs	15		17.40±3.18		NS,p>0.05
14000 & above	12		19.33±2.60		

This table shows the association of knowledge scores with monthly family income(Rs) of postnatal mothers. The tabulated 'F' values was 2.68(df=3,96) which is higher than the calculated 'F' i.e 1.33 at 5% level of significance. Also the calculated 'p'=0.26 which was much higher than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that monthly family income(Rs) of postnatal mothers in selected hospitals of Wardha is not associated with their knowledge scores

Table 11. Association of knowledge score in relation to parity of the postnatal mothers $n=100$				
Parity	No. of postnatal mothers	Mean knowledge score	t-value	p-value
Primipara	65	17.14±3.35	2.00	0.04
Multipara	35	18.57±3.48		S,p < 0.05

This table shows the association of knowledge scores with the parity of postnatal mothers. The tabulated 't' values was 2.00(df=98) which is less than the calculated 't' i.e 2.00 at 5% level of significance. Also the calculated 'p'=0.040 which was less than the acceptable level of significance i.e. 'p'=0.05. Hence it is interpreted that parity of postnatal mothers in selected hospitals of Wardha is associated with their knowledge scores.

#### CONCLUSION

Based on the analysis of findings of the study, the following inference was drawn. There was evident increase in the knowledge scores in all the areas included in the study after administration of the plan teaching. The actual gain score was significantly higher in the areas of Contraceptive Methods and indicated more scope for improving in the area of knowledge of Contraceptive Methods Thus the plan teaching was effective and while the gain in knowledge scores. It was found that there was deficit in knowledge about Contraceptive Methods. Paired' test was computed to assess the effectiveness of the planned teaching in terms of knowledge gain. A significant difference in means was found in knowledge scores between pre-test & post-test. The mean post-test knowledge score was found to be significantly higher than the mean pre-test knowledge scores.

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## An Extensive Study: Preparation of People's Biodiversity Register (PBR) in Malkangiri, Odisha

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#### ABSTRACT

Biological Diversity Act, 2002 envisaged that every local body in India shall constitute a Biodiversity Management Committee (BMC) within its jurisdiction for the purpose of promoting conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of the commercial utilization of bioresources. The registers have opened new hope for local communities to get incentives against their conservation action. Poverty reduction, ecological infrastructure, risk reduction/mitigation and climate change, valuations of nature's contribution to human society and better management of the local resources are the other issues that can be addressed under the registers. Methods like Participatory Rural Appraisal (PRA), Focus Group Discussions (FGDs), Personal Interviews (PIs), Key Informants (KIs), Review of published literatures like district working plan, published research papers/research reports, review of district web portals of all the government line departments and collection of primary field data are followed to document the PBR. Due to the presence of no. of primitive tribal groups like Bondas, Gadabas, Kondhs and Koyas, the indigenous knowledge related to application of bio-resources in human welfare is still prevailing in most part of the district which is reflected in the present PBR document.

**KEY WORDS:** BMC, MITIGATION, KEY INFORMANTS, BONDAS.

#### **INTRODUCTION**

Under a multilateral environment agreement, to protect and conserve the loss of biodiversity, the Convention on Biological Diversity (CBD) was signed by 193 countries in 1992 and India as a signatory to CBD, developed its National Biodiversity Strategies and Action plan. The Government of India notified the "Biological Diversity Act in the year 2002 and the "Biological Diversity Rules" were framed in 2004. The main objectives of the Act are Conserve Biological Diversity, sustainable use of its component and fair and equitable sharing of the benefits arising from its use. With this enforcement, the Government of Odisha has constituted the Odisha Biodiversity Board in the year 2009 and "Odisha

Biological Diversity Rules" were framed in 2012 (research gate).

1.2 The Biological Diversity Act, 2002 and People's Biodiversity Registers: With the the enactment of Biological Diversity Act, 2002, the goal of establishing people's rights over their natural resources and their involvement in its protection and conservation is put in place. Various efforts are being made countrywide for documenting the local biodiversity. Although there are defined formats for data collection, a systematic approach for the local community to develop the People's Biodiversity Register (PBR) was required. Without this, there was a lack of ownership. This manual is an attempt to bridge this gap. To execute legal implementation of the Act to empower the local bodies to exercise their right on protection and conservation of bioresources including preparation of PBRs, three statutory bodies were formed through a three-tier system. At National level national Biodiversity Authority (NBA) was established in Chennai under section 8, state biodiversity boards (SBBs) and Union Territory Councils (UT Councils) were formed at state level under section 22 and Biodiversity Management



#### Subhasmita et al.,

Committees (BMCs) were formed at local body level under section 41. The methodology and manuals for developing the PBRs was designated by National Biodiversity Authority (NBA) of India.

1.3 People's Biodiversity Registers and the role of the **Biodiversity Management Committees:** Every local body shall constitute a Biodiversity Management Committee (BMC) within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of land races, folk varieties and cultivars, domesticated stocks and breeds of animals and microorganisms and chronicling of knowledge relating to biological diversity. The mandate of the Biodiversity Management Committee has been clearly highlighted in the Biological Diversity Act, 2002 as follows: As per Section 22 (6) of Biological Diversity Rules, 2004 -"The main function of the BMC is to prepare People's Biodiversity Registers (PBRs) in consultation with local people. The Register shall contain comprehensive information on availability and knowledge of local biological resources, their medicinal or any other use.

- The other functions of the BMC are to advice on any matter referred to it by the State Biodiversity Boards or Authority for granting approval, to maintain data about the local vaids and practitioners using the biological resources.
- The Authority shall take steps to specify the form of the People's Biodiversity Registers, and the particulars it shall contain and the format for electronic database.
- The Authority and the State Biodiversity Boards shall provide guidance and technical support to the Biodiversity Management Committees for preparing People's Biodiversity Registers.
- The People's Biodiversity Registers shall be maintained and validated by the Biodiversity Management Committees.

**1.4 People's Biodiversity Registers and the role of National Biodiversity Authority (NBA):** Biodiversity Management Committee (BMC) for preparing People's Biodiversity Register.

**1.5 People's Biodiversity Registers and Role of the Technical Support Group (TSG):** The Technical Support Group (TSG) will consist of experts from various disciplines and line departments, universities, research institutes, colleges and schools and non-governmental organizations. The Technical Support Group will provide technical inputs and advice to the BMCs on identification of plants and animals, monitor and evaluate the PBR exercise, examine confidential information and advice on legal protection, maintain a database of local and external experts on biodiversity.

**2.1 People's Biodiversity Registers (PBR):** PBR is a document which contains comprehensive information on locally available bioresources including landscape and demography of a particular area (springer.com).

The PBR is an authentic document prepared by the state biodiversity boards and UT Councils in their vernacular language chronicling the local biodiversity of their cultural landscapes at Panchayat, Municipal Corporation and other urban area level in a participatory manner with prior informed consent (PIC) of the local community. The register records people's knowledge and ongoing changes in biodiversity of the area and serves as a baseline database for future management strategies and it is considered as a handbook for assessing locally significant elements of biodiversity and TK. The registers can serve as an instrument to understand appropriate components in designing conservation efforts. The PBR can also protect intellectual property rights (IPR) of local communities as it is a database of traditional knowledge (TK) and intellectual properties (IP) of local tribal and rural communities on biological resources.

#### 2.2 Relevance OF PBR:

#### The PBRs will help in;

- Chronicling the depleting indigenous traditional knowledge at all local bodies across the entire Indian subcontinent.
- Declaration of Biodiversity Heritage Sites (BHS).
- Conservation of threatened and endemic plants and animal species of the area falling within its territorial jurisdiction.
- Long term strategies for biodiversity conservation.
- Increasing the livelihoods of the local community who are depending on the biodiversity and assisting in poverty reduction.
- Documentation of potential biodiversity for Access and Benefit Sharing (ABS) mechanisms.
- Effective management, promotion and sustainable uses of bioresources.
- Protection of rights including IPR over Biological resources and associated knowledge and systems.
- Impose restriction/regulations towards access to the flora and fauna which are threatened, and endemic.
- Restrict the activities which cause genetic erosion affecting the species and ecosystems.

1.2 Review of Literature: After 16 years since the enactment of Biological Diversity Act, its implementation remained dismal. In July 2016, a petition was filed by a Pune-based activist Chandra Bhal Singh before the National Green Tribunal (NGT) for effective implementation of the BD Act, 2002. At the time of filing the petition, out of 2,70,573 local bodies across the country, only 9,700 had a BMC; thereby implying compliance at a mere 3.58 percent. In terms of PBRs, 1,388 out of 9,700 BMCs had managed to complete the same; which means compliance of 14.31 percent. Given the tardy progress made by India's cornerstone biodiversity legislation even after 13 years of its being in force, the petitioner sought the intervention of the NGT to ensure compliance with the Act. Since then there have been a series of orders leading to significant movement in the case. Due to the NGT order, there has been a significant improvement in the formation of Biodiversity Management Committees and People's Biodiversity Registers which are important for the implementation of the Act.

Till date 2, 62,138 BMCs and 1, 90,950 PBRs have been prepared in all the states and Union Territories of India at Gram Panchayat, Pancahyat Samiti, Block, Districts, Municipal Corporation and other urban area level by State Biodiversity Boards and UT Biodiversity Councils. States viz. Assam (2549), Goa (205), Haryana (6437), Kerala (1034), Madhya Pradesh (23557), Punjab (13599), Sikkim (196), Tamil Nadu (13604), Tripura (1264) and Uttarakhand (1264) which have completed the constitution of BMC and preparation of PBRs in their respective local body level, states like Jharkhand and Telangana are on the verge of completing the process.

In Odisha till date the board has constituted 6952 BMCs at gram panchayat block, district and urban area level out of 7256 local bodies and prepared 181 PBRs at gram panchayat level and 30 PBRs at district level. Even though BMCs are constituted by UTs, no PBRs are yet to be prepared by them. Odisha Biodiversity Board is now in a mission to complete the preparation of PBRs and inviting assistance from Panchayat Raj department, leading civil society organizations of the state and scholars of universities to accomplish 100% results in this direction.

#### PBR Methodology:

- One of the first steps for preparing a PBR is to organize a group meeting at unit level (Panchayat Raj Act 1994) to explain the objectives and purpose of the exercise.
- Different social groups in the village need to be identified for purpose of data collection from those groups
- Facilitators/TSG will collect the information from all sectors of biodiversity and ecosystem with intensive and extensive consultation with the people.
- The objectives and purpose is to be explained in a group meeting in the presence of all sections of people in the Panchayat, members of the BMC, students, knowledgeable individuals and all those interested in the effort.
- Documentation includes photographs (including digital images), drawings, audio and video recordings and other records like printed material, FGD, PRA, PI, KI etc.

# Following methods were applied to document the PBR:

- Interviews of knowledgeable individuals, for instance, of changes in the availability of a medicinal plant species in the locality;
- Group interviews, for instance, as to who the gainers and losers are of a particular regime of management, for example, joint forest management of a forest patch;
- Field observations, for instance, of occurrence of a certain species of medicinal plant in a specific patch of forest, or the depth of water at a particular sampling location in a stream;

• Official documents, for instance, as to the amount realized by auctioning the rights to catch fish in a pond.

Following approach was adopted to documentation of Traditional Knowledge (TK) related to biodiversity in PBR: Every effort was made to identify the persons with proven knowledge of local biodiversity. Special attention was given to the elderly persons who can also provide information on the biodiversity which was available in the past but are no longer seen at present. In some cases focus group discussions were held for the purpose of documentation. The Vaidyas, Hakims, Disharies, NTFP collectors, Fisher folks, Grazing men/women, hunters, cultivators of indigenous verities, etc. were consulted thoroughly.

#### Process in PBR Preparation;

Step 1

Formation/Constitution of BMC

Step 2

Sensitization of the public about the study, survey and possible management

Step 3

Training of members in identification and collection of data on biological resources and traditional knowledge Step 4

Collection of data includes review of literature on the natural, resources of the districts, Participatory Rural Appraisal (PRAs) at village level, house hold interviews, individual interviews with village leaders and knowledgeable individuals, household heads, key actors of the panchayat raj institutions and NGOs and direct field observations.

Step 5

Analysis and validation of data in consultation with technical support group and BMC

Step 6

Preparation of People's Biodiversity Register (PBR) Step 7

Computerization of information and resources

As per the revisited guidelines issued by the NBA in 2013 of 2009, the format of PBR consists brief profile of the local bodies (GPs/Block/NACs/Municipality/District. The general details include Annexure 1-5 and the PBR has 3 parts.

#### Part I

- 1. The Biological Diversity Act, 2002 & Rules, 2004
- 2. Peoples Biodiversity Registers and the role of the BMC.
- 3. Peoples Biodiversity Registers and the role of NBA
- 4. PBRs and the role of State Biodiversity Board
- 5. PBR and role of the Technical Support Group
- 6. The PBR Process
- 7. PBR methodology
- 8. Documentation of Traditional Knowledge related to biodiversity

#### Part II

There are 32 different formats to be filled up in different

discipline for entire PBR preparation (Agro biodiversity, Domesticated Biodiversity, Wild Biodiversity, Urban Biodiversity)

#### Part III

Basically, covers the guide to field studies

Profile of the district: Malkangiri District is named after its headquarters town, Malkangiri. During formation of Odisha Province in 1936, Malkangiri was a 'Taluk' of Nabrangpur sub-division of Koraput District of Odisha. In 1962 it was upgraded to a subdivision of Koraput District. The present Malkangiri got its identity as an independent district due to reorganization of districts of Odisha as per a notification on 1st October, 1992 and with effect from 2nd October 1992. The Malkangiri district situated between 17°45' to 18°40'N latitude and 81º10' to 82 º 00' E longitudes in southernmost part of Orissa state, India. This district is spread over an area of 5791 km2 with a maximum north-south elongation of 137 km and a maximum east-west elongation of 76 km. The district is bounded in the east by Koraput district (a portion) of Orissa, Visakhapatnam and East Godavari districts of Andhra Pradesh, Bastar district of Chhattisgarh in the west, Koraput district of Orissa in the north and East Godavari and Khammam districts of Andhra Pradesh in the south.

#### Peoples' Biodiversity Register (PBR): General Details

Name of the District: Malkangiri State: Odisha Geographical Area: 5791 km2 Population: Total: 6,13,192 Male: 3, 03,624 Female: 3, 09,568

Habitat and Topography: The general topography of the area is of broken mountains intercepted by large riverbeds and watercourses. The altitude varies from 400 m near western side to 1200 m on the eastern side with mountain peaks and ridges. Numerous hill streams drain into major rivers such as Sabari, Sileru, Potteru, Kolab and Machhkund. Mainly black soil, which is rich in organic matter, occurs in this district. The climate of the major portion of the district is influenced by its varied elevation. The hill system descends into the low lying tracts of Malkangiri, about 1200 m altitude at their northern end and gradually falling away in a south-westerly direction to 200 m high at Motu, the extreme south-western corner of the district. Due to various anthropogenic active-ties, the forest cover of Malkangiri district now faces a threat of extinction. Slash and burn (locally known Podu) cultivation carried out by tribal people is the main cause of deforestation and land degradation in the district. With increase in human and animal population, the pressure on land has increased tremendously and much of the valley areas have been laid bare.

Climate (Rainfall, Temperature and other weather patterns) Land Use (Nine-fold classifications available with village records): December is the coldest part of the year with an average daily minimum temperature of 11.2. The maximum temperature seldom touches 43 in summer. Humidity is generally high especially in the monsoon and post monsoon months. It receives about 1400–2000 mm rainfall annually. Date, Month and Year of PBR preparation: July, 2020 Management Regime: Reserve Forests (RF) / Joint Forest Management (JFM) / Protected Areas (PA) / Community Owned and Managed Forests (COM)

#### CONCLUSION

The BMCs have been assigned with the responsibility of documentation of biodiversity and associated knowledge within their jurisdiction in the form of People's Biodiversity Registers (PBR). As BMCs will have the authority to levy charges on the individuals, traders, manufacturers, companies etc, against the commercial collection of the biological material, and would be consulted by SBBs and NBA while deciding on access to biological material and associated knowledge from the areas under their jurisdiction, an integrated and coordinated effort of all the three statutory bodies may lead to conservation of biodiversity and poverty reduction, Such complete document shall help the local sustainable resource management in restoration of wild relative of crop plants, traditional fishes, land races, folk verities, breeds of domesticated animals, wildlife habitats, other biologically significant areas like regional biodiversity rich sites, sacred groves and locally threatened wild species and supports claims of local ownership of biodiversity & restoration of indigenous traditional knowledge and contributes to Knowledge flow.

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# Pakistan Agriculture and Livestock: An Insight and Climate Change Impacts

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#### ABSTRACT

This review article focuses on Impacts of Climate Change and their Effects on Agriculture and livestock in Pakistan. In this article we were studied that the related literature to present topic in a good and better way and also discussed the climate change impacts and adaptation strategies in agriculture and livestock sector. Climate and agriculture are directly connected to one another so I found it good on talk about the summer season, winter season and monsoon season and their impact on agriculture in Pakistan. This article will also provide a short study of undernourished people in Pakistan as well as a graph that explains this theory in a better way. The way to overcome the shortcomings of bad climate effect on agriculture and livestock is also discussed in this paper because various climatic conditions, such as average temperature, humidity, and wind speed, play a significant impact in the fertility, reproductive performance, meat and milk output of dairy cows. From all this review. In conclusion the Pakistan is one of the most climate-sensitive nations despite contributing just 0.8% to atmospheric Greenhouse Gases (GHG) More than 40% of the population in this region is involved in agricultural production. Pakistan has inadequate water storage facilities and aging water infrastructure.

KEY WORDS: CLIMATE, AGRICULTURE, PAKISTAN.

#### INTRODUCTION

Agriculture is one of the most vulnerable sectors of the economy to climate change. It reacts to climate change-related changes in temperature, precipitation, and soil radiation. In overpopulated areas of the world, rising temperatures, uneven rainfall distribution, floods, droughts, and other climatic calamities have had an impact on human existence and socio-economic sectors



(ie, South Asia). Assessing the eventual economic impact of climate change on agricultural producers, consumers, and other factors necessitates a thorough examination of the economic impact utilizing data from several climate and crop models. Scientists and crop experts collaborated on a thorough study to investigate the potential consequences of climate change. They analyzed the interaction of meteorological variables using multiple physical, biological, and chemical principles, and then estimated their reaction to rising amounts of greenhouse gas emissions in the atmosphere using global climate models.

Agricultural facilities account for about 20% of the rise in man-made greenhouse gas emissions each year. Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (NOx) emissions from the industry contribute to global warming (N<sub>2</sub>O). Greenhouse gases allow light to reach the



ground while preventing heat transfer and attempting to escape from the atmosphere, collecting heat in the same way as a greenhouse does.  $CH_4$  has around 300 times the global warming potential of  $CO_2$  and about 20 times the potential of  $N_2O$ . Nitrogen fertilizer, flooded rice fields, soil management, land conversion, biomass burning, livestock production, and related manure management are the main sources of gas. The livestock industry contributes between 5% and 10% of the total greenhouse gas emissions.

The Asia-Pacific area has seen extreme heat in recent decades. The agricultural industry is especially sensitive in these regions, accounting for 37 percent of total world emissions from agricultural production in Asia and the Pacific. Bhutan, Indonesia, Pakistan, Papua New Guinea, the People's Republic of China, Sri Lanka, Thailand, East Timor, Uzbekistan, and Vietnam are the country's most vulnerable to climate change (Asian Development Bank, 2009). On the other side, the agriculture industry has the potential to harm the environment. Paul et al. were the ones that came up with this solution (2009). The agricultural sector is responsible for 14 percent of nitric oxide and methane emissions, with deforestation for agricultural purposes accounting for 18 percent. In the agricultural sector, season and location are critical factors in output. African crops are more sensitive to minor temperature fluctuations than they are to rainfall changes. Rising temperatures benefit African crops, whereas less rainfall has a negative impact on net revenue. These findings are based on 300 South African regions and seven African field crops (maize, wheat, sorghum, sugarcane, peanuts, sunflowers, and soybeans) (Gbetibouo, 2005). The study also revealed that agricultural growth seasons can shift in response to temperature, although this behavior could result in the extinction of specific crops in particular places.

Pakistan is one of the most climate-sensitive countries, despite contributing only 0.8 percent of global greenhouse gas emissions. Pakistan is ranked 135th among other countries. Pakistan was ranked seventh most susceptible country in the 2017 Global Climate Risk Index due to its geographic and climatic characteristics. It is situated in a geographical region where temperature rises are predicted to be greater than the world average. The glacier, which is the river's primary source of food, is fast receding, and the majority of the land is barren or semi-arid. Agriculture employs more than 40% of the inhabitants in the region. Their vulnerability is exacerbated by the fluctuation of monsoon rains, largescale floods, and droughts. The combined influence of all of these climatic factors puts the country's food, water, and energy security in jeopardy.

The output of Pakistan's principal grain crops is prone to high temperatures and poor rainfall, according to empirical literature based on crop models. In Pakistan, the growing season necessitates a specific quantity of heat and precipitation. During the wheat growing season, the average temperature remains mild. Despite this, wheat does not receive enough rain to thrive. After the monsoon, irrigation water and rainfall restore the majority of the arable land. According to the 2016-17 Pakistan Economic Survey, canal water irrigates 30% of total arable land area for wheat crops, while tube wells and other sources irrigate 55 percent. However, only 15% of the population has access to water.

The range and extent of monsoon rainfall has reduced over time as a result of climate change. The summer monsoon is responsible for 60% of all annual precipitation. Pakistan is also a water-scarce country, with limited water storage facilities and old water supply infrastructure, including a vast irrigation network. Although there is a growing body of literature on the impact of climate change on crop yields in Pakistan, the nature and scope of its economic impact remains largely unknown. Furthermore, there is a scarcity of study on the effects of agricultural impacts on human livelihoods. The majority of present research focuses on the local equilibrium analysis of climate change variables (such as temperature and precipitation) on crop yields and production.

An Overview of Climate Change and Agriculture in **Pakistan:** When it comes to climate change, Pakistan is no exception. Pakistan is particularly sensitive to climate change due to its geographic location. It is situated in an area where the likelihood of temperature rise is expected to be higher than the global average. Pakistan's agricultural lands are mostly arid or semi-arid. According to meteorological statistics, around 60% of the whole area receives yearly precipitation of less than 250 mm, while 24% receives annual precipitation of 250 to 500 mm. The Indus River is the principal source of agricultural water, with the Karakoram, Himalayas, and Hindu Kush glaciers supplying the majority of it. Recent studies, however, have convincingly demonstrated that these glaciers are fast melting as a result of climate change. Pakistan's economy is highly vulnerable to climate change because it is based on agriculture. Because of this vulnerability, the monsoon rainfall fluctuations that resulted in the 2010 drought and flood represent a significant hazard.

Under light of these topographical facts, insufficient water supply, food security, and electricity generation are clearly in jeopardy (TFCC, 2010). Pakistan has a land area of 79.61 million hectares, excluding the northern section of the country. Only 72 percent of the total area has been recorded, indicating that 28 percent of the region has still to be surveyed for land use classification. The total area provided is divided into four categories: forest (4.02 million hectares), uncultivated land (22.88 hectares), arable land (8.12 hectares), and crops (22.05 hectares). If enough water is available, approximately 8.1 million hectares of the total reported area can be exploited for future agricultural and other uses (Ahmad and Joyia, 2003). Agriculture and animal husbandry have long been the backbones of the economy, contributing roughly 22% of GDP, 60 percent of exports, 68 percent of the population's livelihoods, and 44 percent of the overall workforce's employment.

Climate Change Impacts and Adaptation strategies in Agricultural Sector: The scientific community has come to the conclusion that climate change is occurring. Climate change is occurring worldwide, according to the IPCC's fifth report. Developing countries are projected to suffer disproportionately more losses than developed countries. Two main choices for societal reaction have arisen in order to handle the repercussions of climate change: mitigation and adaptation. Mitigation and adaptation, according to Fusel, are complementary rather than mutually exclusive. Historically, mitigation measures have been the primary focus of efforts to combat climate change. However, a shift has occurred, and it is now widely accepted that mitigation alone will not be adequate to address climate change. Climate change adaptation has gotten a lot of attention in scientific and political issues. "The adjustment of ecological, social, or economic systems in response to real or expected climate stimuli and their affects or effects," according to the definition of adaptation. "Adaptation is vital to reduce vulnerability to climate change and is the only way to deal with the unavoidable repercussions of the coming decades," according to Stern. Many countries have already put in place national, provincial, state, regional, and local strategies to deal with climate events on various levels.

At the Seventh Conference of the Parties in Morocco in 2001, the predicament of developing countries was acknowledged for the first time. Climate change adaptation's critical significance as a policy has been properly explored and acknowledged internationally. Article 4.1b of the United Nations Framework Convention on Climate Change, for example, states that the parties "commit to formulate and implement national programmes, and as appropriate, regional programmes, which include measures to mitigate climate change and measures to promote full adaptation to climate change." Similarly, the Kyoto Protocol's Article 10 promotes the development of adaptation and the incorporation of adaptation technological advancements to combat climate change. Furthermore, the necessity to increase the adaptation measures of the Parties to the Convention (UNFCCC) was stressed during the 2007 UN Climate Change Conference in Bali.

To avoid the effects of climate change, adaptation is required; else, the effects will be gradual. Climate models suggest that disastrous floods, torrential rains, and heat waves will become more common. As a result, such climate impact scenarios must be factored into adaptation plans. Adaptation is viewed as a promising first step toward improving local capacity to respond to both expected and unanticipated weather events. Climate change adaptation is a key component of the 2015 Paris Agreement. Dessai et al (2005) believe that mitigation alone will not be sufficient to address climate change effectively. As a result, efforts are being made all across the world to adapt to the challenge of climate change. Pakistan understands the necessity of climate change adaptation. In order to address Pakistan's climate change problem, it is necessary to develop a

change adaption strategy (Ali et al. 2017). Adaptation measures are a priority in Pakistan's policy response. The national climate change policy, for example, focuses on climate adaption measures. Given Pakistan's significant sensitivity to climate change, Mumtaz feels that climate adaptation measures are unavoidable. These adaptation efforts, according to reports, are critical for all key industries, including agriculture.

Pakistan's status as a developing country makes it highly reliant on agriculture, making it particularly sensitive to climate change. The agricultural industry alone contributes for 21% of GDP and 44% of the labor force. The agriculture sector, which provides for around 65 percent of foreign exchange, is also very important to the country's exports. More over two-thirds of the country's population lives in rural areas, with agricultural and agriculture-related industries providing the majority of their income (Pakistan, 2009). The agriculture sector's contribution to GDP, exports, and employment has decreased dramatically. Climate change is thought to be the primary cause of agricultural production decline, in addition to other factors.

"In 2009, the Pakistani government drew attention to the fact that the agricultural sector had underperformed in 2007-08. In contrast to the aim of 4%, it climbed by 1.5 percent. The agricultural sector was hit hard in May 2007 due to a variety of factors, including heavy rain, high temperatures in August and September 2007, and a lack of water during the irrigation season. The current research topic Punjab is Pakistan's second-largest and densely populated province. Punjab's main economic activity is agriculture. The agricultural sector dominates the majority of Punjab's land (57.2 percent). It also accounts for over 53% of Pakistan's agricultural GDP (Punjab, 2009). According to the Punjab Development Statistics for 2007-08, released in 2009, Punjab's primary crops contribute 59.1 percent of rice, 74.5 percent of wheat, 63.1 percent of sugar cane, 74.5 percent of corn, and 77.8 percent of cotton to the country's agricultural production. Similarly, when it comes to key fruits, Punjab produces a significant portion of the country's total output.

**Climate change and disaster:** Climate change also brings climate variability/extreme weather events, which can be measured over a shorter period of time. Climate variability (extreme weather events) has increased in recent years, resulting in hydro meteorological disasters, which are a major problem around the world. Storms, floods, droughts, and hurricanes have been common in recent years around the world, claiming lives and livelihoods and exacerbating poverty. Climate variability and the frequency of extreme events are increasing in Pakistan, and they are the primary cause of climate disasters. The frequency of hydro meteorological disasters has increased worldwide, particularly in Pakistan, since the 1990s. Because of its climatic and geographic diversity, the country is vulnerable to these climatic disasters. The fragile sector (agriculture) accounts for a large portion of our economy, and the majority of the

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rural population is impoverished. The level of resistance is low. Given that one of the most serious consequences of climate change is increased climate variability, which increases the risk of extreme weather events and hydro meteorological disasters, it is critical to work on climate change adaptation and disaster risk reduction. Extreme weather events pose a risk of disaster.

#### Climate Change, Agricultural Adaptation and Fairtrade:

Climate change will have an impact on many Fairtrade export crops, including cotton, cocoa, coffee, tea, sugar, bananas, flowers, and citrus. Crop yields may increase or decrease as a result of climate change, and planting places may shift. These changes, however, are difficult to assess or forecast. Returns may be harmed (positive and negative effects may occur in different time periods and in different locations). The areas and thresholds that can be cultivated will alter as the climatic average (temperature and precipitation) changes. Although there are more and more evaluations on the potential influence of climate change on agriculture and agricultural product trade, they are still largely limited to the primary grains of wheat, rice, and corn, with the impact on fair trade not thoroughly studied. This study was commissioned by the Fairtrade Foundation to help the fair-trade movement adapt to the issues that climate change offers to fair trade producers.

**Concept of Fairtrade:** Fair trade is a business partnership built on communication, transparency, and mutual respect. It aspires to make international trade more equitable. It encourages long-term growth by improving economic conditions and protecting the rights of underprivileged producers and workers. The International Fair Trade Labeling Organization (FLO) has a number of procedures or "paths of influence" for fair trade certification. It tries to have a positive impact on disadvantaged workers and producers through various processes or "paths of influence" (Eberhart and Smith, 2008). They include producer and trader standards, auditing and certification of producer organizations and farms based on these standards, and fair trade organizations' capacity-building networks and advocacy operations. Technical aid, organizational development assistance, skills training, and more capable ways to create trust and help less powerful groups define their own narratives and agendas are all examples of capacity building.

**Climate change impacts on smallholder agriculture:** Long-distance and remote climate change impacts may arise when the influence of climate change affects a population, prompting them to adopt adaptations (modifications and more radical alterations) in order to have an impact in another region. This could happen as a result of market forces or population shifts, for example. There will be secondary consequences as a result of the government's, development agencies', non-governmental organizations', and private sector's responses. In the future of climate reduction, adaptation, and development, new political frontiers have developed (Boyd et al., 2009), but it needs to be seen whether climate policies and plans will provide new prospects for low-carbon development and a better environment.

Is causing or exacerbating existing social and environmental inequity. have been observed social inequality may increase if adaptation and mitigation measures are not implemented in a gender-sensitive way, and full participation of women and socially excluded groups in key policies and decision-making is not increased (Nelson et al. 2002; 2017; FAO, 2007; Dan Kerman, 2008). Given the unpredictability and severity of climate change estimates, trade-offs in adaptation decision-making must be explored as decision-making gets increasingly complex. Who will hear opinions in decision-making will be more crucial than ever, and marginalized groups will require more help to engage in the adaptation policy process?.

**Climate and Fairtrade Crops:** As we all know, atmospheric greenhouse gases (mostly carbon dioxide, CO<sub>2</sub>, and water vapour, H<sub>0</sub>) trap long-wave radiation, causing the earth's temperature to rise by around 30 degrees Celsius (Jain, 2009). However, since the 1980s, people have understood that the amount of CO<sub>2</sub> in the atmosphere has increased as a direct result of human activity, from a pre-industrial (1750) level of c. 280 ppm to a present level of c. 388 ppm (Houghton, 2009; NOAA, 2010). In the twentieth century, this resulted in an average temperature increase of 0.6 °C +/- 0.2 °C, mainly during the 1980s (IPCC, 2007). Because there are different scenarios for the speed and nature of economic growth, the increase in greenhouse gas emissions and different climate models give different results, it's difficult to predict the future of global warming. However, everyone agrees that as the level of carbon dioxide rises, so will the amount of carbon dioxide in the atmosphere. The planet will become warmer if it continues to climb (IPCC, 2007). In the next two decades, global temperatures are expected to rise by at least 0.2°C every decade. Even if greenhouse gas and aerosol emissions remain unchanged after this time, the temperature is anticipated to climb by at least 0.1°C per ten years. However, a model indicates that by 2100, the temperature will have risen to 6°C, with disastrous ecological effects (IPCC, 2007).

According to the model's forecasts, variations in temperature and rainfall will be significant, with some areas becoming warmer and others becoming colder. Likewise, certain areas will be more humid, while others would be dryer. These changes will modify the length of the growing season, which might have a significant impact on corn and other crop output in regions of Africa. The decline of snow cover in the Himalayas will have an impact on the water flow of certain major river systems in Asia, restricting irrigation water supplies. Sea level rise will impair rice and other crop output due to salt water intrusion, while temperature and precipitation patterns will change the scope and productivity of crops separately or in combination. Fields that are more complicated but also more complex. It's usually written in the negative. These are the results of direct crop physiology effects. Crop pest and disease transmission

will also change as a result of these changes, altering the dynamics of these interactions (Harrington and Woiwod, 1995; Bale et al. 2002). The order of relative importance of these effects is a source of debate in the scientific literature.

The impact of climate change on feed crop production:

Agriculture and food supply stability, in addition to natural vegetation, are the most vulnerable activities to climate and meteorological changes. Unfavorable climatic conditions can result in a considerable fall in crop yields, and in certain cases, crop extinction. To avoid this, significant efforts are needed to investigate the adaptive capacity of crops. It is critical to adjust production technologies to planting site conditions and crop requirements, expand the usage of drought-resistant varieties/hybrids, and apply selective breeding to achieve these aims. One possible effect of climate change is the need to transition as much as possible from production based on natural precipitation to production based on irrigation. The soil moisture development model gives quick information on how soil water supply conditions match the needs of various crop kinds, expressed as a percentage of the maximum useable water content of the soil. Several studies in temperate regions have come to the same conclusion that a 10% reduction in precipitation will raise irrigation water demand by at least 7-8%, however crop kinds and climatic circumstances play a role. Many significant data points in the literature point to the need of distinguishing between prospective and actual vegetation periods. The possible vegetative season will be extended as a result of the higher average daily temperature.

Higher temperatures, on the other hand, cause rapid growth, which shortens the life cycle of crops, and hence the duration of the real vegetation period. In this instance, it is more practical to plant types with longer growing seasons (which provide bigger yields and can be stored well) or to grow after harvest. The latter situation allows for the harvesting of the same area twice in the same year (Babinszky et al. 2011). C3, C4, and CAM photosynthesis are the three forms of photosynthesis (Crassulaceae acid metabolism). C3 photosynthesis is the most common type of photosynthesis seen in plants. C4 and CAM photosynthesis are the outcome of drought adaptation because they boost water use efficiency. Furthermore, CAM plants can conserve energy and water in times of scarcity, whereas C4 plants, unlike C3 plants, may perform faster photosynthesis in the desert due to their usage of biochemical pathways. To minimize light respiration, extra and unique anatomy is used.

**Cattle production: milk production, milk quality and beef production:** Various climatic conditions, such as average temperature, humidity, and wind speed, play a significant impact in the fertility, reproductive performance, and milk output of dairy cows, as well as other species. Has a great deal of genetic potential. The ideal temperature for cows is between 5 and 15 degrees Celsius. Animals begin to sweat at temperatures above 15°C, but they can still maintain a balance between heat generation and

dissipation. Sweating and heat dissipation increase over time. The cow can no longer maintain heat balance at such a high temperature, even though it becomes quite strong over the crucial temperature (25°C).

According to Cazer et al (2002), the amount of water lost through evaporation on hot days can equal or even exceed the amount of water expelled in milk. The high rate of water loss highlights the need of providing water to cows in hot weather. However, as humidity rises, the body's cooling efficiency diminishes due to water evaporation loss. It is advised to utilize the Temperature and Humidity Index (THI) as an indicator of hot climate conditions (THI = 0.72 (W + D) + 40.6, where W is the wet bulb and D is the dry bulb temperature in °C). The associated heat stress is mild, moderate, or severe when THI is in the range of 72-80, 80-90, or 90-98. The dry matter intake and milk production of dairy cows will be negatively affected by an increase in ambient temperature (from 25°C to 32°C) and THI (from 73°C to 82°C) (West et al. 2003). According to relevant evidence, the shorter an animal is exposed to heat stress, the better its tolerance, yet even modest heat stress might affect its productivity.

**Effect of Heat Stress on Dairy Animals in Pakistan:** The most significant impacts of heat stress are alterations in energy metabolism and distribution and reduction in DMI. As a result, milk output is reduced. Maintenance energy requirements and heat stress increased by 20-30% in commercial dairy herds, whereas DMI reduced by 10-20%. (Chase, 2006). To optimize the milk production response, the formula for providing appropriate food intake for heat-stressed cows relies on improving non-degradable rumen protein. As the temperature rises, so should the amount of forage available (West, 1999). De Rensin and Scaramuzzi (2003) discovered that dairy cows' appetite and dry matter intake are reduced after delivery, prolonging the negative energy phase.

According to Tao et al. (2011), heat stress cooling can increase milk production (28.9 vs. 33.9 kg/day) while lowering milk protein levels (3.01 vs. 2.87 percent). It's possible that physiological alterations in milk production during heat stress are related to liver glucose being used for processes other than milk synthesis (Baumgard et al. 2011). Temperature, rainfall frequency, and the severity of extreme events all have an impact on livestock and crop output (Thornton et al. 2008). The Humidity and Temperature Index (THI) has been utilized as a heat stress indicator. The THI threshold is 72 (Igono et al. 1992), and a 2009 study by Dikeman and Hanson found that dry bulb temperature can also be used to forecast nursing Holstein cows' rectal temperature in subtropical conditions. Heat load exceeding the neutral heat zone has an impact on animal performance.

To maintain a consistent temperature, animals do not produce excessive heat (West, 1999). Mukherjee and colleagues Heat-stressed cows' lymphocytes were shown to be reduced in 2011. The rectal temperature and respiratory rate will rise physiologically as the ambient

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temperature rises above the thermal neutral zone (Chase, 2006). Estrus hormones are low during heat stress, according to Gwazdauskas (1985), resulting in a shorter estrus duration. He also looked at the poorer fertility of heat-stressed male cattle as a result of changes in spermatogenesis and testosterone after high-temperature exposure. Baumgard and Rhoads (2007) indicated that heat stress has a negative influence on numerous dairy product parameters including milk production and reproduction, producing a major economic burden. The efficiency of reproduction will be reduced as the heat load rises (Fuquay, 1981, Imtiaz Hussain et al. 1992). Most reproductive difficulties are shortened duration and intensity of estrus (Her et al. 1988), lower conception rates (Stott et al. 1972), and significant embryonic death (Wise et al., 1988).

Awareness campaign in Punjab: The Punjab government has launched a climate change and agriculture awareness campaign. They established a radio station to provide weather updates to farmers. Multiple programmes are broadcast on the radio to promote farmer awareness of climate change, its influence on the agricultural industry, and potential solutions to problems. The radio station's influence has been well-documented across the province. Many farmers, for example, listen to the radio on a regular basis to learn about weather conditions, upcoming events, and how climate change may affect them. Some interviewees said they listen to the radio frequently because it provides them with useful information such as weather forecasts, fertilizer and seed application techniques, and government subsidy programmes for agricultural regions. Climate specialists and agricultural experts were asked to examine climate change, its influence on agriculture, and potential remedies in some projects. A farmer informed us that he listens to these programmes on the radio frequently because they provide him with new ideas and best practices from agricultural specialists. Table 1 lists adaptation initiatives as well as the variables that drive them.

A short analysis of how to overcome the shortcoming of bad effects of climate on agriculture: The impact of climate change on agriculture in Pakistan and Asia is a major concern for the people living in the areas affected by it. As per the recent studies, the areas that are receiving the most rainfall have been found to be mostly arid. This means that there will be less or even no rainfall during the summers. This can dramatically affect the productivity of crops. Thus, the governments of most countries including Pakistan are trying to lessen the effects of climate change on their agriculture as much as possible. Pakistan has an agricultural system based on rice. The change in climatic conditions will greatly impact this. There are two types of rice cultivation in Pakistan-organic and the non-organic. Rice is one of the major crops that have been very affected by the change in climate. The crops such as wheat and maize cannot grow properly in areas that receive less rainfall.

Agriculture in Pakistan is also largely dependent on monsoon rains. The monsoon brings heavy rainfall

to different parts of Pakistan. The impact of climate change on agriculture in Pakistan can greatly aggravate the problem. As the country receives less rainfall, the fruits and vegetables produced recover slowly and thus have less nutrients. The impact of climate change on agriculture in Pakistan is alarming. However, it is not something which can be immediately acted upon. More studies are required to find out the impacts, both adverse and beneficial, of climate change. The problem is not unique to Pakistan. Across the world, experts are grappling with similar problems.

Experts believe that it will take at least 40 years before the impact of climate change on agriculture in Pakistan can be measured through scientific research. But there is already enough evidence to show that the impact of climate change is felt. An analysis by the International Food Products Corp (IFPC) found that food prices have risen more than fourfold in the past 15 years in Pakistan. In the agricultural sector this means lower production, higher input cost and increased use of agricultural chemicals. Reduced production and high input costs mean that the benefits of increased farming output cannot be realized.

**Pakistan climate change impacts and their possible solutions:** One important step is to make use of green technologies to reduce greenhouse gas emissions and hence climate change impacts. For example, farmers can increase the efficiency with which they grow plants by using new techniques and technology. Increasing crop rotation techniques, using fertilizers and pesticides in a more appropriate way and using conservation tillage are some of the methods that can be adopted. Using these methods, the impact of climate change on can be reduced up to two thirds.

There is also a need for developing a regional agricultural strategy that takes into account the impact of climate change on agriculture in Pakistan and develops policies that will mitigate the damage. This is a two-way effort as developing regional solutions that are applicable to rural and urban development is only possible if federal government policies are implemented at the national level. Similarly for the developed world there is a need to provide technical assistance to developing countries to build up the necessary capacity and infrastructure required for adaptation. This should include the use of green technologies to reduce greenhouse gas emissions.

All these challenges require urgent action. The impact of climate change on agriculture in Pakistan can be reduced by developing an agricultural policy that taking all these issues into consideration. The key is to start the discussion at the community level, both within Pakistan and with the outside world. This is a step that I believe is necessary for the world's attention to be focused on the problem of climate change and how it is going to impact us all.

# Undernourished people in Pakistan: A study: Pakistan's 326

economy is based on agriculture due to the agricultural sector's contribution to the country's total income. The agriculture sector employs 42.3 percent of rural population and accounts for 19.8 percent of the country's GDP (GDP). The agricultural sector's major purpose is to increase productivity in order to ensure food security and eliminate poverty. The country is very vulnerable to climate change due to its geographic location, massive population, and lack of technological resources. The 2010 floods cost Pakistan more than \$15 billion in economic losses, displaced around 300,000 individuals, and badly impacted more than 20 million people. To counteract the detrimental consequences of climate change, Pakistan needs \$6-14 billion every year.



1	Awareness campaigns	To educate farmers, control damages, improve productivity, linkage with NGOs
2	Training programs for farmers	To expedite implementation, enhance understanding of farmers, to prepare the farmer's community for climate change
3	Research and innovation	Understanding of climate change dynamics, to produce novel techniques
4	Institutional capacity	Effective implementation of climate policies, to address the challenge of lack of professionalism
5	Role of academics	Better research environment, promote climate research, establishment of climate policies with sound scientific backing
6	Departmental coordination	To expedite implementation mechanism, comprehend the situation well in time
7	Autonomous adaptation	Past experiences, knowledge sharing, avoid damages and enhance productivity

Floods in 2013, 2011, and 2010, harsh droughts in 1999-2003, and hurricanes in Karachi/Gwadar in 2008 that caused landslides and glacial lake flooding in northern Pakistan (GLOFS) are just a few of the gifts that climate change has bestowed on Pakistan. Climate change poses a severe danger to Pakistan's food, water, and energy security since weather patterns may alter, extreme events such as floods, droughts, and heat waves may occur, and agricultural production may drop. Pakistan has around 5,000 glaciers that are disappearing at a quicker rate than the rest of the world. Pakistan is one of the world's countries with the highest rate of food insecurity, with approximately 65 percent of the population living in poverty. Congo, China, India, Indonesia, Pakistan, Ethiopia, and Bangladesh are among these countries. Many Asian and African countries have severe food insecurity and are unable to take meaningful measures

to address the issue. They also won't be able to meet the Millennium Development Goals or the objective of ending hunger. Figure 1 depicts the number of Pakistanis that are malnourished.

Analysis on crop production in Pakistan in the summer season: Analysis on crop production in Pakistan in the summer season is one of the most important and complex tasks of a government or private organization. With the availability of irrigation and climatic conditions, there are many issues to be tackled at this time. The climate is quite hot during the summer season and it can cause a lot of problem for the farmers who have acres of land. The weather conditions in the country have been pretty stable all through the year. However, the summer season has witnessed a change with frequent heat waves and heavy rainfall. In this era of globalization, analysis on crop production in Pakistan is also getting more difficult due to the huge influx of new technologies and farming techniques from various countries. Some of the places have seen a complete transformation of their whole agricultural production system. Agriculture is not a very old industry in Pakistan and it was developed long back. Agriculture has always been one of the main industries of Pakistan. There are a wide range of crops that are cultivated in this country.

The most popular crops that are grown in Pakistan are wheat, pulses, lentils, ground apple, tea, jute and oranges. All these crops have their own unique history and are cultivated in different regions of the country. The production of pulses is mostly done on farms and smallscale. The major crops grown in the urban areas are rice and wheat. The analysis on crop production in Pakistan in the summer season considers the productivity of each of the above crops as per the weather, climatic conditions and other factors. The analysis on crop production in Pakistan focuses on the productivity of wheat and its yield. This is because of the fact that Pakistan itself has a great wheat-growing region. The yield of wheat is very high and is sold the world market. It is one of the staple foods of the people living in urban areas. The analysis on crop production in Pakistan shows that there is a remarkable development in the production and quality of wheat.

The analysis also indicates that there has been a notable improvement in the production of rice. Both rice fields are being farmed at better levels and the yields are also expected to grow in the coming season. The most important crop, wheat, has seen some fluctuations in the past but it is growing steadily and shows a marked improvement. There is a sharp rise in the demand for wheat in rural areas, though this is declining in the urban regions. Analysis on crop production in Pakistan also indicates that there is a steep increase in the production of oranges.

Analysis on crop production in Pakistan also indicates that there is a marked improvement in the production of tomatoes. There is an increase in the production of both tomatoes (red and green varieties) in the coming

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season. Moreover, an increasing number of farmers have been encouraged to take up cultivation of strawberries. This is because of their popularity. Moreover, the prices of strawberries have been touching the sky in the recent times. The production of coffee and tobacco has also seen a significant improvement in the coming season.

Analysis on crop production in Pakistan also indicates that there has been a marked improvement in the production of onions. The main reason behind this is the improvement in irrigation and soil management. This is helping farmers in getting more harvests from the soil. The improvement in irrigation techniques has helped in irrigation for agricultural lands. This has facilitated the growth and harvest of onions. An analysis on crop production in Pakistan also indicates that there has been improvement in the production of tomatoes and peppers.

The analysis also indicates that there has been an improvement in the production of crops like potatoes and carrots. It has also been noticed that there has been a significant improvement in the productivity of crops in the southern part of the country. These results are largely attributed to the seasonal changes and climatic conditions prevailing in this region. With the right kind of irrigation systems and intensive planting programs, it is expected that the productivity of the agricultural products will improve as the summers draw to a close. Analysis on crop production in Pakistan in the winter season: Analysis on crop production in Pakistan in the winter season reveals that the deficient areas are also supplied with a sufficient amount of rainfall during the monsoon season. This is a great gain for the farmers, as it gives them ample time to complete the harvest. Analysis on crop production in Pakistan in the winter season also reveals the importance of irrigation by using water tank irrigation systems. The government has adopted an effective irrigation system named "Pakbarat". This irrigation system regulates the flow of water in water tanks and provides ample amount of water to the crops.

Analysis on crop production in Pakistan in the winter season also indicates that there is a deficit in the production of pulses. The main culprit is the insecurity of the climate and weather in different parts of the country. During monsoon months, the soil here becomes saline which does not allow adequate amount of moisture to pass through the soil. During the rainy season, the soil here drains off completely. So, in order to ensure productivity in the fields, it is important that irrigation is adopted at proper times.

Analysis on crop production in Pakistan in the winter season also reveals that irrigation improves the productivity of the crops. This is done through channeling the water through sprinklers so that the surface of the soil is moisturized. During the hot climatic conditions, the soil here receives an increased amount of water as compared to other climatic conditions. Analysis on crop production in Pakistan in the winter season also indicates that during the monsoon season, the demand for pulses is on the higher side as compared to the other seasons. It also indicates that due to climatic conditions, farmers are finding it difficult to manage the crops on a large scale. So, in order to overcome this problem, irrigation is provided on a smaller scale during the monsoon season and this has led to an increase in the production. Analysis on crop production in Pakistan in the winter season also indicates that due to adequate rainfall, there is an increase in the yield.

#### **CONCLUSION**

Agriculture and livestock is one of the most climatevulnerable industries. It reacts to climate change-related changes in temperature, precipitation, and soil radiation. Temperature, rainfall frequency, and the severity of extreme events all have an impact on livestock and crop output. The heat stress has a negative influence on numerous dairy product parameters including milk production and reproduction, producing a major economic burden. The efficiency of reproduction will be reduced as the heat load rises. Collaborative and extensive research was undertaken by scientists and crop professionals. They employed a global climate model that analyses meteorological factors using physical, biological, and chemical concepts. The Asia-Pacific area is the most vulnerable to climate change's effects. Pakistan is one of the most climate-vulnerable countries, despite emitting only 0.8 percent of global greenhouse gas emissions (GHG). Agriculture employs more than 40% of the inhabitants in the region.

Pakistan is a water-scarce country due to a lack of water storage facilities and aged water supply infrastructure. Wheat, beans, lentils, apple powder, tea, jute, and oranges are the most popular crops in Pakistan. In certain locations, the entire agricultural production system has undergone a total shift. Pakistan has a vast wheat-growing region, and wheat is one of the most common meals consumed in urban areas. Wheat demand is increasing in rural areas, whereas it is decreasing in urban areas. Orange production has also expanded dramatically, according to the data. The relevance of adopting tank irrigation systems for irrigation is revealed by a research of winter crop yields in Pakistan. The government devised a costeffective irrigation technology known as "Pakbarat." The flow of water in the tank is controlled by this irrigation system, which provides a significant amount of water to the crops.

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## The Prevalence and Risk Factors of Migraine Among the Selected High School Students

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#### ABSTRACT

Migraine is one of the most common aetiologies for headache. This very common neurological disorder has a significant impact on patients' quality of life. Communitybased epidemiological studies are scarce in India and other developing countries. As India is multi-ethnic, it is essential to determine the prevalence of headache and its subtypes in other regions also. Information about headache disorders is insufficient and variable, although migraine was identified to be more common in the rural population. To assess the prevalence of migraine among the students of selected high school. 2. To assess the risk factors of migraine among the students of selected high school. 3. To associate the prevalence and risk factors of migraine among the students of selected high school with a selected demographic variable. Quantitative Research Approach. Descriptive Research Design. The study was conducted at School of Scholars, Sawangi (M) Wardha; Alphonsa Sr. High School, Sawangi (M) Wardha and Model High School, Salod, Wardha. Population- High School students. Non-Probability Sampling Technique. 314. The study shows that the Prevalence of migraine was 10.83%. Mean migraine score was 2.27±1.81which is higher than the level of significance. While dealing with the distribution of subjects with their demographic variables, the prevalence of migraine is statistically associated with the father's educational status (p=0.006), family history of migraine (p=0.001) and gender (p=0.026). In this study the findings of the study shows that there is no significant association of risk factors of migraine with the demographic variables like age, class, family income, type of family, residence and mother's educational qualification; but there is a significant relationship with the gender, father's educational qualification and family history of migraine.

**KEY WORDS:** ASSESS, PREVALENCE, MIGRAINE, HIGH SCHOOL STUDENTS

#### **INTRODUCTION**

Migraine is one the oldest ailments known to mankind. Some of the earliest cases of painful headaches were recorded by the ancient Egyptians and date back as far as 1200 B.C. Much later, in around 400 B.C., Hippocrates referred to the visual disturbances that can precede a migraine such as flashing lights or blurred vision, which we call aura. He also described the relief felt by sufferers after vomiting (Assadi et al., 2012).



The word migraine was derived from the Latin word "hemicrania" meaning "half" (hemi) "skull" (crania). This term was first used by Galenus of Pergamon to describe the pain felt across one side of the head during a migraine. He also suggested that the pain originated in the meninges and vasculature of the head. In addition, he pointed towards a connection between the stomach and the brain due to the vomiting that seemed to be related to migraines (Assadi et al., 2012).

Migraine is a brain disorder most clearly manifested by headache. The two major forms are distinguished based on headache frequency: episodic migraine (EM) and chronic migraine (CM). The revised second International Classification of Headache Disorders (ICHD-IIR) defines CM as having 15 or more headache-days per month for 3 months, with at least eight headaches per month linked to migraine without aura, either by virtue of meeting a case definition or by response to migraine-specific treatment (Assadi et al., 2012).



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EM is characterized by headache on <15 days per month with one or more attacks fulfilling ICHD-II criteria. CM affects approximately 1–2% of the worldwide population and has a significantly greater effect on quality of life than EM. CM patients are more debilitated and more likely to miss work or have decreased productivity. CM patients have more comorbid conditions, including psychiatric and pain disorders. They also use more health resources than EM patients, including emergency department (ED) visits, clinic visits and medications.

Statement of the Problem: Assess the prevalence and risk factors of migraine among the students of selected high school (Lipton et al., 2011).



**Objectives of the Study:** To assess the prevalence of migraine among the students of selected high school. To assess the risk factors of migraine among the students of selected high school. To associate the prevalence and

risk factors of migraine among the students of selected high school with a selected demographic variable.

#### Hypothesis

 $H_1$ : There is significant association between prevalence and risk factors of migraine among the students of selected high school with their selected demographic variables (Lipton et al., 2011).

 $H_0$ : There is no significant association between prevalence and risk factors of migraine among the students of selected high school with their selected demographic variables (Lipton et al., 2011).

#### **MATERIAL AND METHODS**

314 samples of high school students were selected by Non-Probability convenience sampling technique in selected high schools of Wardha. The inclusion criteria were: a) High school students who are present at the time of data collection. b) High school students who are willing to participate. The exclusion criteria were: a) High school students who have already attended the programme on the same topic. b) High school students who are not willing to participate at the study. In this study, Descriptive Research Design was used. The tool used were Bilirubinometer and Serum estimation. The data gathering process began from 1st-20th November 2020. The investigator visited selected high schools in advance and obtained the necessary permission from the concerned authorities (Lipton et al., 2011).

**Statistical Analysis:** Based on the objectives and the hypothesis the data were analyzed and interpreted by SPSS software (Assadi et al., 2012).

Sl.no	Characteristics	Yes	%	No	%
1.	Intensity (Mild to moderate)	96	30.57	218	69.43
2.	Duration (4-72 hours)	62	19.75	252	80.25
3.	Frequency (3-5 times/ month)	88	28.03	226	71.97
4.	Location (unilateral)	60	19.11	254	80.89
5.	Quality (throbbing)	100	31.85	214	68.15
6.	Aggravation	93	29.62	221	70.38
7.	Photophobia	95	30.25	219	69.75
8.	Phonophobia	56	17.83	258	82.17
9.	Vomiting + nausea	64	20.38	250	79.62
	No Migraine <5	280(89.17%) 34(10.83%)			
	Migraine ≥5				
	Mean ± SD	2.27 ± 1.81(0 to 8)			

**Study Approval:** Approvals were obtained from the following: Institutional Ethics Committee, Datta Meghe Institute of Medical Sciences (Deemed to be University) with reference No. DMIMS(DU)/IEC/2018-19/9767, Chief Medical Superintendent, AVBRH, Sawangi(M), Wardha and informed consent has been taken from the patient's parents (Assadi et al., 2012).

#### **RESULTS AND DISCUSSION**

The data obtained to describe the sample characteristics including demographic variables (age, gender, class, residence, family income, type of family, mother's educational qualification, father's educational qualification, family history of migraine, already diagnosed with migraine), prevalence of migraine among the high school students and the associated risk factors of migraine. The study shows that 30.57% of the high school students had mild to moderate intensity of headache, 19.75% had headache duration lasting for about 4-72 hours, 28.03% had frequency 5-9 times of headache per month, 19.11% had unilateral location of pain in head,

31.85% had throbbing quality of pain, 29.62% had report that the headache is aggravated by some factors, 30.25% had photophobia and 20.38% of the high school students had nausea and vomiting. Minimum prevalence score in was 0 and maximum score in was 8.

SL No	Characteristics	Yes	%	No	%
1.	Do you have the habit of sleeping late unnecessarily?	34	100.00	0	0.00
2.	Will your daily water intake be a minimum of 1.5litres?	8	23.53	26	76.47
3.	Do you frequently skip meals?	5	14.71	29	85.29
4.	Do you have the habit of fasting?	19	55.88	15	44.12
5.	Do you have the habit of consuming tea or other caffeinated drink regularly?	16	47.06	18	52.94
6.	Do you smoke?	3	8.82	31	91.18
7.	Do you consume tobacco or other gutkha products?	3	8.82	31	91.18
8.	Do you have the habit of regular watching of Television, Computer, Mobile phone?	26	76.47	8	23.53
9.	Do you spend more than 2 hours continuous watching TV, Computers, Mobile phone etc in a day?	34	100.00	0	0.00
10.	Do you consume alcohol?	0	0.00	34	100.00

Table 3.	Table 3. Assessment of migraine with level of environmental characteristics n=34							
Sl. No	Environmental Characteristics	Yes	0/0	No	0/0			
1.	Is your living condition prone for too much sun exposure?	15	44.12	19	55.88			
2.	Is your living area free from pollution?	17	50.00	17	50.00			
3.	Is your home lighting condition sufficient for you to study?	8	23.53	26	76.47			
4.	Do you require long distance travel from your home to reach school?	16	47.06	18	52.94			

Table 4. Assessment of migraine with level of health characteristics							
Sl. No	Health Characteristics	Yes	0/0	No	0/0		
1.	Stress	18	52.94	16	47.06		
2.	Diabetes Mellitus	2	5.88	32	94.12		
3.	Hypertension	1	2.94	33	97.06		
4.	Cardiac Disease 0 0.00 34 100.00						
5.	Visual defect 18 52.94 16 47.06						
6.	Seizure	0	0.00	34	100.00		

Mean migraine score was  $2.27\pm1.81$ . Prevalence of migraine was 10.83%. While dealing with section A, distribution of subjects with their demographic variables, the prevalence of migraine is statistically associated with the father's educational status (p=0.006), family history of migraine (p=0.001) and gender (p=0.026). Hence, it is interpreted that if the status of the father's educational qualification is high or in average, it may overall contribute to the low risk of occurrence of migraine among their children. Also, children who are having family history of migraine are likely to develop migraine in their later life. The study also interprets that girl are likely to have migraine as compared to boys in relation to different hormonal factors and environmental factors (Philipp et al., 2019).

Present study reported the prevalence of migraine among 314 high school students in selected schools. In this study, Descriptive Research Design was adopted. International Headache Society classification of migraine criteria was adopted to assess the prevalence of migraine in which students scoring 5 points and above ( $5 \ge$ ) are classified under students having migraine, while students scoring below 5 points (5 <) are regarded not to have migraine. In this study, the prevalence rate of migraine among the high school students of selected schools is found out to be 10.83%. Present study shows that the prevalence of migraine is statistically associated with the father's educational status (p=0.006); the prevalence of migraine is statistically associated with the family history of

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migraine (p=0.001); the prevalence of migraine is statistically associated with the gender (p=0.026).

#### CONCLUSION

In this study the findings of the study shows that there is no significant association of risk factors of migraine with the demographic variables like age, class, family income, type of family, residence and mother's educational qualification; but there is a significant relationship with the gender, father's educational qualification and family history of migraine.

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### Assess the Efficacy of Role Play on Knowledge Regarding Ayushman Bharat Yojana Among People

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#### **ABSTRACT**

The Pradhan Mantri Jan Arogya Yojana (PMJAY) popularly known as Ayushman Bharat Yojana Scheme is the flagship scheme by the Government of India. It is essentially a health insurance scheme to cater to the poor, lower section of the society and the vulnerable population. The scheme offers financial protection in case of hospitalization due to medical emergencies. This article is a detailed guide about the government's health insurance scheme's eligibility, features, benefits and the application process To assess efficacy of role play on knowledge regarding Ayushman Bharat Yojana among people A pre-experimental pre-test, post-test research design was used to conduct this study. non probability convenient sampling technique was used to collect data from community people. Structured Questionnaire was used to collect the data after collecting pre-test data, role play was organized after the pre-test data collection Seven days were provided to the samples for utilizing role play which was organized for 30-40 minutes of role play with Audio-Visual (AV) aids. Post-test information was gathered after seven days from the day of role play intervention. Seven days was assigned after getting expert opinions as well as to give time for implication of knowledge through role play regarding Ayushman Bharat Yojana among Community people. The sample characteristics were described by frequency, percentage and t-test was used to describe the difference between pre-test and post-test knowledge score. Chi-square test was also used to find out the association between knowledge of community people regarding Ayushman Bharat Yojana with selected demographic variables. Results:-The mean pre-test knowledge score was 14.65 and mean post-test knowledge score was 17.90 the comparison of pretest and Post test scores for knowledge regarding Ayushman Bharat Yojana. Standard deviation is compared with mean difference values and student's paired't' test is applied. The calculated 't' value i.e. 11.41 are much higher than the tabulated value at 5% level of significance for overall knowledge score of community people which is statistically acceptable level of significance. Role play significantly out their improvement in the knowledge regarding Ayushman Bharat Yojana for selected area among community people. Analysis of the data show there was significant difference between pretest and posttest knowledge

KEY WORDS: KNOWLEDGE, ROLE PLAY, COMMUNITY PEOPLE, AYUSHMAN BHARAT YOJANA.

#### **INTRODUCTION**

The World Health Organization defines universal health coverage (UHC) as means to enable all people and communities to use promotive, preventive, curative, rehabilitative, and palliative health services they need,

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of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship. It embodies three objectives: equity in access, quality, and financial risk protection. The UHC movement received more impetus after it was included as one of the targets of the United Nation's Sustainable Development Goals-3 (SDG-3) in 2015. Many low- and middle-income countries have started special programs, mainly different kind of health financing and insurance schemes in aspiration to move toward UHC.

In 2018, the Government of India launched an ambitious health-care scheme known as "Ayushman Bharat" (long live India), widely projected to be a progressive step



toward UHC in India. The Ayushman Bharat scheme essentially has two components: Pradhan Mantri Jan Arogya Yojana (PMJAY) and Health and Wellness Centre's (HWCs). The PMJAY is a publicly financed health insurance scheme for the socioeconomically deprived rural and selected occupational category of the urban population. It aims to cover 100 million households and approximately 500 million people of the country, which roughly accounts for 40% of the total population.

India's National Health Policy 2017 (NHP-2017) has its goal fully aligned with the concept of Universal health coverage. The Ayushman Bharat Program announced in the Union budget 2018–19 of the Government of India, aimed to carry NHP-2017 proposals forward. The Ayushman Bharat Program has two initiatives/ components – Health and Wellness Centers, and National Health Protection Scheme – aiming for increased accessibility, availability and affordability of primary-, secondary- and tertiary-care health services in India. Afterwards, the second component has been renamed as Pradhan Mantri Rashtriya Swasthya Suraksha Mission. The new program has received an unprecedented public, political and media attention; and is being attributed to have placed health higher on political agenda.

This study analyzes and provides critical reflections, suggestions and way forward for rapid and effective implementation of Ayushman Bharat Program. Acording to Vikash R keshri, as per the Constitution of India, health is a subject matter under the jurisdiction of state governments. Therefore, the health systems in different states have developed heterogeneously due to the influence of the prevailing political economy. Conventionally, the expenditure on health care is also very dismal. The overall health expenditure in India was 3.8 % of the total gross domestic product (GDP), and the government's contribution was nearly 1.18 % of GDP in 2015–2016. The household health expenditure comprised 64.7 % of the total health expenditure, and out-of-pocket expenditure (OOPE) was around 60.5 % of the total health expenditure. The expenditure on primary, secondary, and tertiary care is 45 %, 35 %, and 15 % of total health expenditure, respectively.

Annual report by National Health Authority (2019) on Ayushman Bharat, Report suggests that there is a need to spread awareness of the scheme. There is a need to undertake education, information and communication to impart awareness. Efforts are being made to reach out to the people and make them aware about the policy but large population, lack of awareness; low literacy is hurdle in the same. It is also important to aware the people who have enrolled under this scheme about the benefits and other operational details of the policy. Jain V and Singh V.D., Khusboo (2019), in their study based on Moradabad in Uttar Pradesh, suggested that demographic factors have an impact on AB- PMJAY awareness. Educational level, socio-economic status of people plays an important role in affecting the awareness level. There is a need to create awareness among the people, while doing so level of education and socio-economic background of the people should be considered. To be effective and impactful in achieving the desired health outcomes, there is a need for getting both design and implementation of Ayushman Bharat Program right, from the very beginning. If implemented fully and supplemented with additional interventions, the program can prove a potential platform to reform Indian healthcare system and to accelerate India's journey towards universal health coverage. The aims of the study that to assess the knowledge regarding Ayushman Bharat Yojana among community people.

Angell BJ, Prinja S, Gupta A, Jha V, Jan S (2019) in their research paper on AB-PMJAY, authors have suggested for making the policy successful government has to remove the limitations in the health care system of the country. Quality control, health system, awareness are some of the key areas which needs to be sorted in making this universal health scheme successful. Annual report by National Health Authority (2019) on Ayushman Bharat, Report suggests that there is a need to spread awareness of the scheme. There is a need to undertake education, information and communication to impart awareness. Efforts are being made to reach out to the people and make them aware about the policy but large population, lack of awareness; low literacy is hurdle in the same. It is also important to aware the people who have enrolled under this scheme about the benefits and other operational details of the policy. Jain V and Singh V.D., Khusboo (2019), in their study based on Moradabad in Uttar Pradesh, suggested that demographic factors have an impact on AB- PMJAY awareness. Educational level, socio-economic status of people plays an important role in affecting the awareness level.

There is a need to create awareness among the people, while doing so level of education and socio-economic background of the people should be considered. Netra G and BA Varadaraja Rao (2019) in their study on awareness of health insurance scheme among rural area in central Karnataka found that majority of the population had opted for government health insurance scheme and awareness coverage was associated with educational level, occupation of head of family and their socio-economic status. Manuja, Viswanatha &, Kanchana Nagendra (2019) in their study on awareness of health insurance among rural areas of Karnataka discovered that major factors which affects health insurance enrolments were gender, occupation, socio economic status and hospitalization etc. From the above literature review it is clear that AB-PMJAY scheme has all potential to become the game changer in universal health scheme in India. Demographic characteristics of India.

#### MATERIAL AND METHODS

A quasi-experimental research design was used to conduct this study. non probability – convenient sampling technique was used to collect data and 100 community people from community were selected. The study was conducted during December 2019 to January 2020 and the setting was selected Wardha, city. After the ethical permission (Ref. no: DMIMS (DU)/8503). By using purposive sampling technique, 100 community people were selected for the study.

#### RESULTS

**Description of Tool:** A structure questionnaire consists of two section i.e. section I and section II.

Table 1. Percentage wise Allocation of Community PeopleBy its Demographic Characteristics n=100					
Demographic Variables	No. of community people	Percentage (%)			
Age(yrs)					
18-33 yrs	31	31			
34-49 yrs	27	27			
50-65 yrs	30	30			
66-81 yrs	12	12			
Gender					
Male	51	51			
Female	49	49			
Educational Level					
Primary	24	24			
Secondary	42	42			
Higher Education	21	21			
Graduate and above	13	13			
Residency					
Rural	74	74			
Urban	26	26			
Income of the					
family per year					
10000-35000 Rs	63	63			
35000-60000 Rs	32	32			
60000-85000 Rs	3	3			
85000-110000 Rs	2	2			
Marital Status					
Married	78	78			
Unmarried	9	9			
Widow	12	12			
Divorce	1	1			
Occupation					
Housewife	38	38			
Farmer	13	13			
Private Employee/ Business	44	44			
Govt. Employee	5	5			

**Section I:** - It is consisting of demographic characteristics regarding the adolescents i.e. age, gender, residence, education, marital status, type of family, income, previous information about Ayushman Bharat Yojana.

**Section II:** -It is consisting of 20 multiple choice questions to assess the efficacy of role play on knowledge regarding Ayushman Bharat Yogana.

- Score 1 for correct reply.
- Score 0 has been given for wrong reply.
- Knowledge ranked from poor knowledge to excellent, scoring-based knowledge.

**Validity:** Tool was validated five person's in consultation with expert the field.

**Methods of data collection:** For the present study the validated tool was used structured questionnaire. The tool was in English and Marathi local language. Structured knowledge questionnaire contained 20 multiple choice questions. Data was collected within 02 weeks by group members pre-test data collection was followed by knowledge.

Permission from the concerned authorities is taken The tool content validity of the was done by various from different fields. Suggestion The proposed tool was incorporated, and appropriate modifications were made analysis was done by Intra class correlation. The data gathering process was done from 6 January 2020 to 14 January 2020 investigator visit to the selected area arvi nakka wardha and obtained the necessary. Permission from the concerned authorities of garmpanchayat.

**Role play details:** After explaining the objective and purposes of the study consent was obtained from the ward members of area for participation in the study. pretest was given to assess the knowledge regarding Ayushman Bharat Yojana among community people then role play on the Ayushman Bharat Yojana to the perform partition of the study. in the role play they give all the information of Ayushman Bharat Yojana . Role play participant perform the different characters in the role play. It can be conducted in different places of that area .The duration of the role play was 15-20min . after the role play the drought cleaners section was done. Post test was conducted on the 7th day after performing role play.

#### RESULTS

#### Section A

This section deals with percentage wise distribution of community people as for their demographic's characteristics. The data obtained to describe the sample characteristics including age, gender, educational level, residence, income, marital status and occupation respectively. The above table shows that 3 % of the community people had average level of knowledge score, 63 % had good and 34 % had excellent Level of score on knowledge. Minimum knowledge In-score pretest was it 6 and the max. knowledge score in pre test and mean percentage of knowledge score in pretest was 20. Mean knowledge score in pretest was  $14.65 \pm 2.21$  and mean percentage of knowledge was  $73.25 \pm 1$ . The above table shows that 17% of the community people had good level of knowledge score and 83% had excellent knowledge Score Level. Minimum Rate knowledge In-score posttest Was it 12 and maximum knowledge score in posttest was

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20. Mean knowledge score in posttest was  $17.90 \pm 1.83$ and mean percentage of knowledge score in post test was 89.50±9.19 Evaluation of Efficacy Of Role Play And Knowledge Regarding Ayushman Bharat Yojana Among Community People.

	6 D	Pre-test Level Awareness Score		
pre test knowledge	Score Range	No of community people	Percentage	
Poor	0-25 % (1-5)	0	0	
Average	26-50 % (6-10)	3	3	
Good	51-75 % (11-15)	63	63	
Excellent	76-100 % (16-20)	34	34	
Minim	um score	6		
Maxim	um score	20		
Mean know	vledge score	14.65±2.21		
Mean % Kno	owledge Score	73.25±11.0	6	

Table 3. Assessment with Level of Posttest Knowledge Regarding AyushmanBaharat Yojana among Community People n=100

and the state	C D	Pre-test Level Awareness Score		
pre test knowledge	Score Range	No of community people	Percentage	
Poor	0-25 % (1-5)	0	0	
Average	26-50 % (6-10)	3	3	
Good	51-75 % (11-15)	63	63	
Excellent	76-100 % (16-20)	34	34	
Minimu	1m score	6		
Maximum score		20		
Mean knowledge score		14.65±2.21		
Mean % Knowledge Score		73.25±11.06		

Table 4. Differential significance of knowledge score in pretest and Posttest regarding Ayushman Baharat yojana among community people n=100

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre-Test	14.65	2.21	3.25±2.84	11.41	0.0001 S, p<0.05
Post Test	17.90	1.83			

This table summarizes the comparison of pretest and Post test scores for knowledge of community people regarding Ayushman Bharat Yojana. Mean while, standard deviation is compared with mean difference values and student's paired 't' test is applied at 5% level of significance. The tabulated value for n=100-1 i.e. 99 degrees of freedom was 1.98. The calculated 't' value i.e. 11.41 are much higher than the tabulated value at 5% level of significance for overall knowledge score of community people which is statistically acceptable level

of significance. Hence it is statistically interpreted that the Role Play on knowledge regarding Ayushman Bharat Yojana among community people was effective. Thus, the H1 is accepted.

#### DISCUSSION

The NHPM is a central initiative targeting approximately 50cr deprived population of the country when

beneficiaries seek service from the providers, there is a chance for the raise of grievances. Whenever a beneficiary faces any difficulty it needs to be redressed through a dedicated system which is specially placed for this function. Asimul Haque and Dr. Shiv Choudhary research study finding shows that out of 100 samples samples 84% were having inadequate knowledge 14%were having moderate knowledge and only 2% were having adequate knowledge towards the Ayushman Bharat Yojana. Finding of the study similar to study conducted by Geeta parwanda et all studied to assess the knowledge of people towards Ayushman Bharat Yojana in which 00 people participated and result shows 4% people having adequate knowledge,71% people were having moderate knowledge and 25% people were having inadequate knowledge. In the present study also only 2% people were having adequate knowledge hence the finding of the above mentioned it also support the study.

in this study also before giving the intervention the knowledge of the people was less regarding ayushman bhart yogana and after giving the intervention i.e role play the post test knowledge was increase i.e good knowledge score was 17% and the Excellent knowledge score was 83% regarding Ayushman Bharat Yojana.

#### **Recommendation:**

On the basis of the finding of the study .it is recommendation that the following studies can be conducted

- This study can be conducted on large scale
- This study can be done on urban area
- A study can be done to assess the attitude of people towards Ayushman BharatYojna.

#### CONCLUSION

Role play significantly out their improvement in the knowledge regarding Ayushman Bharat Yojana for selected area among community people. Analysis of the data show there was significant difference between pre test and post test knowledge.

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# To Assess the Effectiveness of Self Instructional Module on Knowledge Regarding Selected Obstetric Danger Sign in Pregnancy Among Primi-Gravida Women

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#### ABSTRACT

Background Motherhood is the greatest blessing for all women. Motherhood is the symbol of love, kindness and forgiveness. Mother's touch is the first human touch for a child. Mother showers love and affection on her children eternally throughout her life. She devotes her life only for the welfare of her children Objectives of study:1.To Assess the existing knowledge on selected Obstetric Danger sign in pregnancy among primigravida women.2.To Assess the Effectiveness of Self Instructional module on knowledge regarding selected Obstetric danger sign in pregnancy among primigravida women 3. To find the association between selected demographic variables among primigravida women Method-Present study is descriptive study conducted among 100 Primigravida women in selected hospitals by Non probability convenient sampling.Research design one group pre and post test without control group design was used Result: findings shows that in pre test majority of antenatal mothers 23(23%)had good knowledge and mean knowledge score was 22.71±2.51Education found to be associated with knowledge of antenatal mothers and none of the other variable were found significantly related with the knowledge of mothers.Conclusion:The pre test findings showed that knowledge of primigravida women regarding danger sign was inadequate. The administration of self instructional module helped the primigravida women to understand more about obstetric danger sign's in pregnancy.

**KEY WORDS:** EFFECTIVENESS, SELF-INSTRUCTIONAL MODULE, PREGNANCY, PRIMIGRAVIDA, OBSTETRIC DANGER SIGN.

#### **INTRODUCTION**

According to World Health Organization stated that the gestation and childbearing are the important events in the mother life. There is a risk in each different areas in developing countries These risks are present in each areas of living and in every location. In developing countries they have been mostly overcome because all charged female has to take particular care during pregnancy and childbirth. In budding countries where



each pregnancy represents a crossing into the strange from which all too many female never return, due to lack of care provision.

#### **Objectives Of Study:**

- 1. To Assess the existing knowledge on selected Obstetric Danger sign in pregnancy among primigravida women
- 2. To Assess the Effectiveness of Self Instructional module on knowledge regarding selected Obstetric danger sign in pregnancy among primigravida women
- 3. To find the association between selected demographic variables among primigravida women.

#### **RESEARCH METHODOLOGY**



**Research design:** Pre-experimental one group pretest posttest design.

Research Approach: Evaluative approach

Setting of the study: Selected hospital of Wardha

Sampling technique: Non probability convenient sampling

Sample: Primigravida women

Sample size: 100

**Independent variable:** Self instructional module on knowledge regarding selected obstetric danger signs in pregnancy.

Dependent variable: Primigravida women

#### Sampling Criteria:-Inclusion criteria:

- 1. Who are attending antenatal O.P.D in selected hospital, Wardha.
- 2. Those who are ready to participate in the study.
- 3. Those who can understand Marathi Hindi, English.

#### **Exclusion Criteria:**

1. Those who are not willing to participate.

#### RESULTS

**SECTION A-** Distribution of primi-gravida women with regards to demographic varibles.

**SECTION B:** Assessment of level of knowledge regarding selected obstetric danger sign in pregnancy among primigravida women

**SECTION C-** Evaluation of effective ness of self instructional module on knowledge regarding selected obstetric danger signs in pregnancy among primigravida women.

**SECTION D-** Association of level of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to demographic variables

This above table shows the association of knowledge score with age in years ofprimigravida women regarding selected obstetric danger signs in pregnancy. The tabuleted 'F' value was 2.68(df=3.96) which is much higher than the calculated 'F' i.e 1.33 at 5% level of significance. Also the calculated p=0.26 which was much higher than the acceptable level of significance i.e. p=0.05.Hence it is interpreted that age in year of primigravida women is statistically not associated with their post test knowledge score. This above table shows the association of knowledge score with religion primigravida women regarding selected obstetric danger signs in pregnancy.

Table 1. Assessment with demographic variables         n=100						
Demographic Variables	no. of primigravida women	Percentage (%)				
Age(vrs)						
20-25 vrs	74	74				
26-30 vrs	22	22				
31-35 vrs	3	3				
≥36 vrs	1	1				
Religion						
Hindu	93	93				
Muslim	1	1				
Christian	0	0				
Others	6	6				
Educational Level						
Primary	36	36				
Higher Secondary	40	40				
Graduate	23	23				
Post Graduation	1	1				
Occupation						
Private Sector	16	16				
Govt. Sector	7	7				
Labourer	17	17				
Housewife	60	60				
Business	0	0				
Marital Status						
Married	99	99				
Unmarried	1	1				
Widowed	0	0				
Divorced	0	0				
Duration of marriage						
(yrs)						
1-5 yrs	88	88				
6-10 yrs	12	12				
11-15 yrs	0	0				
≥16 yrs	0	0				
Area of residence						
Rural	70	70				
Urban	30	30				
Habits						
Smoking	0	0				
Tobacco Chewing	0	0				
Alcohol Consumption	0	0				
Others	100	100				
ANC visits attended						
One	12	12				
Two	31	31				
Three	30	30				
Four	16	16				
Five and above	11	11				

The tabulated 'F' value was 3.07 (df=2.97) which is much higher than the calculated 'F' i.e1.21 at 5% level of significance. Also the calculated p=0.30 which was much higher than the acceptable level of signifiacnce i.e. p=0.05.Hence it is interpreted that religion of

primigravida women is statistically not associated with their post test knowledge score.

T and a film and a day	Carrie Danas	Level of knowledge score		
Level of knowledge	Score Range	Pre Test	Post Test	
Poor	0-20%	10(10%)	0(0%)	
Average	21-40%	67(67%)	1(1%)	
Good	41-60%	23(23%)	2(2%)	
Very Good	61-80%	0(0%)	74(74%)	
Excellent	81-100%	0(0%)	23(23%)	
Minimun	1 score	5	8	
Maximum score		18	27	
Mean knowl	edge score	10.17±3.18	22.71±2.51	
Mean % Know	ledge Score	33.90±10.62	75.70±8.39	

Table 3. Significance of difference between knowledge score in pre test and post test of Primigravida Women n=100

Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test	10.17	3.18	12.72±3.31	38.39	0.0001 S.p<0.05
Post Test	22.89	2.07			

Table 4. Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to age n=100

Age (year)	No of primigravida	Mean nostlest	F-value	n_value
	women	knowledge score	1 vulue	p vulue
20-25 yrs	74	22.83±2.13	1.33	0.26 NS,p>0.05
26-30 yrs	22	23.40±1.84		
31-35 yrs	3	21.33±1.52		
≥36 yrs	1	21±0		

Table 5. Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to religion n=100

Religion	No.of primigravida women	Mean posttest knowledge score	F-value	p-value
Hindu	93	22.81 <u>+</u> 2.09		
Muslim	1	25 <u>+</u> 0	1.21	0.30
Christian	0	0±0		NS,p>0.05
Others	6	23.83±1.32		

This table shows the association of knowledge score with educational level of primigravida women regarding selected obstetric danger signs in pregnancy. The tabulated 'F' values was 2.68 (df=3.96) which is much higher than the calculated 'F' i.e. 1.87 at 5% level of significance. Also the calculated p=0.13 which was

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much higher than the acceptable level of significance I.e. p associated with their post test knowledge score.=0.05. Hence it is interpreted that educational level of primigravida women is statistically not This table shows

the association of knowledge scorewith occupation of primigravida women regarding selected obstetric danger signs in pregnancy. The tabulated 'F' value was 2.68(df=3.96) which is much higher than the calculated 'F' i.e. 0.93 at5% level of significance.

Table 6. Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to education $n=100$				
Education No.of primigravida Mean posttest F-value p- women knowledge score				p-value
Primary	36	22.77±2.08	1.87	0.13
Higher Secondary	40	23.35±2.01		NS,p>0.05
Graduate	23	22.21±1.90		
Post Graduation	1	21±0		

Table 7. Association of post testknowledge score regarding selected obstetric danger signs in pregnancy in relation to occupation n=100

Age (year)	No.of primigravida women	Mean posttest knowledge score	F-value	p-value
Private Sector	16	23.12 <u>+</u> 1.54	0.93	0.42
Govt. Sector	7	23.14 <u>+</u> 1.95		NS,p>0.05
Labourer	17	22.11 <u>+</u> 2.20		
Housewife	60	22.96 <u>+</u> 2.12		
Business	0	0 <u>±</u> 0		

Table 8. Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to marital status n=100

Education	No.of primigravida women	Mean posttest knowledge score	t-value	p-value
Married	99	22.88±2.03	1.41	0.16
Unmarried	1	20±0		NS,p>0.05
Widowed	0	0±0		
Divorced	0	0±0		

Table 9. Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to duration of marriage n=100

Duration of marriage(years)	No.of primigravida women	Mean posttest knowledge score	t-value	p-value
1-5 yrs	88	22.85+2.05	0.10	0.91
6-10 yrs	12	22.91±2.06		NS,p>0.05
11-15 yrs	0	0±0		
≥16 yrs	0	0±0		

Table 10: Association of post test knowledge score regarding selected obstetric danger signs in pregnancy in relation to resident n=100

Residence	No.of primigravida women	Mean posttest knowledge score	t-value	p-value
Rural	70	22.98±2.19	0.93	0.35
Urban	30	22.56±1.63		NS,p>0.05

Table 11. Association of post testknowledge score regarding selected obstetric danger signs in pregnancy in relation to ANC visits n=100

No of ANC visits	No.of primigravida women	Mean posttest knowledge score	F-value	p-value
One	12	22.08±2.31	1.73	0.15
Two	31	22.32±2.00		NS,p>0.05
Three	30	23.31±1.81		
Four	16	23.31±1.66		
Five and above	11	23.36±2.61		

Also the calculated p=0.42 which was much higher than the acceptable level of significance i.e. p=0.05. Hence it is interpreted that occupation of primigravida women is statistically not associated with their post test knowledge score.

This table shows the association of knowledge scorewith marital status of primigravida women regarding selected obstetric danger signs in pregnancy. The tabulated 't' value was 2.00(df=98) which is much higher than the calculated 't' i.e. 1.41 at 5% level of significance . Also the calculated p=0.16 which was much higher than the acceptable level of significance i.e.p=0.05. Hence it is interpreted that marital status of primigravida women is stastically not associated with their post test knowledge score. This table shows the association of knowledge scorewith duration of marriage(years) of primigravida women regarding selected obstetric danger signs in pregnancy. The tabulated 't' value was 2.00(df=98) which is much higher than the calculated 't' i.e. 0.10 at 5% level of significance. Also calculated p=0.91 which higher than the acceptable level of significance i.e. p=0.05. Hence it is interpreted that duration of marriage (years) of primigravida women is stastically not associated with therepost test knowledge score.

This table shows the association of knowledge score with area of residence of primigravida women regarding selected obstetric danger signs in pregnancy. The tabulated 't' value was 2.00 (df=98)which is much higher than the calculated 't' i.e 0.93 at 5% level of significance. Also the calculated 'p'=0.35 which was much higher than the exceptable level of significance i.e 'p'=0.05. Hence it is interpreted that area of resident of

primigravida women is statistically not associated with their post test knowledge score.

#### DISCUSSION

A study was conducted to explore primigravida knowledge of obstetric difficulties among 33 primigravida in rural healthcare center in the Blantyre district,Malwai city in 2002.Findings showed that members had inadequate knowledge of complication that may need instant management,82% of primigravida had particular knowledge and could make an up-to-date decision to go to a heath care facilities with pregnancy complications. And in that 61% of primigravida had knowledge and could make an up to date decision to go to a health care facilities with complication after delivery. And this studies results have critical inferences for the providing of information on obstetric complications.

The study was on institutional based cross sectional study and it is conducted in 2014, on "Knowledge About Danger Signs of Pregnancy and Related Factors Among Pregnant Women in Debra Birhan Town, Central Ethiopia." On the 355 pregnant women. The data was used to collect by pre-tested and structured questionnaires . The result revealed that 355 pregnant ladies participated in the study by making a response rate of 100%. In this study, 137(38.6%) of the respondents were knowledgeable about danger signs during pregnancy. Being urban resident, educational level of grade 9–10, having attended diploma and above and having previous antenatal care follow up were meaningfully associated with knowledge about danger signs during pregnancy. Ministry of health should be strengthening reproductive health services in

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rural areas to get quality antenatal care follow up by manipulating an proper approaches including providing of targeted material, learning and statement. The above studies supported to the present study.

**Implication:** The conclusions of the education have inferences on the ground of nursing training, nursing teaching, nursing administration and nursing research.

**Nursing practice:** The staff and student nurses can use the self instructional module for imparting the knowledge of selected obstetrical danger sign in primigravida women in the hospital and community. The tool prepared for this study can be used to assess the knowledge of primigravida women regarding selected obstetrical danger signs in pregnancy. The staff nurses in obstetrics and gynecology wards can use this tool for the same.

The major role and responsibilities can be summarized as:

- Identify the problem of the primigravida women.
- Providing appropriate information regarding selected obstetrical danger sign in pregnancy.
- Help the primigravda women to ventilate all their doubts by interpersonal interactions.
- Help the mother in their problemss regarding danger signand support them.

**Nursing education:** The lesson on obstetrical danger sign in pregnancy can be used for teaching the student nurses and the questionnaire prepared for this study can be used for testing its effectiveness among student nurses and patients. The tool for data collections prepared for this study can be used on a routine to test the knowledge of mother regarding selected obstetrical danger sign in pregnancy in general. In-service education regarding this topic should be conducted to improve the knowledge of staff nurses who are employed in obstetrics & gynecology department.

Nursing administration: The administrators of the hospital, primary health centers and sub centers can formulate the policy of educating community member regarding selected obstetrical danger sign to advance the well-being of the mother and prevent complication of danger sign's in pregnancy. Nurse administrators are the key persons to plan, organize and conduct in-service education programme. Nurse administrator support should be necessary to conduct and evaluate health education programme. They can help to improve the knowledge of the staff nurses working in obstetrics and gynecology department by providing various teaching programmes with the help of various AV aids. They are in a key position to organize, implement and evaluate educative programmes which will in turn help to improve the knowledge as well as to meet the future needs and accelerate the standards of health services.

**Nursing research:** The main goal of the nursing research is to improve the knowledge of staff nurses through the implementation of evidence based practice. The study provides a baseline data for conducting other research studies. The study will be a motivation for the budding researchers to conduct similar studies in large scale. The study will be a reference for the research scholars. Further research work can be conducted with every medical condition to identify most effective knowledge imparting strategies.

#### **Recommendations:**

- 1. A similar study can be directed by using video assisted teaching
- 2. A related study can be directed to find out the difference in the knowledge level of the staff nurses on the basis of various institutional setting such as government and private setting.
- 3. A same study can be focused to discovery the knowledge level of the treatment work.
- 4. A similar study can be directed to assess the effectiveness of planned teaching regarding selected obstetrical danger signs in pregnancy among primigravida women.
- 5. A similar study can be conducted in community area

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### A Validated Method for the Estimation of Casimersen Using RP-HPLC in Bulk and Pharmaceutical Dosage Form

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#### ABSTRACT

New validated method for the estimation of Casimersen using RP-HPLC In Bulk and Pharmaceutical Dosage form. Chromatographic separation was achieved on a Waters Phenyl Hexyl column (150x4.6mm, 3.5 µ) using isocratic elution with a mobile phase containing buffer and acetonitrile within the ratio of 50:50 as mobile phase with a flow of 1 ml/min at ambient temperature and UV detection was carried at 227 nm. Analysis was achieved within 5 min over an honest linearity within the concentration range from 10-150 µg/ml of Casimersen. By injecting the standard six times, system suitability parameters were studied and the outcomes were well under the acceptance criteria. Precision and recovery study results were found to be within the limit. By using the above technique assay of marketed formulation was performed and found to be within the limit. Degradation studies were carried out on Casimersen, with a purity threshold greater than purity angle in all conditions and within the acceptable range. The above mentioned technique was validated according to ICH guidelines

KEY WORDS: HPLC, CASIMERSEN, DEVELOPMENT, VALIDATION, DEGRADATION STUDIES.

#### **INTRODUCTION**

Casimersen, sold under the brand name Amondys 45, is an antisense oligonucleotide medication used for the treatment of Duchenne muscular dystrophy (DMD) in people who have a confirmed mutation of the dystrophin gene that is amenable to exon 45 skipping. It is an antisense oligonucleotide of phosphorodiamidate morpholino oligomer (PMO). The most common side effects include upper respiratory tract infections, cough, fever, headache, joint pain and throat pain. Casimersen was approved for medical use in the United States in February 2021 and it is the first FDA-approved targeted treatment for people who have a confirmed mutation of the DMD gene that is amenable to skipping exon 45.

# MATERIAL AND METHODS / EXPERIMENTAL DETAILS



**2.1 Materials:** Acetonitrile, Potassium dihyrogen ortho phosphate and ortho phosphoric acid, water (HPLC grade) were purchased from Merck (India) Ltd, Worli, Mumbai, India. All APIs of Casimersen as reference standards were procured from Glenmark Pharmaceuticals., Mumbai.

**2.2 Tools:** An HPLC system (Waters alliance e2695 model) consisting of quaternary pump, PDA detector-2998 was used. Data processing was performed with Empower 2.0 software.

**2.3 Chromatographic Conditions:**Chromatographic separation was carried out in isocratic mode at room temperature using Waters Phenyl Hexyl column (150x4.6 mm,  $3.5 \mu$ ). A mixture of acetonitrile and buffer in 50:50 v/v at a flow of 1 ml/min was used as mobile phase. The injection volume was 10 µl and the run time was 5.0 min.

**2.4 Preparation Of Buffer:** Take 1.36gm of Potassium dihyrogen ortho phosphate is dissolved in 1 lt of HPLC grade water adjust pH-2.5 with OPA and filtered through 0.45  $\mu$  filter paper.

2.5 Diluent: Mobile phase was used as diluent.

**2.6 Preparation Of Standard And Quality Control Samples:** Accurately weigh and transfer 100 mg of Casimersen in 100 ml volumetric flask and add app. 70 ml



of diluent, sonicate to dissolve it for 30 min. and made up to the mark with diluent. Furthur dilute 5 ml of the above solution to 50 ml with diluents.

**2.7 Preparation of Sample Solution:** Accurately weigh and transfer weight equivalent to 100 mg of Casimersen sample in 100 ml of volumetric flask and add 70 ml of diluent. Sonicate to dissolve and dilute up to the mark with diluent. Take 5 ml of the above solution and diluted to 50 ml and filtered through 0.45  $\mu$  nylon syringe filter. From literature survey there is no literature available in Casimersen till today. So that we take and developed new eco friendly method.

#### 2.8 Method Validation

**2.8.1 System Suitability:** System suitability parameters were measured to verify the system performance. The parameters including USP plate count, USP tailing and % of RSD are calculated and found to be within the limit.

**2.8.2 Specificity:** Specificity is the ability to assess unequivocally the analyte in the presence of other components, which may be expected to be present in the sample and standard solution. It was checked by examining the chromatograms of blank samples and samples spiked with Casimersen.

**2.8.3 Accuracy:** Accuracy is the closeness of the test results obtained by the method to the true value. It was assessed by the recovery studies at three different concentration levels. In each level a minimum of three injections were given and amount of the drug present, percentage recovery and related standard deviation were calculated.

**2.8.4 Precision:** Precision of the analytical method is the degree of agreement among individual test results. It was studied by analysis of multiple sampling of homogeneous sample. The precision of the present method was assessed in terms of repeatability, intraday and inter-day variations. It was checked by analyzing the samples at different time intervals of the same day as well as on different days.

**2.8.5 Linearity:** Linearity of an analytical method is its ability to obtain results directly proportional to the concentration of the analyte in the sample within a definite range. The six series of standard solutions were selected for assessing linearity range. The calibration curve was plotted using peak area versus concentration of the standard solution and the regression equations were calculated. The least squares method was used to calculate the slope, intercept and correlation coefficient.

**2.8.6 Stress Degradation:** Stress degradation should be no interference between the peaks obtained for the chromatogram of forced degradation preparations. Stress degradation studies were performed as per ICH guidelines Q1 (A) R2. The degradation peaks should be well separated from each other and the resolution between the peaks should be at least 1.0 and the peak purity of the principle peaks shall pass. Forced degradation studies

were performed by different types of stress conditions to obtain the degradation of about 20%.

**2.8.7 Robustness:** Robustness of an analytical procedure is a measure of its ability to remain unaffected by small but deliberate variations in method parameters and provides an indication of its reliability during normal usage. Robustness study was performed by injecting standard solution into the HPLC system and altered chromatographic conditions such as flow rate ( $\pm 0.2$  ml/min), organic content in the mobile phase ( $\pm 10\%$ ). The separation factor, retention time and peak asymmetry were calculated by determining the effect of the modified parameters.

#### **RESULTS AND DISCUSSION**

The current study was designed to develop a simple, precise and rapid analytical RP-HPLC method, which can be used for the analysis of assay method for he estimation of Casimersen in bulk and pharmaceutical dosage form. The chromatographic conditions were optimized in order to provide a good performance of the assay. To optimize mobile phase, various combinations were tried for Casimersen. The final working mobile phase is buffer and acetonitrile in the composition of 50:50 v/v. Mobile phase for drug was selected based on its polarity. Detection was carried out in several wavelengths in order to obtain enough sensitivity for the two APIs in smaller proportion (Casimersen). At last the wave length 227 nm was selected showes good absorbance. The flow rate was 1.0 ml/min. The retention time for Casimersen were 3.251 min respectively. The proposed method is validated in accordance with the ICH guidelines with all of the results within the limits. The detection was carried out with a total runtime of 10.0 min. Optimized chromatographic conditions were shown in table 1.

Table 1. Optimized chromatographic conditions			
Parameter	Condition		
Stationary phase	Waters Phenyl Hexyl (150x4.6 mm, 3.5 μ)		
Mobile phase	Buffer: Acetonitrile		
	(50:50, v/v)		
Injection volume	10 µl		
Flow rate	1.0 ml/min		
Column temperature	Ambient		
Wave length	227 nm		
Run time	5.0 min		
Retention time of Casimersen	3.251 min		
* nm: Nanometer			

**System Suitability:** The system suitability was performed by injecting standard solution containing  $100 \mu g/ml$  of Casimersen in six replicates. The results indicate that the system suitability parameter is within the limit. System suitability results were shown in table 2 and the standard chromatogram was shown in figure 1.

Table 2. Results of system suitability			
Parameter	Casimersen		
Theoretical plate count	8762		
Resolution	-		
Retention time	3.252		



**Specificity:** There was no interference from blank at the retention time of Casimersen. Figure 2 represents the blank chromatogram.



#### Table 3. Results of linearity

S. No	Casimersen Concentration (µg/ml)	Area
1	10.00	259986
2	25.00	649966
3	50.00	1299932
4	100.00	2599863
5	125.00	3249829
6	150.00	3799856

**Linearity:** Linearity was determined by plotting a calibration curve of peak area against their respective concentration. From this calibration curve it was found that the curve was linear in the range of 10-150 µg/ml of Casimersen. The regression equations for calibration

curve of Casimersen was Y= 25599x+ 11930 (R<sup>2</sup>-0.9998), the results were shown in table 2 and the calibration plots were shown in figure 5.



 Table 4. Results of method precision & Intermediate

 precision

S. No.	Area of	Area of Intermediate
	method precision	precision
1	2545634	2566789
2	2555741	2577465
3	2563782	2556644
4	2555578	2598886
5	2557783	2568893
6	2544788	2588937
Mean	2553884	2576269
Std. dev	7352.42	15510.34
% RSD	0.28	0.60

Table 5. Results of accuracy			
Accuracy	Amount of Casimersen	% Recovery	
50	50	100.04	
100	100	100.21	
150	150	99.98	

Table 6. Results of robustness	
Parameter	% RSD of Casimersen
Flow (0.8 ml/min)	0.45
Flow (1.2 ml/min)	0.72
Organic phase (55:45)	1.01
Organic phase (45:55)	0.58

**Precision:** Precision of this method was assessed in terms of intraday (repeatability) and (intermediate precision) variations. The intraday studies were determined by performing six repeated analysis of the sample solution of Casimersen on the same day under the same

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experimental conditions. The intermediate precision of the method was carried out in the same laboratory by studying the analysis with different analyst and different instrument. The method is highly precise as %RSD values were found to be <2%. Good recoveries of the drug were obtained at each added concentration, indicating that the method was accurate. Table 4 gives the method precision and intermediate precision.

Table 7. Results of forced degradation	
Stress parameter	% of degradation Casimersen
Acid degradation (1N HCl+ reflux+ 24 hrs)	15.5
Alkali degradation (1N NaOH+ reflux+ 24 hrs)	12.8
Peroxide degradation (30% Peroxide+ reflux+ 24 hrs)	11.6
Photo degradation (UV light (200 W h/m2) and fluorescent light (1.2 million lux-hrs))	14.3
* nm: Nanometer	





**Accuracy:** The accuracy of the method was performed by calculating the recovery experiments at three levels (50%, 100% and 150%). APIs with concentration 50, 100, 150 µg/ml of Casimersen were prepared. The test solution was injected three times for each spike level and assay was performed as per the test method. The recovery results were close to 100% and also the RSD values were less than  $\pm 2$ %. The percentage recovery, mean and relative standard deviation were calculated.





Recovery values demonstrated that the method was accurate within desired range. Accuracy results were shown in table 5.

**Robustness:** Robustness of the chromatographic method was determined by varying flow rate and mobile phase composition. % RSD was found to be within the acceptable limit. Robustness results were shown in table 6.

Forced Degradation: The proposed method can be used for release and stability studies for effective evaluations and can be considered as stability indicating method. The forced degradation study was carried out according to the ICH requirements include acid, base, oxidation, photo degradation. From the chromatograms it is evident that the selected drugs were stable under the applied stress conditions though the degraded peaks were observed. Forced degradation study results were shown in table 7 and the degradation chromatograms were shown in figure 5, 6, 7 and 8 respectively. However, the study of forced degradation had never been done or published in any journal, it was the first stabilising LC technique for Casimersen quality control. The devised approach was validated in accordance with ICH requirements and found to be very precise, quick, simple, cost-effective, and sensitive to the specific pharmaceutical dosage form.

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**Competing Interests:** There is no competing of interests
**Authors' Contributions:** Autor 1 designed the study, performed the statistical analysis, wrote the protocol, and wrote the manuscript. Autor 2 to check the work and review the manuscript.

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## Method Development and Validation of Tepotinib by Using Reverse Phase Liquid Chromatography in Bulk and Pharmaceutical Dosage Form

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### **ABSTRACT**

Method Development and Validation of Tepotinib By Using Reverse Phase Liquid Chromatography in Bulk and Pharmaceutical Dosage Form Chromatographic separation was achieved on a agilent eclipse C18 column (150x4.6mm,  $3.5 \mu$ ) using isocratic elution with a mobile phase containing buffer and acetonitrile within the ratio of 50:50 as mobile phase with a flow of 1 ml/min at ambient temperature and UV detection was carried at 254 nm. Analysis was achieved within 6 min over an honest linearity within the concentration range from 22.5-337.5 µg/ml of Tepotinib. By injecting the standard six times, system suitability parameters were studied and the outcomes were well under the acceptance criteria. Precision and recovery study results were found to be within the limit. By using the above technique assay of marketed formulation was performed and found to be within the limit. Degradation studies were carried out on Tepotinib, with a purity threshold greater than purity angle in all conditions and within the acceptable range. The above mentioned technique was validated according to ICH guidelines.

KEY WORDS: HPLC, TEPOTINIB, DEVELOPMENT, VALIDATION, DEGRADATION STUDIES.

## **INTRODUCTION**

Tepotinib, sold under the brand name Tepmetko, is a medication for the treatment of adults with metastatic non-small cell lung cancer (NSCLC) whose tumors have a mutation that leads to mesenchymal-epithelial transition (MET) exon 14 skipping. It is a c-Met inhibitor, a type of tyrosine kinase inhibitor. The most common side effects seen in clinical trials were edema, fatigue, nausea, diarrhea, muscle aches, and shortness of breath. Like capmatinib, tepotinib can also cause interstitial lung disease and liver damage, and is toxic to a developing fetus.

# MATERIAL AND METHODS / EXPERIMENTAL DETAILS



**2.1 Materials:** Acetonitrile and Tri ethyl amine, water (HPLC grade) were purchased from Merck (India) Ltd, Worli, Mumbai, India. API of Tepotinib as reference standard was procured from Laurus Labs Pvt. Ltd., Hyderabad.

**2.2 Tools:** An HPLC system (Waters alliance e2695 model) consisting of quaternary pump, PDA detector-2998 was used. Data processing was performed with Empower 2.0 software.





**2.3 Chromatographic Conditions:** Chromatographic separation was carried out in isocratic mode at room temperature using agilent eclipse C18 column (150x4.6 mm,  $3.5 \mu$ ). A mixture of acetonitrile and 0.1% tri ethyl amine (TEA) in 50:50 v/v at a flow of 1 ml/min was used as mobile phase. The injection volume was 10 µl and the run time was 6.0 min.

**2.4 Preparation Of Buffer:** 1 ml of tri ethyl amine is dissolved in 1 lt of HPLC grade water and filtered through 0.45  $\mu$  filter paper.

**2.5 Diluent:** Acetonitrile was used as diluent.

**2.6 Preparation Of Standard And Quality Control Samples:** Accurately weigh and transfer 225 mg of Tepotinib in 100 ml volumetric flask and add app. 70 ml of diluent, sonicate to dissolve it for 30 min. and made up to the mark with diluent. Furthur dilute 5 ml of the above solution to 50 ml with diluents.

**2.7 Preparation Of Sample Solution:** Accurately weigh and transfer weight equivalent to 225 mg of Tepotinib sample in 100 ml of volumetric flask and add 70 ml of diluent. Sonicate to dissolve and dilute up to the mark with diluent. Take 5 ml of the above solution and diluted to 50 ml and filtered through 0.45  $\mu$  nylon syringe filter.

### 2.8 Method Validation

**2.8.1 System Suitability:** System suitability parameters were measured to verify the system performance. The parameters including USP plate count, USP tailing and % of RSD are calculated and found to be within the limit.

**2.8.2 Specificity:** Specificity is the ability to assess unequivocally the analyte in the presence of other components, which may be expected to be present in the sample and standard solution. It was checked by examining the chromatograms of blank samples and samples spiked with Tepotinib.

**2.8.3 Accuracy:** Accuracy is the closeness of the test results obtained by the method to the true value. It was assessed by the recovery studies at three different concentration levels. In each level a minimum of three injections were given and amount of the drug present, percentage recovery and related standard deviation were calculated.

**2.8.4 Precision:** Precision of the analytical method is the degree of agreement among individual test results. It was studied by analysis of multiple sampling of homogeneous sample. The precision of the present method was assessed in terms of repeatability, intraday and inter-day variations. It was checked by analyzing the samples at different time intervals of the same day as well as on different days.

**2.8.5 Linearity:** Linearity of an analytical method is its ability to obtain results directly proportional to the concentration of the analyte in the sample within a

definite range. The six series of standard solutions were selected for assessing linearity range. The calibration curve was plotted using peak area versus concentration of the standard solution and the regression equations were calculated. The least squares method was used to calculate the slope, intercept and correlation coefficient.

**2.8.6 Stress Degradation:** Stress degradation should be no interference between the peaks obtained for the chromatogram of forced degradation preparations. Stress degradation studies were performed as per ICH guidelines Q1 (A) R2. The degradation peaks should be well separated from each other and the resolution between the peaks should be at least 1.0 and the peak purity of the principle peaks shall pass. Forced degradation studies were performed by different types of stress conditions to obtain the degradation of about 20%.

**2.8.7 Robustness:** Robustness of an analytical procedure is a measure of its ability to remain unaffected by small but deliberate variations in method parameters and provides an indication of its reliability during normal usage. Robustness study was performed by injecting standard solution into the HPLC system and altered chromatographic conditions such as flow rate ( $\pm 0.2$  ml/min), organic content in the mobile phase ( $\pm 10\%$ ). The separation factor, retention time and peak asymmetry were calculated by determining the effect of the modified parameters.

Table 1. Optimized chromatographic conditions			
Parameter	Condition		
Stationary phase	Agilent eclipse C18 (150x4.6 mm, 3.5 μ)		
Mobile phase	0.1% TEA: Acetonitrile (30:70)		
Injection volume	10 µl		
Flow rate	1.0 ml/min		
Column temperature	25°C		
Wave length	254 nm		
Run time	6.0 min		
Retention time of Tepotinib	3.714 min		
*TFA : Tri ethyl amine			
nm: Nanometer			

## **RESULTS AND DISCUSSION**

The current study was designed to develop a simple, precise and rapid analytical RP-HPLC method, which can be used for the analysis of assay method for the estimation of Tepotinib in bulk and pharmaceutical dosage form. The chromatographic conditions were optimized in order to provide a good performance of the assay. To optimize mobile phase, various combinations were tried for Tepotinib. The final working mobile phase is 0.1% tri ethyl amine and acetonitrile in the composition of 50:50 v/v. Detection was carried out in

several wavelengths in order to obtain enough sensitivity for the two APIs in smaller proportion (Tepotinib). At last the wave length 254 nm was selected at which the drug showed good absorbance. The flow rate was 1.0 ml/min. The retention time for Tepotinib was 2.423 min respectively. The proposed method is validated in accordance with the ICH guidelines with all of the results within the limits. The detection was carried out with a total runtime of 6.0 min. Optimized chromatographic conditions were shown in table 1.





**System Suitability:** The system suitability was performed by injecting standard solution containing 225  $\mu$ g/ml of Tepotinib in six replicates. The results indicate that the system suitability parameter is within the limit. The standard chromatogram was shown in figure 2.

Table 2. Results of linearity			
S. No	Tepotinib Concentration (µg/ml)	Area	
1	22.50	184880	
2	56.25	459113	
3	112.50	896209	
4	168.75	1256347	
5	225.00	1834505	
6	281.25	2178517	
7	337.50	2655617	

**Specificity:** There was no interference from blank at the retention time of Tepotinib. Figure 3 represents the blank chromatogram.



Table	3.	Results	of	method	precision
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S. No.	Area of Tepotinib
1	1900847
2	1897995
3	1903999
4	1907151
5	1903482
6	1902710
Mean	1902697
Std. dev	3088.07
% RSD	0.162

**Linearity:** Linearity was determined by plotting a calibration curve of peak area against their respective concentration. From this calibration curve it was found that the curve was linear in the range of  $22.5-337.5 \mu g/ml$  of Tepotinib. The regression equation for calibration curve of Tepotinib was Y= 7831.06x + 4819.23 (R2-0.9991), the results were shown in table 2 and the calibration plot was shown in figure 4.

Table 4. Results of Intermediate precision			
Area of Tepotinib	Relative standard deviation		
1900654			
1897351			
1903262	0.17		
1905471			
1903031			
1902356			

**Precision:** Precision of this method was assessed in terms of intraday (repeatability) and (intermediate precision) variations. The intraday studies were determined by performing six repeated analysis of the sample solution of Tepotinib on the same day under the same experimental conditions. The intermediate precision of the method was carried out in the same laboratory by studying the analysis with different analyst and different instrument. The method is highly precise as %RSD values were found to be <2%. Good recoveries of the drug

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were obtained at each added concentration, indicating that the method was accurate. Table 3 gives the method precision results and the table 4 gives the intermediate precision results.

**Accuracy:** The accuracy of the method was performed by calculating the recovery experiments at three levels (50%, 100% and 150%). APIs with concentration 112.5, 225, 337.5 µg/ml of Tepotinib was prepared. The test solution was injected three times for each spike level and assay was performed as per the test method. The recovery results were close to 100% and also the RSD values were less than  $\pm 2$ %. The percentage recovery, mean and relative standard deviation were calculated. Recovery values demonstrated that the method was accurate within desired range. Accuracy results were shown in table 5.

Table 5. Results of accuracy			
Accuracy	Amount of Tepotinib	% Recovery	
50	5	99.1	
100	10	100.8	
150	15	100.4	

Table 6. Results of robustness	
Parameter	% RSD of Tepotinib
Flow (0.8 ml/min) Flow (1.2 ml/min)	0.22
Organic phase (45:55)	0.18
Organic phase (55:45)	0.06

Table 7. Results of forced degradation				
Stress parameter	% of degradation Tepotinib			
Acid degradation (1N HCl+ reflux+ 24 hrs)	16.2			
Alkali degradation	1012			
(1N NaOH+ reflux+ 24 hrs)	16.6			
Peroxide degradation				
(30% Peroxide+ reflux+ 24 hrs)				
Thermal degradation				
(Sample + heat for 6 hrs)	14.3			
17				
Hydrolysis degradation	15			
(1 ml HPLC water +				
reflux + 24 hrs)				

**Robustness:** Robustness of the chromatographic method was determined by varying flow rate and mobile phase composition. % RSD was found to be within

the acceptable limit. Robustness results were shown in table 6.

**Forced Degradation:** The proposed method can be used for release and stability studies for effective evaluations and can be considered as stability indicating method. The forced degradation study was carried out according to the ICH requirements include acid, base, oxidation, thermal, hydrolysis degradation. From the chromatograms it is evident that the selected drugs were stable under the applied stress conditions though the degraded peaks were observed. Forced degradation study results were shown in table 7.

The devised approach was validated in accordance with ICH requirements and found to be very precise, quick, simple, cost-effective, and sensitive to the specific pharmaceutical dosage form.

## CONCLUSION

In this study a novel, rapid, economical, sensitive and easily available HPLC method was developed for the determination of Tepotinib in bulk and pharmaceutical dosage form. In this method shorter run time, low price, accessibility, sensitivity, reliability and reproducibility. These properties are important when a large number of samples are to be analyzed. The validation of all the parameters like linearity, accuracy, specificity, robustness, method precision were done and found to be within the acceptable limit. The RSD values for all the parameters were found to be less than 2%, which indicates the validity of the method and the results obtained by this method are in fair agreement. So the proposed method could be easily applied for the routine analysis and the pharmaceutical formulations of Tepotinib in quality control laboratories without any preliminary separation.

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**Competing Interests:** There is no competing of interests

**Authors' Contributions:** Autor 1 designed the study, performed the statistical analysis, wrote the protocol, and wrote the manuscript. Autor 2 to check the work and review the manuscript.

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# A Study to Assess the Effectiveness of Planned Teaching on Knowledge Regarding Importance of Breast Feeding and Weaning Among the Primigravida Mothers

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## ABSTRACT

Breast feeding is the most precious gift a mother can give her infant. "When there is illness or malnutrition it may be a life saving gift, when there is poverty, it may be the only gift". 1. To assess the existing knowledge regarding importance of breastfeeding and weaning among primigravida mother's in selected hospital of Wardha city. 2. To assess the effectiveness of planned teaching knowledge on regarding importance of breastfeeding and weaning among primigravida mother's comparing for the pretest and post test knowledge score. 3. To compare the knowledge regarding importance of breastfeeding and weaning among primigravida mother with selected demographic variables Descriptive interventional research approach. Research Design: - one group pretest and post test design. Setting of the study: Selected hospital of Wardha city. Population- All primigravida mothers admitted in selected hospital of Wardha city. Sample size: 60 Sampling technique: Non -probability convenient sampling.

**KEY WORDS:** ASSESS, EFFECTIVENESS, PLANNED TEACHING, KNOWLEDGE, PRIMIGRAVIDA, BREASTFEEDING, MOTHER, WEANING.

## INTRODUCTION

Weaning complementary feeding is the gradual process and progressive transfers of the baby from the breast feeding to the usual family diet during this process the infants gets accustomed to food other than mother's milk. Weaning does not mean discontinuity of breast feeding. Weaning food is given in addition of breast feed when the amount of breast feeding is inadequate.

**Background Of The Study:** For the healthy baby, the first routine after delivery should be skin to skin contact and initiation of breast feeding. Starting breast feeding soon after birth lowers infant's risk of neonatal death.2 Breast feeding should be initiated within an hour of birth instead of waiting several hours as is often customary. Although there is little milk at that time it helps to



establish feeding and a close mother-child relationship, known as "Bonding".

#### Need of the Study

**Review of Literature:** The related literature is presented under the following headings:

- Review of literature related to importance of breast feeding and weaning.
- Review of literature related to knowledge regarding importance of breast feeding and weaning.
- A study was conducted to initiation breastfeeding within one hour after birth has been associated with reduced neonatal mortality in a rural Ghanaian population. Data were collected during a community-based randomized trial of the impact of topical chlorhexidine antisepsis interventions on neonatal mortality and morbidity in southern Nepal. Multivariable regression modeling was used to estimate the association between death and breast feeding initiation time. Partially breastfed infants (72.6%) were at higher mortality risk than those exclusively breast fed. Improvements in breastfeeding practices in this setting may reduce neonatal mortality substantially.



### Mendhe

- A study was conducted to assess knowledge and current breastfeeding practices and to evaluate the gain in awareness post breastfeeding awareness campaign (BFAC) among lactating women in an urban resettlement colony of Chandigarh. This study was undertaken on a study sample of 210 lactating women. A pre-tested questionnaire was used to assess the knowledge and practices of these women and a post campaign assessment of gain in awareness was done after one month. Post BFAC, results revealed improved awareness among the mothers.
- According to national policy survey (2001), nutrition plays a pivotal role in determining optimal health and development of children. Regarding the importance of child nutrition right since independence India has started many programmed to combat under nutrition supplementary feeding program received emphasis for the weaker section of society .Fortunately 'Green Revolution' also helped the country to attain food self-sufficient of direct result has been a sharp declining in severe forms of malnutrition like Kwashiorkor and Marasmus. However, benefits of development have not reached all children; especially the vulnerable group mainly clubbed together at remote and slum areas.
- Shubhangi Joshi (2009) recently said that, the adequacy of complementary feeding (adequacy in short for timely, adequate, safe and appropriate) not only depends on the availability of a variety of foods in the household; but also, on the feeding practices of caregivers. Feeding young infants requires active care and stimulation, where the caregiver is also the child clues for hunger and also encourages the child to eat. This is also referred to as active of responsive feeding.
- A study was conducted on maternal child-feeding style during the weaning period: association with infant weight and maternal eating style. A controlling maternal child-feeding style has been show to have negative consequences for child weight and eating style for children over the age of 12 months. In the current study, 642 mothers with a child aged 6-12 months completed a copy of the Child Feeding Questionnaire and reported infant and maternal weight. Infant weight was positively correlated with maternal use of restriction, monitoring and concern for infant weight. Moreover, mothers high in restraint, external and emotional eating reported higher levels of concern for infant weight, restriction and monitoring and perceived their infants to be larger. The findings suggest that the extent to which controlling feeding practices are used is influenced by infant and maternal personal weight concerns even at this early stage. Potentially, these early behaviors could have long term consequences for child weight and eating style.

**Problem Statement:** "A study to assess the effectiveness of planned teaching on knowledge regarding importance of breast feeding and weaning among the primigravida mothers."

### **Objective:-**

- To assess the existing knowledge regarding importance of breastfeeding and weaning among primigravida mother's in selected hospital of Wardha city.
- To assess the effectiveness of planned teaching knowledge on regarding importance of breastfeeding and weaning among primigravida mother by comparing for the pretest and post test knowledge score.
- To compare the knowledge regarding importance of breastfeeding and weaning among primigravida mother with selected demographic variables.

## **RESEARCH METHODOLOGY**

**Research approach: –** Descriptive interventional research approach.

**Research Design:-** one group pretest and post test design.

**Sample:-** All primigravida mothers admitted in selected hospital of Wardha city.

**Sampling technique:-** Non -probability convenient sampling.

#### Sample size: - 60

Setting: - Selected hospital of Wardha city.

Criteria For Selecting Sample

#### Inclusive Criteria: -

- Primigravida mother age between 18 30 years.
- Mothers who can be available at the time of data collection.
- Primigravida mother who can read & write either Hindi & Marathi./English.
- Primigravida mother who are willing to participate.

#### **Exclusive Criteria:**

- Those who attain the same programmed.
- Those who are belong to health profession.

#### **Description of tool**

The structure questionnaire consists of 3 sections.

- 1. Demographic data-
- 2. It includes the demographic data such Age, Religion, Education, Occupation, Type of family, Income, Residence.
- 3. Regarding breast feeding questionnaires.
- 4. Regarding weaning questionnaires.

#### **Organization Of Findings**

The analysis and interpretation of the observations are given in the following section:

• Section A: Distribution of primigravida mothers with

regards to demographic variables.

- Section B: Assessment of existing knowledge regarding importance of breastfeeding and weaning among primigravida mother's in selected hospital of Wardha city.
- Section C: Effectiveness of planned teaching on knowledge regarding importance of breastfeeding and weaning among primigravida mother by comparing for the pretest and post test knowledge score.
- **Section D:** Association of knowledge score in relation to demographic variables.

## RESULTS

The analysis of the demographic data of the study samples gives an idea about the general characteristic of the total 60 primigravida mothers.

As per demographic variable the result of the 60 primigravida mothers were assessed

- Related to age, the maximum number 26(43.3%) of The Samples were in the age group of 22-23 years and the minimum number 1(1.7%) of the sample were in the age group of 30-33.
- Related to religion, the maximum number 25(41.7%) of mothers belonged to Hindu religion and the minimum number 5(8.3%) Muslim religion.
- Related to educational status, it reveals that maximum number 31(51.7%) of mothers educated up to secondary and the minimum number 10(16.7%) were primary.
- Related to type of family, the maximum number 35(58.3%) sample from joint family and the minimum number 1(1.7%) from single motherhood family.
- Related to occupational status, the maximum number 27(45%) from house wife mothers and minimum number 4(6.7%) sample from business.
- Related to income of families, maximum number 29(48.3%) families were having 3001 -6000rs. and the minimum number 5(8.3%)>9000rs.
- Related to Residence, out of 60 subject maximum number 36(60%) of mothers belongs to Rural area and the minimum number 24(40%) belong to Urban area.
- Related to breast feeding is the first immunization to the baby, the maximum number 45(75%) from yes answer and the min9mum number 15(25%) from no answer.
- In pre test most of the primigravida mothers the maximum score 22(36.37%) had average knowledge and the minimum score 9(15%) had poor knowledge.
- In post test, of the primigravida mother the maximum number 43(71.67%) had excellent knowledge and minimum score 1(1.67%) had good knowledge.
- In relation to knowledge of importance of breast feeding and weaning before and after planned teaching module, there was significant difference between pre test and post test knowledge score which was evidence by t value was 17.92 and p

value was 0.000 which was less than 0.05.

In order to achieve the objective, analysis of over all comparison of assessment of pre test and post test knowledge as criteria was done and the result describe that in pre test, primigravida mothers and Excellent (0%), Very good (16.67%)Good (31.67) and average (36.67%) and Poor (15%) level of knowledge. where as in post test , level of knowledge was excellent (71.67%), and Very good (26.27%), Good (1.67%) and average (0%) and Poor (0%) which was higher than the pre test knowledge level. It shows that the planned teaching was effective in terms of gain in knowledge score in post test. Analysis of overall comparison of assessment pre test and post test level of the as per criteria was done and the result describe that in pre test primigravida mother had excellent (0%), very good (16.67%), good (31.6%) and average (0%) level of practices .where as in post test, level of practice is excellent were (71.67%) and very good (26.67%) which is higher than the pre test practices level. it shows than the plan teaching was effective in terms of gain in practices score in post test.

The total knowledge means score in the pre test was 11.28 and in post test it was 24.63. The standard deviation in pre test was 5.20 and in post test was 3.07 which shows that the data was consistent .As' t' value calculated was 17.92 and t (p=0.000, P<0.05), which is highly significant i.e. greater than the table value of 't' . The total practices mean score of importance of breast feeding in the pre test was 6.18 and in the post test was 11.68 respectively. The standard deviation in pre test is 2.83 and in post test 2.06 which shows that the data is consistent. As 't'value calculated was t= 13.43 and t (p= 0.000 S, p<0.05), and total mean score weaning in pre test was 5.10 and post test was 12.95 respectively. The standards deviation in pre test 2.96 and in post test 1.80 which shows that the data is consistent. As a 't' value calculated was t=13.43 and t tab. (p=0.000 S, p < 0.05) which was highly significant i.e. greater than the table value of 't'at df.

Association of knowledge and practices of breast feeding and weaning in demographic variables.

- 1. Association of knowledge in related to age i.e. cal .value is < F tab and p cal. Value is <0.05 level of significant ,so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning related to age, hence it is not significant.
- 2. Association of knowledge is relation to religion i.e. t cal. value is <t tab and p cal. Value is > 0.05 level of significance, so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning in relation to religion , hence it is non significant .
- 3. Association of knowledge in relation to educational status i.e. t cal value is < t tab and p cal .value is >0.05 level of significance ,so there is no association of primigravida mothers of knowledge regarding breastfeeding and weaning in relation to educational status ,hence it is non-significant.
- 4. Association of knowledge in relation to type of

family i.e., F cal. value is <F tab and p cal. value is > 0.05 level of significance, so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning in related to type of family, hence it is not significant.

- 5. Association of knowledge in relation to occupational status i.e. F cal. Value is < F tab and p cal. value is p > 0.05 level of significance, so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning in relation to occupational status, hence it is non-significant.
- 6. Association of knowledge in relation to income level i.e. t cal. Value is < t tab and p cal .value is p>0.05 level of significance , so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning in relation to income level, hence it is non-significant.
- 7. Association of knowledge related to family residence. i.e. F cal. Value is <F tab and p cal. Value is > 0.05 level is significance, so there is no association of primigravida mothers of knowledge regarding breast feeding and weaning in relation to family income per month, hence it is non significant.
- 8. Association of practices in relation to breast feeding is the first immunization to the baby i.e. F cal. Value is < F tab and p cal. value is > 0.05 level of significance, so there is no association of primigravida mothers of practices score regarding breast feeding and weaning in relation to breast feeding is the first immunization to the baby, hence it is not significant.

#### Criteria For Selecting Sample Inclusive Criteria: –

- Primigravida mother age between 18 30 years.
- Mothers who can be available at the time of data collection.
- Primigravida mother who can read & write either Hindi & Marathi. /English.
- Primigravida mother who are willing to participate.
- Exclusive Criteria:
- Those who attain the same programmed.
- Those who are belong to health profession.
- Recommendations For Further Research

On the basis of this study the following recommendations have been made for further study.

• A comparative study to find out the knowledge of primigravida mothers in different hospitals may be carried out.

- A teaching manual may be developing for the primigravida mothers, family members and neighbors.
- A similar study may be conducted by using a larger sample size which would help to generalize the findings.
- An exploratory study may be conducted to find out the knowledge of the primigravida mothers regarding importance of breastfeeding and weaning
- A longitudinal study may be done to see the effect of planned teaching among primigravida mothers.
- A comparative study may be conducted to find out the knowledge and practice of mothers in urban and rural areas.

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## Assess the Efficacy of Hot Water Application With EPSOM Salt in Reducing Joint Pain among Geriatric with Arthritis

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### ABSTRACT

Arthritis affects 15% of people i.e. over 180 million people in India. Application of the heat generally or locally producing the body physiological change, such as vasodilatation and muscle relaxation that produces beneficial effect therapeutic effect to pain relief Aims and To evaluate the effectiveness of hot water compress with Epsom salt in reducing joint pain among old patients with arthritis in experimental and control group. Quasi-experimental study research design was used to conduct this study, simple random sampling used to collect data. The subject consisted of 60 geriatric patients who having joint pain, in the selected community of Wardha a Epsom salt hot water application Epsom salt compress was prepared by adding 30 grams of Epsom salts to one liter of boiling water (The temperature of the boiling water was as tolerated by the client) creating a hot compress by dipping a clean washcloth in the boiling water, wringing it out, Applying for 20 minutes over the joint in which pain was present, twice a day. The result revealed that out of 30 experimental samples, pretest mean score level of pain was 3.10 with the standard deviation of 0.60 whereas after implementation of Epsom salt with hot water application, the posttest mean pain score was 0.70 with the standard deviation of 0.79 The effectiveness was statistically tested by paired t test which was found to be highly statistically significant at p less than 0.001. The findings of the study regarding effectiveness of warm Epsom salt application to the knee joint pain can make the health care workers, specially nurses and doctors aware of it and implement this method as a protocol and should be used by all for the benefit of socio economical class people as it is cost effective but gives good results in reducing knee joint pain in arthritis patient. Warm Epsom salt application is highly effective in reduction knee joint pain in arthritis patient.

KEY WORDS: EFFICACY, HOT WATER APPLICATION, EPSOM SALT, ARTHRITIS, JOINT PAIN

## **INTRODUCTION**

Rheumatoid arthritis is a chronic, inflammatory disorder which affects many parts like joints of hands and feet, many tissues of the body, organs. In this disorder the immune system of the body attacks its own tissue which includes joints.it can attack internal organs also in severe cases. The onset of the rheumatoid arthritis is more frequent which is between the ages of 40 and 50. If the inflammation associated with the rheumatoid arthritis is



for longer period then it can cause joint deformity and bone erosion.

The primary type of OA is most commonly caused by aging process.the second most common rheumatologic problem isOA and also most frequent joint disease with the prevalence rateof 22-39% in India.The prevalence rate increases with agingprocess.Nearly 45 and 70% of the women have the symptomsand radiological evidences of pathology. It is one of the majorcauses of mobility impairment among females., Applying general or local heat that causes physiological changes in the body such as vasodilatation and muscle relaxation that causes the beneficial therapeutic effect of pain relief, moist heat application is a non-pharmacological, inexpensive and easiest solution that has a beneficial effect on pain in the knee joint. It causes vasodilatation and penetrates deeper into the muscle, thereby minimizing muscle spasm and discomfort.



This was also supported by a study was conducted by Amudha, G This study focuses on the effectiveness of hot water compress with Epsom salt in relieving knee joint pain among elderly women in urban areas, Chennai. The clients in the experimental group58% of reduction in pain levels as compared to the clients in the control group who had 3% of pain reduction. People today rely on pharmacological intervention to relieve pain, it has side effects. If we use hot water compress with Epsom salt to relieve muscle pain which has been proved in this study, it will be economical, culturally accepted, it can be practiced safely at home and it has less side effect as compared to pharmacological intervention.

This research will examine the effectiveness of hot water application with Epsom salt in reducing joint pain among geriatric with arthritis. To evaluate the effectiveness of hot water compress with Epsom salt in reducing joint pain among old patients with arthritis in experimental and control group. An experimental research approach and Randomized controlled Trial Research Design was used in the study. The study was conducted in rural and urban area of community Wardha district. The population of the study was geriatric who were having arthritis joint pain and who were fulfilling the inclusion criteria.

## **MATERIAL AND METHODS**

The sampling technique used was purposive sampling technique. The sample was consisting a total number of 60 subjects 30 experimental group and 30 control group. The study was approved by the institutional ethical committee and the study was conducted in accordance with the ethical guidelines. Duration of the study as per the guidelines, the total duration of study will be 10 months after approval of synopsis from ethical committee. The questionnaire to assess the effectiveness of hot water application with Epsom salt to reducing joint pain among geriatric with arthritis. An experimental research approach and randomized controlled trial research design was used in the study. The study was conducted during December 2019 to February 2020 and the setting was selected in rural and urban area of community Wardha district. The population of the study was geriatric who were having arthritis joint pain and who were fulfilling the inclusion criteria.

Severity	Pain score	Severity	Description of experience
No pain	0	No pain	I have no pain
Medium pain	1	Minimal	My pain is hardly noticeable
	2	Mild	I have low level of pain .i am aware of my pain only when
			I pay attention to it
	3	Uncomfortable	My pain bothers me but I can ignore it most of the time
Moderate pain	4	Moderate	I am constantly aware of my pain but I can continue most activities
	5	Distracting	I think about my pain most of the time .I can't do some of the activities
	6	Distressing	I think about my pain all of the time. I give up many activities
			because of my pain
Severe pain	7	Unmanageable	I am in pain all the time. It keep me from doing most activities.
	8	Intense	My pain is so severe that it is hard to think of any think else.
			Talking and listening are difficult.
	9	Severe	My pain is all that I can think about ,I can barely talk or move
			because of the pain
	10	Unable to move	I am in bed and can't move due to my pain I need someone to take
			me to the emergency room to get help for me pain

The sampling technique used was simple random sampling technique. Sample size calculation  $N = x^2$ . N.P (1-P) /  $c^2$  (N-1) + x 2.P. (1-P) X2 = Chi-square value for 1 degree of freedom at some desired probability level. This is at 3.84 at 5% level of significance= 50% proportion =0.50C= Confidence interval of the one choice (95% CI) =0.05 =1.96\*1.96\*0.028\* (1-0.028)/ (0.05\*0.05) =41.82119the sample was consisting a total number of 60 subjects. The study was approved by the institutional ethical committee and the study was conducted in accordance with the ethical guidelines. (Ref.No.DMIMS (DU)/IEC/2019/7923).

Modified Numeric Pain Rating Scale It is 11 point numerical rating scale (0-10 scale of pain severity) to assess the severity of among geriatric suffering from arthritis. It includes 11 statements containing description of pain experiences indicating severity of pain in the form of number. The scale of pain is divided as none (0), mild (1-3), moderate (4-6) and severe (7-10) .For the purpose of statistical analysis of pain in divided as scoring of numerical pain rating scale. **Inclusion criteria:** The study participants those who were able to understand Marathi and Hindi, who were willing to give consent, who were available at the time of data collection, which have arthritis are under 65 years old in rural and urban community area. Geriatric chief complaint the area around the joint is swollen, red, tender, or warm to the touch, pain in joint, the pain persists for three days or more. Numeric rating scales (NRS) use for assessment of pain.

**Exclusion criteria:** We excluded geriatrics clients with severe neuropathies, burns, skin lesion on the joints, geriatric clients with complicated like facilities, vascular compromise, and systemic lupus erythematosus, and the geriatric clients with fracture, blood disorders, mentally not fit. This diseases rule out from history collection physical assessment and laboratory report.

## RESULTS

# Section A:Distribution of geriatric with regards to demographic variables.

Table 1 shows experimental group 26.7% of the geriatric were in the age group of 60-65 years, 50% in control group and 36.70% in experimental group were in the age group of 66-70 years, 23.3% in control group and 16.7% in experimental group were in the age group of 71-75 years and 26.7% in control group and 20% in experimental group were in the age group of 76-80 years.

to their demographic characteristics.				
Demographic Variables	Control Group n=30	Experimental Group n=30		
	Age(yrs)			
60-65 yrs	0(0%)	8(26.7%)		
66-70 yrs	15(50%)	11(36.7%)		
71-75 yrs	7(23.3%)	5(16.7%)		
76-80 yrs	8(26.7%)	6(20%)		
	Gender			
Male	13(43.3%)	16(53.3%)		
Female	17(56.7%)	14(46.7%)		
	Education			
Uneducated	13(43.3%)	6(20%)		
Primary	10(33.3%)	16(53.3%)		
Secondary	7(23.3%)	8(26.7%)		
	Occupation			
Housewife	28(93.3%)	21(70%)		
Self-Employed	2(6.7%)	9(30%)		
	Monthly family income	e(Rs)		
<rs 10000<="" td=""><td>14(46.7%)</td><td>20(66.7%)</td></rs>	14(46.7%)	20(66.7%)		
Rs. 10001-15000	9(30%)	7(23.3%)		
Rs. 15001-20000	7(23.3%)	3(10%)		
>Rs 20000	0(0%)	0(0%)		
	Do you perform any exercise?			
Yes	17(56.7%)	19(63.3%)		
No	13(43.3%)	11(36.7%)		
	If yes, what type of exer	cise?		
Yoga	9(52.9%)	10(52.6%)		
Walking	8(47.1%) 9(47.4%)			

Section B-assessment of level of joint pain among geriatric with rheumatoid arthritis in experimental and control group

Table 2 shows that 6.67% of the geriatric at post test had no pain, each 66.67% of the geriatric at pre and post test had mild pain and 33.33% at pre test and 26.67% at post test had moderate pain. Minimum joint pain score in pretest was 1 and at post test it was 0 and maximum joint pain score at pre and post test was 4.Mean joint pain score at pretest was  $3.03\pm0.92$  and at post test it was  $2.66\pm1.21$ .

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Table 2. Assessment with level of joint pain in controlgroup

Level of joint pain	Score Range	Level of joint pain score		
score		Pre Test n=30	Post Test n=30	
No pain	0	0(0%)	2(6.67%)	
Mild Pain	1-3	20(66.67%)	20(66.67%)	
Moderate Pain	4-6	10(33.33%)	8(26.67%)	
Severe Pain	7-9	0(0%)	0(0%)	
Worst Pain	10	0(0%)	0(0%)	
Minimu	m score	1	0	
Maximum score		4	4	
Mean pa	in score	3.03±0.92	2.66±1.21	

Table 3.Assessment with level of joint pain in experimentalgroup

T	6	Level of joint pain score	
Level of joint pain score	Score Kange	Pre Test (n=30)	Post Test (n=30)
No pain	0	0(0%)	15(50%)
Mild Pain	1-3	23(76.67%)	15(50%)
Moderate Pain	4-6	7(23.33%)	0(0%)
Severe Pain	7-9	0(0%)	0(0%)
Worst Pain	10	0(0%)	0(0%)
Minimum score		2	0
Maximum score		4	2
Mean pain score		3.10±0.60	0.70±0.79

Table 3 shows that 50% of the geriatric at post test had no pain, 76.67% of the geriatric at pre and 50% at post test had mild pain and 23.33% at pre test had moderate pain. Minimum joint pain score in pretest was 2 and at post test it was 0 and maximum joint pain score at pre test was 4 and at post test was 2.Mean joint pain score at pretest was  $3.10\pm0.60$  and at post test it was  $0.70\pm0.79$ .

#### Section C: Evaluation of effectiveness of hot water compress with Epsom salt in reducing joint pain among geriatric with rheumatoid arthritis in experimental and control group

Table 4 shows the comparison of pretest and post test joint pain scores of geriatric in control group. Mean, standard deviation and mean difference values are compared and student's paired't' test is applied at 5% level of significance. The tabulated value for n=30-1 i.e. 29 degrees of freedom was 2.05. The calculated 't' value i.e. 2.25 are much higher than the tabulated value at 5% level of significance for overall joint pain score of geriatric which is statistically acceptable level of significance. Hence it is statistically interpreted that the hot water compress with Epsom salt in reducing joint pain among geriatric was effective.

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of geriatric in cont	rol group		0	•	•
Overall	Mean	SD	Mean Difference	t-value	p-value
Pre Test(n=30)	3.03	0.92	0.36±0.88	2.25	0.032 S,p<0.05
Post Test(n=30)	2.66	1.21			

Table 4. Significance of difference between joint pain score in pre and post test

 Table 5. Significance of difference between joint pain score in pre and post test
 of geriatric in two groups

Overall	Mean	SD	Mean Difference	t-value	p-value
Control(n=30)	0.36	0.88	2.03±0.25	7.86	0.0001 S,p<0.05
Experimental(n=30)	2.40	1.10			

Table 5 shows the comparison of difference between pretest and post test joint pain scores of geriatric in control and experimental group. Mean difference, standard deviation and mean difference values are compared and student's unpaired 't' test is applied at 5% level of significance. The tabulated value for n1+n2-2=30+30-2 i.e. 58 degrees of freedom was 2.00. The calculated 't' value i.e. 7.86 are much higher than the tabulated value at 5% level of significance for overall joint pain score of geriatric which is statistically acceptable level of significance. Hence it is statistically interpreted that the hot water compress with Epsom salt in reducing joint pain among geriatric was effective.

## DISCUSSION

The effectiveness of Hot water application with Epsom salt among geriatric with arthritis in selected rural and urban area at Wardha district. The objective was to evaluate the effectiveness of hot water application with Epsom salt in reducing joint pain with arthritis among geriatric with arthritis. In the control group, 23(76.67%) of the geriatric are having mild pain, 7(23.33%) are having moderate pain. in another study According to Fioravanti A, Tenti S, Giannitti C, Fortunati NA, Galeazzi M. 2013Jan 14. conducted a prospective randomized , single blind controlled trial to evaluate the effectiveness of Epsom salt compress in 60 outpatients withbilateral knee pain divided into two groups with experiment group (n = 30) treated with 12 daily generalized thermal baths with magnesium sulfatemineral water added to usual treatment and control group (n = 30)continuedregular outpatient care routine (exercise, NSAIDs and/ or analgesics) for aduration of three months the study results confirmed that Epsom salt compress had a beneficial effect in patients with knee OA.7This study was completed on 200 by Oosterveld FG,&Rasker JJ.reviewed the scientific basis for the treatment of arthritis pain with locally applied heat. They reviewed the experimental studies in healthy subjects and in

patients. They found that the effect of heat on pain, stiffness of joints, grip strength and joint function in inflamed joints reported beneficial effects. They suggested that the heat can be applied for chronic inflammation.

The study finding was supported by the study conducted by SatralkarSP and Dhudum B 201611 to assess the effectiveness of application of warm compress with Epsom salt to reduce knee joint pain among women. The nonprobability purposive sampling technique was used, and 60 samples were selected, in which 30 samples were Epsom salt application group and 30 samples were control group. In the experimental group, hot water application with Epsom salt was done with 200 mg of Epsom salt mixed in hot water, and the painful joints were bathed with hot water for 20 minutes thrice a week. The result revealed that posttest level of pain in the control group was p= 8.1 and in the experimental group p = 1.03, which indicates warm Epsom salt application was highly effective in reduction of knee joint pain in arthritis patient.

**Limitation:** The study was limited to duration would give more relevant results with variations of any research, but the investigator planned to complete the research work within two month to get more feasibility of getting sample. The study was done only on woman because female have more joint pain than male.

## **CONCLUSION**

Justification for undertaking this study was to relieve the clients from rheumatoid arthritis joint pain by hot water compress with Epsom salt and to determine its effectiveness, so that hot water compress with Epsom salt can be used in the future for all rheumatoid arthritis joint pain patients for health promotion. From this study it is statistically interpreted that hot water compress with Epsom salt in reducing joint pain among geriatrics was effective.

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## Assess the Effectiveness of Self-Instructional Module on Knowledge Regarding Sarva Shiksha Abhiyan among Parent in Slum Area

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#### ABSTRACT

Universalization of education in India implies. Elementary education for all (classes I to VIII) and not for a selected few. This concept accept that education is the birth right of every child. This means that all children belonging to the rich and the poor living in town as will as rural area and in places which are accessible with difficulty have to be provided with facility for elementary education. It is accepted in UN's declaration of human rights and children rights it is universally accepted that the universalization' of the elementary education is the true index of the general economic political and social development of a country. To assess the level of knowledge regarding Sarva Shiksha Abhiyan among parents.2) to evaluate the effectiveness of self instruction module regarding Sarva Shiksha Abhiyan among parent in slum area.3) Find out the association between the demographical variable with the post test knowledge of Sarva Shiksha Abhiyan among parent in slum area. There is a significant difference between the score of pre-test and post-test knowledge of Sarva Shiksha Abhiyan among the slum parents. Study design is pre experimental one group pre test and post test design participant of the study was 100 parent selected slum area of Wardha.Non probability convenient sampling technique study conduct in selected area of Wardha city. The level of knowledge among parents in the slum area was concerning Sarva Shiksha Abhiyan. That 44% of parents had poor knowledge score, 45% had average knowledge score and 11% had good knowledge score. The minimum score for pretest knowledge was 1 and the maximum score for pretest knowledge was 12. Mean knowledge score in pretest was 6.35±2.95 and mean percentage of knowledge score in pre test was 25.40±11.82.the level of post-test knowledge level among parents in the slum area was concerning Sarva Shiksha Abhiyan that 57 per cent of parents had very good knowledge score level and 43 per cent outstanding knowledge score level. Minimum score for knowledge in posttest was 16, and maximum score for knowledge in posttest was 24.Mean post-test knowledge score was 20.09±1.89 and average post-test knowledge score was 80.36±7.56. Self instructional module significantly have proved their improvement in knowledge regarding Sarva Shiksha Abhiyan for selected slum area among parents data analysis show that their noticeable difference between pre- and post-test.

KEY WORDS: SELF INSTRUCTIONAL MODULE, SARVA SHIKSHA ABHIYAN, PARENT, SLUM AREA

## **INTRODUCTION**

**Background:** India is one of the larger democratic countries in the world. For the development of the every

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nation the quality basic education is sin qua non. So the human beings without education become an animal. education is the is the 21 century a nation ability to convert knowledge into wealth and social and good thought the process of Enovation is going to determine its feature. The future of the nation is the Hand of young generation why the quality and overall education at primary level is very essential.

There are two goals of Sarva Shiksha Abhiyan (SSA) that universal enrollment and universal retention. Enrollment and Retention in elementary education system



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depends upon various educational and socio-economic variables.

The Sarva Shiksha Abhiyan, among other things, seeks to promote Community participation in school education. Child are active youngster who receive decreasing amount of supervision from the parent and other adults All younger kids can be rebellious stubborn and impulsive from time to time, which is perfectly normal in the span of school age. And sense of taste is fully mature prior to the school year and they have more independent. Children attempt to master new motor skill are it past of organizational teaching learning process for student.

The teachers are pillars of education system. Qualitative retraining input leading to reading to value addiction amongst teacher is a way to enhance quality teaching learning process. Teacher training is continuing process under Sarva Shiksha Abhiyan. Teachers have a broader roll and crucial responsibility in achieving Sarva Shiksha Abhiyan. It is quite important to target the teacher. Unless the teacher prepared them self to adopt the new teaching pedagogies no improment it the exiting standard of education being imparted in our school can be achieve. It is the necessary in service / freshly recruited teacher should be organized at district level India made a Constitutional commitment to provide free and compulsory education to all children up to the age of 14 nearly sixty years ago. The goal, which was expected to be achieved by 1960, remains elusive, even now. Yet, one has to admit that developments in recent years have had significant impacts on the situation, raising the hope that universal basic education could be a reality within a reasonable period of time. Three factors seem to be making a distinct difference in the growth trajectory of elementary education in the country.

This case study was done Sarva Shiksha Abhiyan (SSA) in India, the largest basic education programme in the world, assesses the significance of foreign aid for achieving increased access to elementary education from 2002 to 2010, particularly for the most disadvantaged. It reviews the practical experience of India and its development partners in jointly developing and implementing a national education programme and how greater alignment of external assistance with the Government of India's national policy for achieving universal elementary education was brought about, thus promoting country leadership and harmonizing donor practices for effective aid delivery in line with the principles of aid effectiveness set out in the Paris Declaration (signed by the members of the Development Assistance Committee (DAC) of the OECD and representatives of the developing countries in 2005). The paper draws on documentation about, and experience of SSA design and implementation to establish, through analysis, a picture of how foreign aid principally from three development partners is being used effectively to support India's own policy and strategy for universalizing elementary education.

The case shows that the development partners are playing an important role and that external support for

elementary education in India is organised in a unique and effective way and contributed to increased access to basic education, particularly in the populous north of the country. Universalizing basic schooling means free tuition. Free education in some of the progressing countries It is widely recognized in the decline of the UN in human rights and children's rights that the universalization of primary education is the true measure of the overall political and social development of a country means no free book fees And free stationary midday Free school transport and meals but this is True to that in developing countries such as India. It was Unable to access all these services at this staging Freebies tuition fees at no cost of course education. Further facilities are also provided on a selective basis.

## **MATERIALS AND METHODS**

Quasi –Experimental research design (One Group Pre-Test Post –Test Design) was chosen because this research study aimed at evaluating the effectiveness of the selfeducation module in improving the awareness of Sarva Shiksha Abhiyan selected among parents in the slum region. Research design pre-experimental, one group and pre-test and post. Target population was parents in slum area of selected Wardha city. Sampling technique was non probability convenience sampling sample size was 100 parents of selected slum area. Sample size calculation N=x2 .N.P (1-P) / c 2 (N-1) + x 2.P. (1-P) X2 = Chi-square value for 1 degree of freedom at some desired probability level. Where's N=No of parents =135

 $X^2$ =Chisqnare value at 1df for some desired probability level =3.84, P=50%Proportion =0.50, C<sup>2</sup> = Desiredprobabilitylevel=5%=0-05N=3.84×135×5.50× 0.50÷(0.05z×134)+ (3.84×0.5×0.50) =100 .7, N = 100 parents needed in the study Tool use for this study was structured questionnaire for assess the effectiveness of the self education module on parental knowledge of Sarva Shiksha Abhiyan in the slum region. Assessment of knowledge based on criteria measurement (excellent, good average, poor.)

#### **Inclusion Criteria**

- Slum area parents who are eager to take part in the research. (A lack of awareness of sarva Shiksha Abhiyan among slum parents and lack of understanding the programme development. Surrounding or home environment is one of the important factors influencing the educational.)
- Slum area parents who are available at the time the data are collected.
- Slum area parent who can understand and write Marathi language.

#### **Exclusion Criteria**

- Slum area parents
- Who have already attended similar type of study?
- Parents who are involved in sarva Shiksha Abhiyan project.

A tool was devised through several steps of item education religion pilot testing of the tool and validating the tool. The content validity was determined after the opinion of 10 experts' in the field of community health nursing and child health nursing Tool validation included measurement of inter-observer reliability; and generation of criterion related, construct related and content related validity. The tool was later revised by English-language expert and then translated into Marathi language by language experts without altering the tool's meaning. This is true and appropriate for Sarva Shiksha Abhiyan. The Institutional Ethical Committee of the Datta Meghe, Institute of Medical Sciences,' Deemed to be University sanctioned approval for conducting the research study was obtained. The findings were summarized by concentrations and percentages, categorically. The program used in the study was SPSS 24.0 and the edition of Graph Pad Prism 7.0 and p < 0.05 is regarded as a degree of significance.

## Preparation of the Tool

A tool or an instrument is a formal written document used to collect and record information, the researchers prepared the tool for this study after extensive literature review. Description of the Tool-A structure questionnaire consists of two sections

Section I and Section II.

### Section I

It is consisting of demographic characteristics regarding the parent in slum area i. e. Age, gender education, occupation, monthly income, previous information about Sarva Shiksha Abhiyan, Sarva Shiksha Abhiyan sources.

## Section li

The assessment of knowledge regarding sarva Shiksha Abhiyan for selected parent in the slum area is comprised of 25 multiple choice questions.

Score: - For the correct answer SCORE 1 was given, Score 0 for wrong answer, Knowledge ranked from poor knowledge to excellent, scoring-based knowledge.

## Methods for of Data Collection

For the present study the validated tool was used structured questionnaire. The tool was in Marathi. Structure questionnaire contained 25 multiple choice questions. Data was collected within 15 day group members pre-test data collection was followed by knowledge. The data was collected within 2 weeks.

## **Process of Data Collection**

- The following timetable for data collection was followed;
- The subject matter was clarified regarding the nature

and intent of the analysis

- They were assured that the data was confidential
- The subject was given questionnaire selfadministered
- It look 30 min fill the per test

Structure the subject was given the same day as the teaching programme after pre-test any queries raised by the subject were clarified after the structure programme

Post test data collection with the same questionnaire was done 7 days.

### **Content Validity**

The tool was given to 7 days in order to obtain validity of the material. Experts who include one from the statistics department, one from the English department and five from the Community Health Nursing department. After receiving expert opinions and consulting from the guide, some modifications have been made to frame the item and the same has been incorporated into the tool.

### Informability

Reliability is the instrument's capability to produce reproducible results. (Laura 1995) Tool reliability is an important criterion for the efficiency and accuracy evaluation. It is the degree of consistency it measures the attribute with, it should be measured.

#### **Ethical Aspects**

- The research problem was approved by the research committee
- Information about the study given to participant
- Permission obtained from the concerned of the selected city /village

#### **Statistical Analysis**

The Study Was Conducted among 100 parents of slum area. The present study was used to test the effectiveness of the self-education module on Sarva Shiksha Abhiyan awareness among slum parents. For data collection a standardized questionnaire was used to gather the information ratings. The percentage of wise parent distribution in terms of their demographic characteristics. A convenient sample of 100 subjects was drawn from the study population, who were from selected slum area. The data obtained to define the sample characteristics, including age, sex, educational level, job, monthly family income, knowledge about Sarva Shiksha Abhiyan and source of knowledge respectively.

## RESULTS

Results were expressed as in this study 36% of the parents in the 30-35 age group, 23 per cent in the 36-40 age group, 41 per cent in the 41-50 age group and above. Education of parents 40% of the parents were educated

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up to primary standard, 41% up to secondary standard, 13% were illiterate and only 6% of the parents were graduates. Occupation of parents 10% of the parents were farmers, 24% of them were housewife, 61% of them were daily wagers and 5% of them were doing job. Monthly income (Rs) 31% of the parents had monthly family income of 4001-6000 Rs, 22% had between 6001-8000 Rs and 47% of them had monthly family income of 8001-10000 Rs. source of knowledge about Sarva Shiksha Abhiyan the parents had information from mass media, 15.20% had from friends and 60.90% of the parents had information from neighbor. The level of knowledge among parents in the slum area concerning Sarva Shiksha Abhiyan. The level of knowledge score is divided under following heading of poor, average, good, very good and excellent.

Table 1. Distribution of parent according to theirdemographic characteristics				
Demographic Variables	Parents No. (N-100)	Percentage (%)(N-100)		
	Age(yrs)			
30-35 yrs	36	36		
36-40 yrs	23	23		
41-50 yrs and abov	ve 41	41		
	Gender			
Male	58	58		
Female	42	42		
E	ducational Level			
Primary	40	40		
Secondary	41	41		
Illiterate	13	13		
Graduation	6	6		
Occupation				
Farmers	10	10		
Housewife	24	24		
Daily Wages	61	61		
Job	5	5		
Inc	ome of the family	7		
4001-6000 Rs	31	31		
6001-8000 Rs	22	22		
8001-10000 Rs	47	47		
Knowledge rega	arding Sarva Shik	sha Abhiyan		
Yes	46	46		
No	54	54		
Soi	arce of knowledge	2		
Mass Media	11	23.9		
Friends	7	15.2		
Neighbour	28	60.9		

Assessment of pre-test level of knowledge regarding sarva Shiksha Abhiyan among parents that 44% of parents had poor knowledge score, 45% had average knowledge score and 11% had good knowledge score. The minimum score for pretest knowledge was 1 and the maximum score for pretest knowledge was 12.

Mean knowledge score in pretest was  $6.35\pm2.95$  and mean percentage of knowledge score in pre test was  $25.40\pm11.82$ .





Assessment of posttest knowledge score among parents regarding sarva Shiksha Abhiyan that 57 per cent of parents had very good knowledge score level and 43 per cent outstanding knowledge score level. Minimum score for knowledge in posttest was 16, and maximum score for knowledge in posttest was 24. Mean post-test knowledge score was 20.09±1.89 and average post-test knowledge score was 80.36±7.56 The pre-test and posttest awareness scores on Sarva Shiksha Abhiyan While, standard deviation and mean differential values are compared and the paired student evaluation is applied at 5 per cent meaning point. For n=100-1 i.e. 99 degrees of freedom the tabulated value was 1.98. The measured value 't' i.e. 37.44 Are significantly higher than the table value at a sense point of 5 percent for parents ' overall information score which is statistically appropriate. It is therefore interpreted statistically that the self-instruction module on parental awareness of Sarva Shiksha Abhiyan was successful. Thus the H1 is accepted.

#### DISCUSSION

Effectiveness of self-instructional module on knowledge

regarding sarva Shiksha Abhiyan among parent in slum area. The objective was to assess the level of knowledge regarding sarva Shiksha Abhiyan among parents. To evaluate the effectiveness of self instruction module regarding sarva Shiksha Abhiyan among parent in slum area. Find out the association between the demographical variable with the post test knowledge of sarva Shiksha Abhiyan among parent in slum area.

The study was reveals that the Sarva Shiksha Abhiyan programme aims to ensure elementary education for all including five years of primary education and eight years of schooling for all children. The Sarva Shiksha Abhiyan focuses on community ownership and the village education plans proposed in construction with Panchayati Raj Institutions (PRIs). The central focus in the implementation of the programme is community ownership and their participation in school related activities to bring more relevance in the field of primary education.

The study was undertaken to evaluate the various parameters of Sarva Shiksha Abhiyan (SSA) in district Shopian in Kashmir valley. The parameters were to study the number of primary schools opened under SSA in all educational zones of district Shopian, pupil teacher ratio, total enrollment, Midday meal scheme, total number of EGS centres, training facilities, infrastructure facilities in terms of Classrooms, Principals room, Staff-room, Benches, Mating, Black boards, Chairs etc. To assess the role of VEC's & to study the progression in enrollment in these schools, with effect from the implementation of the scheme (2002). The sample consisted of all the 204 SSA schools of district Shopian. Self constructed information blank and check list were used for the collection of data and percentage statistics was used for the analysis of data. The results of the study highlight that SSA has opened 204 schools upto June 2012 in all the 04 educational zones of district Shopian with total enrolment of 7106.

A total no. of 395 teachers have been appointed making over all pupil teacher ratio (PTR) of 1:17. There has been overall 79.2% progression in enrollment from 2002 to June 2012. Although government is painting a rosy picture on the implementation of centrally sponsored schemes but still a percentage of 55% & 64% of SSA schools of concerned district are without toilet & drinking water facility respectively. All the Education Guarantee Scheme (EGS) centres were elevated to normal SSA primary schools and majority of them are running in single The Sarva Shiksha Abhiyan, among other things, seeks to promote community participation in school education. The programme has completed its first phase of five years of implementation. This article evaluates the working of the school education management committee in a tribal area of East Godavari district of Andhra Pradesh. It shows that community participation in improving education is negligible and that members of the SEMCs have limited awareness of the SSA.

This survey was done on Sarva Shiksha Abhiyan schools

in Sahibganj district of Jharkhand reveals that the SSA, despite its emphasis on decentralization and inbuilt flexibilities, is not making much headway in a socially and economically differentiated setting. This reflects a perception of poor quality of the SSA and also a lack of understanding by the programme of social relations and structural constraints.

Acharya,Prasantakumar And Behera, Manoranjan (2004)-The end of November 2003, the progress on civil work and had been very slow especially due to late release of funds , inadequate monitoring and lack of district level convergence of SSA with other allied development schemes. But remarkable progress was made by Orissa primary education programme authority (OPERA) in organizing teachers training programme both at the state and the district level. Nearly 70% EGS (Education guarantee scheme) this is a remarkable achievement. The progress in the opening of alternative and innovative education centres (AIE) was very unsatisfactory.

## **CONCLUSION**

Pre test Knowledge regarding Sarva Shiksha Abhiyan among the parent was that 44% of parents had poor knowledge score, 45% had average knowledge score and 11% had good knowledge score. Assessment of post test knowledge score among parents regarding sarva Shiksha Abhiyan that 57 per cent of parents had very good knowledge score level and 43 per cent outstanding knowledge score level. Effectiveness of self instructional module has enhanced the knowledge regarding sarva Shiksha Abhiyan among parent in slum area. Hence the self instructional module is effective, appropriate and feasible it can be used in different setting to improve the knowledge of parents.

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## **Effectiveness of Roleplay on Knowledge Regarding Dyslexia Among the Parents of Preschooler**

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## ABSTRACT

Learning to read is extremely difficult for about 10% of children across cultures because they are affected by developmental dyslexia (DD). According to the dominant view, DD is considered an auditory-phonological processing deficit. (Gori and Facoetti, 2014)However, accumulating evidence from developmental and clinical vision science, suggests that the basic crossmodal letter-to-speech sound integration deficit in DD might arise from a mild atypical development of the magnocellulardorsal pathway which also contains the main fronto-parietal attentional network. Letters have to be precisely selected from irrelevant and cluttering letters by rapid orienting of visual attention before the correct letter-to-speech sound integration applies. Our aim is to review the literature supporting a possible role of perceptual learning (PL) in helping to solve the puzzle called DD(Gori-Facoetti-2013, no date). PL is defined as improvement of perceptual skills with practice. Based on the previous literature showing how PL is able to selectively change visual abilities, we here propose to use PL to improve the impaired visual functions characterizing DD and, in particular, the visual deficits that could be developmentally related to an early magnocellular-dorsal pathway and selective attention dysfunction. The crucial visual attention deficits that are causally linked to DD could be, indeed, strongly reduced by training the magnocellular-dorsal pathway with the PL, and learning to read for children with DD would not be any more such a difficult task. This new remediation approach - not involving any phonological or orthographic training - could be also used to develop new prevention programs for pre-reading children at DD risk. Effectiveness of roleplay knowledge regarding dyslexia among the parents of pre-schooler. A pre-experimental pre-test, post-test research design was used to conduct this study. Purposive sampling was the sampling method used to collect data from parents of pre-schoolers by providing structure multiple choice questionnaires. After collecting pre-test data, roleplay was done in front of parents of pre-schooler. Seven days were Assessment of knowledge based on criteria measurement (excellent, good, average, poor, very good). Post-test information was gathered after seven days from the day of learning intervention. Seven days was assigned after getting expert opinions as well as to give time for implication of knowledge through practice of knowledge regarding dyslexia. The mean pre-test knowledge score was 6.18 ± 1.26 and mean post-test knowledge score was 14.45 ± 2.99. There was a statistically significant improvement in the level of knowledge regarding dyslexia among parents of pre-schooler. There was a significant association of knowledge score in relation to age and education of pre-schoolers parents and age of pre-schoolers on roleplay regarding dyslexia. There was no significant association of knowledge score in relation to age, gender, education of parents of pre-schoolers. The study was effective because the post-test knowledge score improved than the pre-test knowledge score. So, the roleplay on dyslexia has proved to improve parents of preschoolers knowledge regarding dyslexia.

**KEY WORDS:** EFFECTIVENESS, ROLEPLAY .KNOWLEDGE, DEVELOPMENTAL DYSLEXIA ,PARENTS OF PRE-SCHOOLER.



#### **INTRODUCTION**

Learning to read is extremely difficult for about 10% of children across cultures because they are affected by developmental dyslexia (DD). According to the dominant view, DD is considered an auditory-phonological processing deficit. However, accumulating evidence from developmental and clinical vision science, suggests that



the basic cross-modal letter-to-speech sound integration deficit in DD might arise from a mild atypical development of the magnocellular-dorsal pathway which also contains the main fronto-parietal attentional network. Letters have to be precisely selected from irrelevant and cluttering letters by rapid orienting of visual attention before the correct letter-to-speech sound integration applies. Our aim is to review the literature supporting a possible role of perceptual learning (PL) in helping to solve the puzzle called DD.

PL is defined as improvement of perceptual skills with practice. Based on the previous literature showing how PL is able to selectively change visual abilities, we here propose to use PL to improve the impaired visual functions characterizing DD and, in particular, the visual deficits that could be developmentally related to an early magnocellular-dorsal pathway and selective attention dysfunction. The crucial visual attention deficits that are causally linked to DD could be, indeed, strongly reduced by training the magnocellular-dorsal pathway with the PL, and learning to read for children with DD would not be any more such a difficult task. This new remediation approach - not involving any phonological or orthographic training – could be also used to develop new prevention programs for pre-reading children at DD risk.

## MATERIAL AND METHODS

A pre-experimental pre-test, post-test research design was used in this interventional study The study was conducted during and the setting was selected in the yelakeli village after getting ethical permission (Ref. no: DMIMS(DU)/IEC/2020-21/152). By using non-probability convince sampling technique, 60 parents of pre-schoolers were selected based on the calculation.

 $n = Z2P.(1-P)^2$  $d^2$ 

where, z=level of significance at 5% i.e., 95% confidence interval=1.96, which is 1.96, P=prevalence of dyslexia=5%=0.05 d=Desire error of margin=6%=0.06 The sample size was calculated to include 60 variable.

The parents of preschooler were informed and explained about the objective of the study. The inclusion criteria were: (I) Pre-schooler child parents who can understand Marathi (ii) Pre-schooler child parents who are willing to participate in study. Demographic variables were collected in terms of age, gender, education. A structured questionnaire, Annexure 1 with 24 multiple choice questions was used. The sections were - (I) meaning and causes of dyslexia; (ii) types of dyslexia (iii) Diagnosis and management of dyslexia. Each correct answer carried one mark and total score was 24. The tool was validated by five experts from nursing department, The data collection process was planned to gather demographic information and the knowledge on dyslexia. The roleplay organized on (I) meaning and causes and risk factors dyslexia ; (ii) sign and symptoms and diagnosis of dyslexia (iii)

prevention and management of dyslexia. There was roleplay done in front of parents of preschooler in rural area and. The post-test structured questionnaire was administered after 7 days.

**Statistical Analysis:** The demographic data, collected in pre-test stage, analysis was done in terms of frequency and percentage. The paired t-test was used to compare pre and post test knowledge scores.

#### **RESULTS**

Table 1. Percentage wise distribution of Parents of Pre-schoolers according to their age(yrs.) n=60

Demographic Variables	No. of parents	Percentage (%)
Age(yrs.)		
20-25 yrs	23	38.3
26-30 yrs	26	43.3
31-35 yrs	9	15.0
≥36 yrs	2	3.3
Gender		
Male	21	35.0
Female	39	65.0
Residence		
Rural	60	100
Urban	0	0
Education		
Primary	6	10.0
Secondary	27	45.0
Higher Secondary	22	36.7
Graduate and above	5	8.3
Age of preschooler child		
3 yrs.	7	11.7
4 yrs.	14	23.3
5 yrs.	26	43.3
6 yrs.	13	21.7

Table	2.	Assessment	with	level	of	pre-test	knowledge.
n=60							

Level of pre-test	0 1	Level of Pre-test K	nowledge Score
knowledge	Score Kange	No of parents	Percentage
Poor	0-20% (0-4)	13	21.67
Average	21-40% (5-9)	47	78.33
Good	41-60% (10-14)	0	0
Very Good	61-80% (15-19)	0	0
Excellent	81-100% (20-24)	0	0
Minimu	im score	3	
Maximum score		10	
Mean knowledge score		$6.18 \pm 1.26$	
Mean % Knowledge Score		$24.73 \pm 5.07$	

The above table shows that 21.67% of the parents of pre-schoolers had poor level of knowledge score and 78.33% had average level of knowledge score. Minimum knowledge score in pre-test was 3 and maximum

knowledge score in pre-test was 10. Mean knowledge score in pre-test was  $6.18 \pm 1.26$  and mean percentage of knowledge score in pre-test was  $24.73 \pm 5.07$ . The above table shows that 28.33% of the parents of preschoolers had average level of knowledge score, 21.67%had goo and 50% had very good level of knowledge score. Minimum knowledge score in post-test was 8 and maximum knowledge score in post-test was 18.Mean knowledge score in post-test was 18.Mean knowledge score in post-test was  $14.45 \pm 2.99$  and mean percentage of knowledge score in post-test was  $57.80 \pm 11.97$ .



Table 3. Assessment with level of post-test knowledge n=60

Level of posttest	C	Level of Posttest K	nowledge Score
knowledge	Score Kange	No of parents	Percentage
Poor	0-20%(1-5)	0	0
Average	21-40%(6-10)	17	28.33
Good	41-60%(11-15)	13	21.67
Very Good	61-80%(16-20)	30	50
Excellent	81-100%(21-25)	0	0
Minimum score		8	
Maximum score		18	
Mean knowledge score		$14.45 \pm 2.99$	
Mean % Knowledge Score		57.80 ± 1	1.97

Table 4. Significance of difference between knowledge score in pre and post-test of parents of pre-schoolers n=60

Overall	Mean	SD	Mean Difference	t- value	p- value	
Pre-Test	6.18	1.26	8.26±3.15	20.32	0.0001 S, P<0.05	-
Post Test	14.45	2.99				

There was a significant association of knowledge score in relation to age and education of pre-schoolers parents and age of pre-schoolers on roleplay regarding dyslexia. There was no significant association of knowledge score in relation to age, gender, education of parents of preschoolers.



## DISCUSSION

The study findings are supported through the studies conducted worldwide. Acomparative study was conducted to investigate the incidence of dyslexia among young offenders in Kuwait. A total of 91 children 8 juvenile delinquent welfare centers across Kuwait were interviewed and tested.('3005262301232303UmaK.pdf', no date) A measure of non-verbal reasoning ability was used to exclude those with low general ability. The remaining 53 participants were tested on their ability to identify alliteration and rhyme, retain and manipulate sequences of digit and letter names, decode novel letter strings and identify words within letter chains. The results indicated that the percentage of individuals presenting evidence of dyslexia was much larger (greater than 20%) in this population of young offenders than would be expected based on the national average (around 6%) of dyslexics in Kuwait derived from a nationwide study. This study concluded that there is a previous evidence for an increased frequency of dyslexia among young offenders.

A study was conducted to determine the prevalence of psychological depression in children with Dyslexia in Auckland, New Zealand(Huc-Chabrolle et al., 2010). This study has precipitated the development of programs aimed at preventing the onset of depression. This review evaluates evidence for the effectiveness of these prevention programs. (no date)The determinants for inclusion were that the trial included a psychological and educational prevention programme for children aged 5 to 10 years- old who did not fall into the clinical range on standardized, validated, and reliable rating scales of depression.

The study concluded that although there is insufficient evidence to warrant the introduction of depression prevention programs currently, results to date indicate that further study would be worthwhile. There is a need to compare interventions with a placebo or some sort of active comparison so that study participants do not know whether they are in the intervention group or not, to investigate the impact of booster sessions, and to consider practical implementation of prevention programs.

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**Limitation:** The study was limited to rural area in wardha district.

## CONCLUSION

It can be concluded that knowledge on dyslexia improved after showing roleplay among parents of pre-schoolers.

Economic assistance and support: Nil.

#### Conflicts of Interest: Nil

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## Assess the Knowledge Regarding Food Poisoning Among Mother of Under Five Children

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#### ABSTRACT

An estimated 600 million almost 1 in 10 people in the world fall ill after eating contaminated food and 420 000 die every year, resulting in the loss of 33 million healthy life years (DALYs). Though most of the foods borne diseases are sporadic and often not reported in India, a nationwide study reported an alarming 13.2% prevalence at the household level. Result: The findings showed that 60% of mothers have heard about food poisoning. The mothers' knowledge about transmission of diseases by food was acceptable; 68.9% knew. When they were asked to detail the diseases, cholera was the most reported by about 84.4%, diarrhea 50%, and food poisoning 22.2% only. 1) to assess the knowledge regarding food poisoning among under five children mother. 2) To find out the association between selected demographic variables with knowledge score. A Descriptive research design was used to conduct this study. Non probability convenient sampling method was used to collect data from under five children mother on the basis of semi structured questioners. Sample size 50 under five mothers participates in study. Setting of the study selected area of Wardha district. The study shows that (2%) each under five mothers had very poor level of knowledge score, 60% had average level of knowledge score, 38% had good level of knowledge score. The minimum score was 6 and the maximum score was 18, the mean score was 11.86± 2.2983 with a mean percentage of knowledge was 39.53%. This study assessed the food poisoning knowledge among mothers in Wardha district. The information could be used as a starting point to design education and training programs that can further improve their knowledge and can be translated into better and safer food handling practices. Food safety efforts generally tend to focus on food supply chains and the household domain of food handling and practices gets limited attention.

KEY WORDS: FOOD SAFETY, FOOD POISONING, MOTHERS KNOWLEDGE, PLANNED TEACHING PROGRAMME.

### **INTRODUCTION**

#### **Prevention Is Better Than Cure**

Food is the most basic requirement of life. The food we eat is digested and assimilated by the body, and it is then used to maintain and grow it.Food also provides energy for doing work. Man has exhibited much thought and foresight in cultivating a variety of grains, fruits, vegetables, nuts and oilseeds and in rearing birds and animals for use as food. The implicated food vehicles were mostly of animal origin, in particular eggs and egg



products and pig meat (both accounting for 10% of all strong-evidence outbreaks), broiler meat (9%) and cheese (8%) followed by fish and fish products (7%), milk and dairy products (5%), bovine meat (4%) and crustaceans (3%).

Food poisoning (FP) refers to a group of illnesses that result from the ingestion of contaminated food that contains infectious organisms in recent decades, food poisoning has become a growing public health problem worldwide, in both developed and developing countries The incidence of food-borne illness depends on the hygienic measures implicated in food production and storage, but they could be ineffective if consumers have poor hygienic practices and food handling approaches.

**Need For The Study:** Although there are a limited number of studies on mothers' knowledge about food poisoning, the present study is unique in several ways



first, touching many populations whose prepare food second, the importance and effectiveness of preventive measures in our daily life to promote the health third, this research identifies key determinants of mothers' knowledge, rather than simply documenting what mothers should do. The findings have implications for increasing mothers' awareness and then the practices in their house surroundings. Knowledge, attitude and practice are key factors in reducing the incidence of food-borne diseases in foodservice areas6. They are also influenced by various factors like gender (females have a higher level of information than males), age (people younger than 35 years of age need extra food safety education), income level and cultural factors.

**Statement:** - Assess the knowledge regarding food poisoning among mother of under five children

### Aim:

- 1. To assess the knowledge regarding food poisoning among under five children mother.
- 2. To find out the association between selected demographic variables with knowledge score

### **Operational Definitions:**

**Effectiveness:** In this study, it refers to the extent to which the planned teaching programme has achieved the desired objectives for the under five mother regarding n prevention of food poisoning.

**Planned teaching programme:** In this study, it refers to a systematically developed teaching programme designed for the under five children mother with the help of LCD projector, charts and flash cards in order to provide information regarding meaning, definition, causes, complications, benefits and importance of prevention of food poisoning.

**Knowledge:** It is the correct response given by the under five mother to the items in the close ended questionnaire regarding food poisoning.

**Food poisoning:-** food poisoning also called food borne illness is illness caused by eating contaminated food. Infectious organisms including bacteria, viruses and parasites or their toxins are the most common causes of food poisoning.

**Mother:** A mother is a female parent of under five children in this study

**Under five children:-** Children who are less than five years old, especially those who are not in full-time education.

## MATERIAL AND METHODS

Research Approach: Survey Approach

**Research Design:** Descriptive research design

Setting of the Study: The study was conducted in arvi

naka Wardha and seloo

**Sample:** The sample for the present study comprises of 100 mothers of under-five mother of arvi naka Wardha and seloo.

**Sampling technique:** Non probability convenient sampling technique was used.

**Development of tool for data collection:** Developed the tool after their knowledge regarding food poisoning base on their experience and practical knowledge and guidance from the expert along with the review of literature which helped in developed the tool necessary for the study Structured questionnaire consist of two section part I consist of demographic variables of the mothers who participated in the study e.g. age, education, religion etc.

**Section B:-** Consist of 20 multiple choice types question on knowledge regarding food poisoning

**Part 1:-** dealt with the demographic data of the sample

**Part 2:-** Consisted of multiple choice questions constructed to assess the knowledge of the food poisoning among mothers of under five children. Total 20 items are included in the questionnaire.

#### Inclusion criteria:

- 1. Under five mothers who are willing to participate
- 2. Under five mothers who are available at the period of data collection
- 3. Under five mothers who are children age group of 5 year

#### **Exclusion criteria:**

- 1. Who had children over 6 years
- 2. Who had difficulty in communication

**Data collection procedure:** Collecting data form the parents; each questionnaire took 10–15 min to administer. Statements in the questionnaire were explained when necessary. A verbal consent form, explaining the purpose of the research and assuring confidentiality was read to participants. The participants had the right to participate or not. The data were collected on weekdays only. The collection process occurred from October to November 2017.

**Ethical consideration:** The Institutional ethical committee of An-Datta Meghe Institute of Medical Science, a Deemed to be University authorized all aspects of the study protocol before the initiation of the study and approval to conduct the study. Verbal and written consent was also obtained from all under five mothers before participation.

**Data statistical analysis:** All analyses were performed using SPSS statistics, version 20.0. Descriptive statistics were used to describe the sample. The responses were

analyzed as correct or incorrect answers. Each correct answer was given one point while each incorrect answer was given zero point.A correct answer indicated good knowledge, whereas an incorrect answer indicated poor knowledge.

**Findings:** The data is analyzed and presented under the following headings:

**Section A:** Description of demographic variables of mothers' age educational level, employment status, Number of under five children in the family.

Section B: Knowledge of mothers regarding food poisoning

Scoring

- Score 1was given for correct answer
- Score 0 was given for wrong answer

# Scoring procedure on knowledge regarding food poisoning

Section -A

Table 1. De five mothe	Table 1. Description of subject according to their demographic characteristics of the under- five mothers, and has been presented in the form of frequency and percentage.					
Sr. No.	Characteristics	Categories Frequency	Total (N=100)	Percentage (%)		
1	Age	21 to 25 year	21	21%		
		26 to 30 year	25	25%		
		30 year Above	54	54%		
2	Educational Status	Primary school				
		High secondary Under graduation Graduate and above	2	2%		
			4	4%		
			26	26%		
			68	68%		
3.	Occupation of mother	House wife	54	54%		
		Laborer	20	20%		
		Working women	18	26%		
	Source of information	T.V	39	39%		
		Social media	36	36%		
		Radio	5	5%		
		Internet	20	20%		
5	Number of under five	One	26	26%		
	children in the family	Two	68	68%		
		Three	04	04%		
		Four and above	02	02%		

Table 1.shows the demographic information of mothers who participated in the study. In the study group, 21% of mother were in the age group of years 21 to 25 year, 25% of them in the age group of 26 to 30 year of age and 54 % were in the 30 year of aboveage. Educational Status of the study group reveals that 2 %( 2) had Primary level education, 4 % (4) had High secondary education, 26 %( 26) had under graduation and 68 %( 68) had Graduate and above. Occupation status of mothers, 54 %( 54) mothers had house wife, 20 %( 20) mothers had Laborer, while 26 %( 18) had Working women.Distribution of subjects according to source of information that 39% of subject information from T.V, 36% source of information from radio, 20% source of information from radio, 20% source of information from radio.

#### Section -B

Table no.2: Pretest knowledge regarding food poisoningamong under five mothers

Level of knowledge score	Percentage score	Pre test Frequency Percentag (n=100)	
Poor	0-19	3	3.0%
Average	20-39	64	64.0%
Good	40-59	27	27.0%
Very good	60-79	6	6.0%
Excellent	≥80%	0	0.0%
Minimum score		3	
Maximum score		17	
Mean score		8.03±2.61	
Mean %		36.50±11.88	

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Assessment of knowledge regarding food poisoning among under five children mothers in selected area of wardha district: This section deals with the assessment of knowledge regarding food poisoning among under five children mothers in selected area of wardha district. The level of knowledge is divided under following heading of poor, average, good, very good, and excellent. The above table shows that 3(3%) of the under-five mothers from selected area of wardha district were having poor knowledge, 64% of them had average, 27%had good knowledge and 6% of them had very good level of knowledge score minimum knowledge score 3 and maximum was 17, the mean score for the pretest was  $8.03\pm2.61$  with a mean percentage score of  $36.50\pm11.88$ .

## DISCUSSION

This study was based on descriptive research design. In this study, 50under five mother. Inclusion Criteria: 1. under five mothers are willing to participate. 2. Under five mother who can read or write Marathi Exclusion Criteria 1) under five mothers who attend the training programme Development of tools: A structured questionnaire was used. Questionnaire method used to assess the knowledge regarding food poisoning among under five mothers it consists of two sections. Section I was consists of demographic characteristics regarding under five mothers. Section II was structured knowledge questionnaire the tool was established in consultation with guide and nine experts.

Suggestions of the experts were considered and changes were made accordingly. The reliability co-efficient was calculated. The Questionnaires is said to be reliable if the co-efficient is more than 0.8. The reliability co-efficient 'r' of the questionnaire was 0.86, which was more than 0.8. Hence the questionnaire was found to be reliable. The data were collected for period of approximately 20 days. Samples were selected by non-probability convenient samplings which were available during the study. Prior to collection of the data, permission was obtained from the authority persons. And the informed consent from the entire participants was taken before starting the study. Data was collected by using questionnaires. The investigator introduced her and obtained consent from under five mothers who were willing to participate. Purpose and important of research study was explained before collection of data.

This study was conducted in Yemen, Taiz, Sharaab.This was a descriptive study,the sampling type used was simple random sampling method; by using lottery to select 180 mothers which is the calculated sample size. The level of mothers' knowledge about food poisoning it was found that 60% of mothers have heard about food poisoning. Their knowledge about the diseases could be transmitted by food was acceptable, 68.9% mentioned they know. When they were asked to detail the diseases, cholera was the most re-ported by about 84.4%, diarrhea 50%, and food poisoning 22.2% only. The preventive measures mentioned include: hand washing by 37.2%,

washing vegetables by 31.1% and appropriate cooking by 23.9%. Regarding the mothers' knowledge about causes of food poisoning, about 65.5% of them mentioned contaminated food, 49.4% mentioned contaminated hands while 37.2% of them mentioned contaminated utensils. The total knowledge was calculated; it was about 40.72%.

**Nursing Implication:** The finding of this has definitive implication in nursing practice, nursing education, nursing administration.

**Nursing Practice:** Nurses should enhance their professional knowledge. The finding of the study can be used to bring about the awareness among the under five children regarding food poisoning can be useful for the future generation in the improvement of knowledge.

**Nursing Services:** The most important role of nurse is to provide awareness to the food poisoning among under five children. This study will help the nurse for promotion of health physical and mental, it also help the nurses to keep update knowledge regarding food poisoning.

### **CONCLUSION**

This study assessed the food poisoning knowledge among mothers in Wardha district .The information could be used as a starting point to design education and training programs that can further improve their knowledge and can be translated into better and safer food handling practices. Food safety efforts generally tend to focus on food supply chains and the household domain of food handling and practices gets limited attention. Food handlers in households need effective and methodical education and training to safeguard themselves and their families from getting food-borne illnesses. It is, therefore, recommended that authorities, researchers, educators, media, and food safety communicators should initiate education programs, with special focus on the high-risk groups like mothers and food handlers at home to advance the food safety knowledge and safer food practices.

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## Assess the Knowledge Regarding Effect and Side Effect of Folic Acid and Ferrous Sulphate Among Anemic Women

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## ABSTRACT

Folic acid and ferrous sulphate are prescription drugs used to treat anemia caused by a deficiency in iron or folic acid. Anemia is caused by an iron deficiency, which is the most common cause of anemia in the globe. Usually women living in villages and rural area do not have knowledge regarding iron and folic acid supplements. To minimize the danger of iron deficiency in the blood, ferrous and folic acid supplements are utilized. Iron is necessary for the body's red blood cell synthesis as well as overall health. Ones who consume oral iron develop black stools, abdominal cramps, and epigastria discomfort, which have no clinical significance but can mask the diagnosis of continued gastrointestinal blood loss. Objectives Of The Studies: 1.To assess the existing knowledge regarding effect and side effect of folic acid and ferrous sulphate among the anemic women 2. To associate knowledge regarding side effect of folic acid and ferrous sulphate among the anemic women with demographic variables This study was carried out using a descriptive research approach. The data from anemic women was collected using a non-probability - convenient sampling techniques was used. The data was gathered using a structured questionnaire. 80 anemic women are selected to conduct the study from selected hospital in Wardha district. 85 % of anemic women had an average level of knowledge, 15% of respondents had a Good level of knowledge, and 0 % of respondents had a poor or excellent level of understanding regarding the effects and adverse effects of folic acid and ferrous sulphate in anemic women. The study shows that the knowledge of the anemic women regarding folic acid and ferrous sulphate is average in most of the anemic women. Women need daily iron because they lose blood each month during their period. But some women have allergies to these supplements can cause various side effect by taking the supplements.

**KEY WORDS:** FERROUS SULPHATE, FOLIC ACID, ANEMIC WOMEN.

## **INTRODUCTION**

Folic acid and ferrous sulphate are prescription drugs used to treat anemia caused by a deficiency in iron or folic acid. Anemia is caused by an iron deficiency, which is the most common cause of anemia in the globe.. Usually women living in villages and rural area do not have knowledge regarding iron and folic acid supplements. To minimize the danger of iron deficiency in the blood, ferrous and folic acid supplements are utilized (such as those caused by anemia or pregnancy).



Iron is necessary for the body's red blood cell synthesis as well as overall health. Ones who consume oral iron develop black stools, abdominal cramps, and epigastria discomfort, which have no clinical significance but can mask the diagnosis of continued gastrointestinal blood loss .Iron is a necessary component for the production of hemoglobin in erythrocytes, and a shortage can result in anemia. Anemia affects an estimated 1.62 billion individuals (24.8%) of the global population, including half a billion women of reproductive age. Preschool-aged children have the highest frequency (47.4%), while males have the lowest prevalence (12.7%), accounting for 25 percent of the global population.

Iron and folic acid deficiency anemia affects 46, 49, 39, and 25% of pregnant women in Africa, Southeast Asia, the mediterranean Region, and the United States, respectively. Anemia is common among women who are expecting in South Africa, with a prevalence rate of 7-29



percent In India, iron deficiency anemia in women is a serious public health concern. According to data from three waves of the National Family Health Survey, iron deficiency anemia among women aged 15 to 49 years in India decreased by just 3.5 percent over the period (from 56.5 percent in 2005-2006 to 53.0 percent in 2015-2016). Iron-deficiency anemia increased in eight of the 27 states studied during the same time period: Delhi, Haryana, Himachal Pradesh, Kerala, Meghalaya, Tamil Nadu, Punjab, and Uttar Pradesh; Furthermore, several of these states (for example, Kerala) have failed to control the burden of iron deficiency anemia while having one of the highest state Human Development Index scores. According to the National Family Health Survey, in India, the occurrence of anemia among pregnant women has dropped from 57.9% to 50.3 percent. However, only 15% of women took iron and folic acid (IFA) supplements for the first 100 days of pregnancy throughout that decade(Rk et al., 2018).

## MATERIAL AND METHODS

This study was conducted using a quasi-experimental research. To obtain data, a non-probability – convenient sampling approach was employed, and 80 anemic women from the hospital were chosen. After the ethical permission (Ref. no: DMIMS (DU)/IEC/2020-21/151).

**Methods of data collection:** For the present study the validated tool was used structured questionnaire. The tool was in English and Marathi local language. Structured knowledge questionnaire contained 20 multiple choice questions. Data was collected within 02 weeks by group members data collection was followed by knowledge. Permission from the concerned authorities is taken The tool content validity of this was done by various from different fields. Suggestion The proposed tool was incorporated, and appropriate modifications were made analysis was done by Intra class correlation. The data in selected hospital of Wardha and obtained the necessary. Permission from the concerned authorities of the hospital.

## RESULTS

This section discusses the percentage-wise distribution of anemic women by demographic variables. From the study population, an appropriate sample of 80 patients was recruited from designated hospitals. Age, residence, family type, education, occupation, marital status, income, and knowledge and source of information about folic acid and ferrous sulphate were all used to describe the sample's characteristics. This section assesses the level of awareness of anemic women in a selected hospital on the effects and side effects of folic acid and ferrous sulphate. The following categories are used to categories the level of knowledge: poor, average, good, and excellent. According to the table above, 85% of anemic women had an average degree of knowledge, while 15% had a good knowledge. The minimum and highest knowledge scores were 6 and 14, respectively. The average knowledge score was 9.081.67, and the average knowledge score percentage was 45.438.38.

Table 1. Anemic Women are distributed in percentagesbased on their demographic traits n=80				
Demographic Variables	No. of anemic women	Percentage (%)		
Age(yrs)				
18-23 yrs	28	35.0		
24-29 yrs	18	22.5		
30-35 yrs	19	23.8		
>35 yrs	15	18.8		
Residence				
Urban	39	48.8		
Rural	41	51.3		
Type of family				
Nuclear	38	47.5		
Joint	19	23.8		
Extended	23	28.8		
Educational Status				
Primary	26	32.5		
Secondary	21	26.3		
Graduate	19	23.8		
PG and above	14	17.5		
Occupation				
Homemaker	37	46.3		
Labour	18	22.5		
Govt/Pvt Job	18	22.5		
Business	7	8.8		
Marital Status				
Married	47	58.8		
Unmarried	30	37.5		
Widow	3	3.8		
Monthly family income(Rs)				
5000-10000 Rs	11	13.8		
10001-15000 Rs	25	31.3		
15001-20000 Rs	27	33.8		
>20000 Rs	17	21.3		
Knowledge about folic acid				
and ferrous sulphate				
Yes	37	46.3		
No	43	53.8		
Source of knowledge				
Friends	18	22.5		
Social Media	16	20.0		
Books	21	26.3		
Health Worker	25	31.3		

## DISCUSSION

The study's findings were addressed in relation to the objectives. The goal of this study was to see how much anemic women knew about the effects and adverse effects of folic acid and ferrous sulphate. Data was collected from 80 anaemic women in this study, which was done at a specified hospital in Wardha city and subjects were chosen using a purposive selection approach. The structural knowledge questionnaire was used to collect data. According to the findings, 85 percent of anaemic women had an average level of knowledge, 15% had a Good level of knowledge, and 0% had a bad or outstanding level of knowledge regarding the benefit and side effects of folic acid and ferrous sulphate in anaemic women.

Level of knowledge score	Score Range	Level of Knowledge Score	
		No of anemic women	Percentage
Poor	0-25%(1-5)	0	0
Average	26-50%(6-10)	68	85
Good	51-75%(11-15)	12	15
Excellent	76-100%(16-20)	0	0
Minimum score		6	
Maximum score		14	
Mean knowledge score		9.08±1.67	
Mean % Knowledge Score		45.43±8.38	



Pregnant women in Nepal have a high rate of iron deficiency anemia and poor adherence to iron and folic acid therapy. The purpose of this study was to see how effectively pregnant and postnatal women in Kathmandu understood and used iron and folic acid supplementation. A descriptive cross-sectional study approach was utilized in this investigation. With a sample size of 103, the data was obtained using a purposive sampling technique. All pregnant women who were more than 7 months pregnant and postnatal women who were less than 6 months pregnant were included in the study. Data was collected using a self-administered questionnaire. More over half of the respondents (51.5%) were between the ages of 21 and 30. The respondents' average age was 30.58. There are 43 expectant moms (42%) and 60 postnatal mothers (58%) among those who responded. Sixty-five percent of respondents said that pregnant and postnatal women must take folic and iron tablets. Iron and folic acid consumption will prevent anemia, according to nearly sixty-nine percent of responders (57.3 percent). SPSS version 20 was used to analyse all of the collected data.

The participants' knowledge of iron and folic acid supplements was found to be adequate in 85.6 percent (88) of the cases. The data revealed that 78.6 percent (81) of the respondents followed the Nepal government's iron and folic acid guidelines, which required them to consume at least 180 tablets before giving birth. In comparison to the national status of 42 percent, the degree of knowledge and compliance rate of iron and folic acid supplements in Kathmandu is good, according to the Nepal Demographic Health Survey 2016. Iron and folic acid tablet knowledge is unrelated to compliance with iron and folic acid tablets. Compliance is the primary factor for responders' that they received adequate advice from a health worker, whereas the main reason for noncompliance is that they forgot to bring their tablet.

As a result, enhancing knowledge alone will not increase compliance; other factors such as counselling, Iron and folic acid pills are easily accessible and available, pill side effects, and family support all have an impact on iron and folic acid supplements compliance. All pregnant and postnatal women were aware with iron and folic acid supplementation treatments, had appropriate knowledge, and were mostly compliant with iron and folic acid supplementation, suggesting that compliance and knowledge levels in Kathmandu are satisfactory. Green leafy vegetables, pulses, legumes, and animal products were the most common sources of iron-rich diets, whereas iron-fortified meals were less common(Rai et al., 2016).

Folic acid (FA) supplementation is a critical intervention for avoiding nutritional deficits throughout maternity, and it has long-term consequences for both the mother and the infant. Nutritional insufficiency is caused by insufficient food consumption, which necessitates supplementation. FA is a necessary vitamin for a healthy pregnancy. Previous research has shown that pregnant women who are aware of the benefits of FA supplementation but do not take it while pregnant are more likely to experience problems with their babies. The purpose of this study was to examine Saudi maternity female's awareness and knowledge of FA supplementation, as well as to compare the results to prior Saudi community studies. We utilized a questionnaire to identify 406 Saudi expectant mothers between the ages of 18 and 65 who were subsequently tested for FA supplements usage during their pregnancy. Pregnant women who were involved completed a questionnaire and signed a permission form.

According to the findings, 38 percent of women between the ages of 31 and 40 became pregnant. Almost 96 percent of pregnant women are aware that they should take folic acid supplements throughout their pregnancy, and 5.9% of women have a history of not taking folic acid supplements and having defective children. According to the present study's questionnaire survey, the benefits of taking FA supplements are known by 55.7 percent of expectant mothers. In previous pregnancies,, over 89 percent of women utilized FA. Saudi pregnant women are well-informed and aware of the benefits of taking

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a prenatal vitamin. Limited efforts should be made across the country at all hospitals and clinics to raise maternal nutrition knowledge during pregnancy. To gain a perspective in Saudi Arabia, nutritional counseling should be performed in rural regions(AlDuraibi & Al-Mutawa, 2020)

#### **Recommendation:**

Based on the findings of the study, it is suggested that the following research be carried out.

- 1. To examine the existing knowledge of folic acid and ferrous sulphate, a comparable study may be done in both urban and rural areas.
- 2. This study can be conducted on large scale
- 3. This study can be done on urban area
- 4. This research can be carried out to examine public perceptions about folic acid and ferrous sulphate supplementation.

## CONCLUSION

Women need daily iron because they lose blood each month during their period. But some women have allergies to these supplements can cause various side effect by taking the supplements. It is important that the women who are taking these supplements have the knowledge regarding these supplements. The primary goal of the study was to examine anaemic women's awareness of the effects and side effects of folic acid and ferrous sulphate.

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## Protocol on Development of Comprehensive Menstrual Symptoms Scale for Grading the Menstrual Problems Among Adolescent Girls

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### ABSTRACT

The adolescent girls face a gamut of problems of which the menstrual problems are the most common. Because menstrual problems are subtle, the problems often are unreported. The objective of this study was to estimate the prevalence of menstrual problems, namely dysmenorrhea, menorrhagia, and irregular menstrual cycles. The menstrual problems form an important domain of adolescent health and because these problems go unreported, it is necessary that adequate attention and care is provided. On this focusing group the more researches are needed to measure menstrual symptom experienced by women of variable ages. Present research focus on experiences of adolescents during menstruation and also focus the early problems finding To develop the comprehensivemenstrual symptoms scale and grading the menstrual problems of adolescent girlsin schools (mild, moderate, severe) In this study used the quantitative research approach used the developmental research design(cross-sectional, correlatinal, Interventional design) and using non-randomized purposive sampling techniques on 100 adolescent girls of 10-16 years of age from school of Wardha . Grading scale will be used for assessing the pre-menstrual and menstrual problems. Then the correlation will be done among the problems of pre-menstrual and menstrual. Ethical approval was obtained by IEC, DMINSU(DU)/IEC/2020-21/8981. The study result will be concluded from the result and data will be disseminated in peer-review publication. Comprehensive menstrual symptoms scale on the basis of twelve factors will be develop and validate and used for the data collection for piloting. The study result will be concluded that find out the menstrual problems on the basis of grading scale and referred for the treatment to resolve the upcoming menstrual problems of adolescent girls and maintain the good reproductive health.

**KEY WORDS:** ADOLESCENT GIRLS, COMPREHENSIVE, MENSTRUAL SYMPTOMS SCALE.

## **INTRODUCTION**

Adolescence is a transition period from childhood to adulthood and is characterized by a spurt in physical, endocrinal, emotional, and mental growth, with a change from complete dependence to relative independence. The period of adolescence for a girl is a period of physical and psychological preparation for safe motherhood. As the direct reproducers of future generations, the health of adolescent girls influences not only their own health, but also the health of the future population. Almost a



quarter of India's population comprises of girls below 20 years.

One of the major physiological changes that take place in adolescent girls is the onset of menarche, which is often associated with problems of irregular menstruation, excessive bleeding, and dysmenorrhea. Of these, dysmenorrhea is one of the common problems experienced by many adolescent girls.

Exact origin of the word dysmenorrhoea is not known, but it has been mentioned in the ancient literature worldwide1 Vivid description and social stigma associated with menstruation related mood and behavioural changes date back to Hippocrates, the Talmud and the Bible. In spite of the fact of existence of painful menstruation in ancient literature, it was only in the last half of past century when dysmenorrheal has been accorded impartial scientific evaluation.



Disorders in cycles or its irregularities are a major gynecological problem among female adults especially adolescent and a major source of anxiety to them and their family. Studies have shown that a large proportion of the female population of reproductive age suffers from menstruationrelated health issues. Abnormal menstrual cycle is any deviation from the normal cycle.

**Rational:** The World Health Organization (WHO) has defined adolescence as the age group of 10-19 years. Adolescents in India comprise 19.3% of the total Indian population. This period is marked by the onset of menarche.Disorders in cycles or its irregularities are a major gynecological problem among female adults especially adolescent.The most prevalent menstrual problems (Dysmenorrhea and premenstrual symptoms) in the target population. Only 48% of the adolescent girls population in India are aware about menstruation prior to the first period.The Comprehensive research tools not used in research study for evaluation of menstrual problems

**Aim:** The aim of the study is to develop the comprehensive menstrual symptoms scale and grading the menstrual problems of adolescent girlsin schools (mild, moderate, and severe).

**Objectives:** To develop the comprehensive menstrual symptoms scale for grading the menstrual problems among the adolescent girls.

## **METHODOLOGY**

Quantitative research approach and the developmental research design(cross-sectional, correlational, Interventional design) used and using non-randomized purposive sampling techniques on 100 adolescent girls of 10-16 years of age from school of Wardha .material will be used for data collection in this study is comprehensive menstrual symptoms scale as a tool. Scoring of menstrual symptoms scale on the basis of six factors Negative affection, Changes of activity level Physical symptoms. Mood changes.Changes in concentration level. Body water retention. The scale being ferther modified and added the more factors such as PBAC pictorial blood assessment chart.Dysmenorrhea, Menorrgea,Premenstrual dysphonic disorder (PMDD)on the basis of 0,1,2,3,4 scoring.

Modified Comprehensive Menstrual Symptoms Scale: The Modified Comprehensive menstrual symptoms scale developed to assess and identify the menstrual problems in premenstrual and menstrual symptoms. The assessment program starts with basic instructions giving details of how to use the scale and grading the symptoms. The following symptoms leading to a comprehensive yet quick menstrual problems assessment and grading .focusing sequentially on the following symptoms or problems. The part on history has twelve factors.

- 1. Premenstrual syndrome (PMS).
- 2. Menstrual symptoms

- 3. Negative affection,
- 4. Changes of activity level
- 5. Physical symptoms
- 6. Mood changes
- 7. Changes in concentration level
- 8. Body water retention
- 9. PBAC pictorial blood assessment chart.
- 10. DYSMENORRHEA
- 11. MENORRGEA.
- 12. Premenstrual dysphonic disorder (PMDD).

**Focus Group Discussion For Social And Cultural Acceptability:** As a part of translation process a focus group discussion was arranged in the teaching area of the schools.Among the 10 adolescent girls.

**Inclusion And Exclusion Criteria:** Who are fulfill the age criteria .Those girls are with premenstrual syndrome and menstrual irregularity

**Sample Size:** Based on the available literature of related researches Formula for difference between two proportion is used

n=4pq  $L^{2} \text{ Where, P=63.3\% -Cumulative percent of variance}$  q=100-p=100-63.3=36.7, L= Allowable error =10% of  $p=\underline{10^{*}63.3}, 100$  =6.33  $n=\underline{4^{*}63.3^{*}36.7}$   $6.33^{2}$ Study Outcomes - =92.92 N=100 adolescent girls

Primary outcome –Develop, evaluate, Assess and Grading the symptoms scale – mild, moderate ,severe.

Secondary outcome- Mild and Moderate cases will be received the nursing intervention and severe cases will be referred to the obstetrics opinion for treatment and managing the symptoms of adolescent girls.

Data Management And Monitoring: In Comprehensive menstrual scale consist of demographic variables including the following factors, Premenstrual syndrome (PMS). Menstrual symptoms Negative affection, Changes of activity level Physical symptoms .Mood changes. Changes in concentration level.Body water retention .PBAC pictorial blood assessment chart. Dysmenorrhea. Menorrgea.Premenstrual dysphonic disorder (PMDD). Using the CMSS in premenstrual and menstrual symptoms in three consecutive months of menstrual period .Then according to the grading of mild, moderate and severe assessing the girls. mild ,moderate symptoms girls provide the nursing intervention and severe grade symptoms referred to the obstetrics opinion for further treatment. Fig. no. 1
**Ethical and Dissemination:** IEC,DMINSU(DU)/IEC/2020-21/8981. The study result will be concluded from the result and data will be disseminated in peer-review publication.

# CONCLUSION

parametric tests used.

The study result will be concluded that find out the menstrual problems on the basis of grading scale and referred for the treatment to resolve the upcoming menstrual problems of adolescent girls and maintain the good reproductive health. This scale will be used in future to find out the menstrual problems of adolescents girls in schools by the teachers also.

#### Conflict of interest: Nil

Financial support: Self

Schematic Diagram To Development Of Scale -Fig. No. 1

FT- Investigator Compilation of menstrual symptoms scale material from original scale Focus group discussion

Modified all scale with added new factors

Grading the scale(0,1,2, 3, 4)

Discussed with opinion by expertise

Compilation and modified with new scale

Grading the scale (mild\_moderate.severe)

Compared in premenstrual and menstrual symptoms

Compilation of symptoms scale with grading and final scale develop Further for validation

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Dysmenorrhea among higher secondary schoolgirls of Imphal West district, Manipur: A crosssectionastudyKSathish Kumar, ShantibalaKonjengbam, HanjabamSanayaima Devi Department of Community Medicine, Regional Institute of Medical Sciences, Imphal, Manipur, IndiaYear : 2016 | Volume : 30 | Issue : 1 | Page : 38-43

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# Assess Teaching Skill with the use of Microteaching Tool among Post Graduate Nursing Students

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#### ABSTRACT

Teaching is a process which facilitates learning by encouraging learners to think. Feel and do. Teaching skill can be defined as teacher behaviors which are specially effective in bringing about desired changes in students. Teaching is an interactive process which taken place between teacher and students to influence each other. Teaching is a task of a teacher who not only improves information but also motivates, guides, helping and encourages students to learn. Objectives: 1) Sensitization of 1st year nursing post graduate students towards microteaching teaching. 2)To evaluate the teaching skill of nursing post graduate students through micro-teaching approach. Methods and Materials: Cross sectional descriptive research design was used. Twenty post graduate MSc 1st year nursing students were selected by non probability purposive sampling technique. Standardized evaluation format of microteaching was used to assess teaching skill. Findings shows that (0%) had poor level of teaching skill, (12%) had average level of teaching skill, (48%) had good level of teaching skill and (20%) had very good level of teaching skill and no one had excellent level of teaching skill. The minimum score was 10 and the maximum score was 19.5, the mean score for the test was 14.50  $\pm$  2.57 and mean percentage of teaching skill 58%. Microteaching is a teaching technique that helps the budding teachers to improve their teaching skill. Microteaching helps the trainee teachers to improve their confidence level, communication and self confidence.

**KEY WORDS:** TEACHING SKILL, MICROTEACHING, TEACHING, TECHNIQUE.

## **INTRODUCTION**

Teaching is a process which facilitates learning by encouraging learners to think. Feel and do. ("JAYPEE BROTHERS: Book Details," n.d.) The teacher should create such a environment that student should be eager to attend the class. Teacher responsibility is to teach the students in a simple language so the learning becomes easy for them. Teacher should have to give examples that shold be based on real life situations and they can apply their knowledge. Teaching is an interactive process which taken place between teacher and students to influence each other. ("How to teach?," n.d.) Teaching is a task of a teacher who not only improves information but also motivates, guides, helping and encourages students to learn. Is both science and art, SCIENCE as it based on psychological



research that identifies cause and effect relationship between teaching and learning, ART, as it shows how those relationships are implemented in successful and artistic teaching. (Rimm-Kaufman et al., n.d.). Teaching skill can be defined as a teacher behaviors which are specially effective in bringing about desired changes in students.("Learning and Teaching Nursing (Fourth Edition) by B. Sankaranarayanan,B. Sindhu," n.d.).

The aim of teaching skills as a method is to supply a clear, practical form of guide to those efficient teaching skills/ platform skills which most of the teachers acquire only through years of experience.(Basavanthappa, 2009) Becoming a better teacher is something all educators should be concerned with. Good teachers are effective classroom managers and communicators who can adapt to a variety of learning styles and effectively instruct a large percentage of the class. Improvement of teaching in the classroom can be obtained by putting together a plan of action and following it through. Teachers who make the extra effort to improve their teaching can make a significant impact on the lives of students.("how to improve teaching and learning in the classroom," 2020).



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It teaches students how to give and receive constructive feedback and provides to better understand the content of education lessons. One more benefit to microteaching is that new staff have an opportunity to better understand the content they are expected to teach.("Outdoor Education School Science Camps California," 2013) In microteaching the trainee teacher get the chance to improve teaching skill. They will do their presentation by using microteaching technique of teaching in peer classroom. After completion the class student will get feedback it will help to know their mistakes they done in teaching. Constructive feedback helps to students to improve to improve their skill. Practice makes the person perfect.

# **METHODOLOGY**

Cross sectional descriptive research design was used in this study. The study was conducted in Smt. Radhikabai Meghe Memorial College of Nursing in Sawangi Meghe, Wardha. The population of the study was, 1st year MSc nursing students and the sample size was 20. The sampling technique used was non-probability purposive sampling technique. First topic were given to all twenty students for preparation of microteaching before two days of presentation. All 20 students had taken the class on peer group and during presentation their teaching skill was assessed by using microteaching evaluation format. Feedback was given to each student from peer and from teacher regarding their presentation skill. The study was approved by the institutional ethical committee DMIMS(DU)/IEC/2018-19/7219 and the study was conducted in accordance with the ethical guidelines prescribed by central ethics committee on human research.

### RESULTS

All students teaching skill was assessed by using microteaching evaluation format. The above table shows that (0%) had poor level of teaching skill, (12%) had average level of teaching skill, (48%) had good level of teaching skill and (20%) had very good level of teaching skill and no one had excellent level of teaching skill. The minimum score was 10 and the maximum score was 19.5, the mean score for the test was 14.50  $\pm$  2.57 and mean percentage of teaching skill 58%.

Level of teaching skill	Score Range	Percentage score -	Teaching skill score	
			Frequency	Percentage
Poor	1-5	0-20%	(a.)	
Average	6-10	21-40%	3	12%
Good	11-15	41-60%	12	48%
Very Good	16-20	61-80%	5	20%
Excellent	21-25	81-100%		-
Minimum			10	
Maximum			19.5	
Mean $\pm$ SD			$14.50 \pm 2.57$	
Mean Percentage Score			58%	





# DISCUSSION

In this study the participants were evaluated on their microteaching evaluation format. They were evaluated by using microteaching evaluation format by the researcher. They get immediate feedback from the peers and researcher also. Feedback was given according to evaluation format of their presentation. Particular points were evaluated like content of presentation, face to face contact, positive reinforcement, participation of students and clarification of doubts. They accepted where they are lacking in teaching skill. On evaluation researcher found that some students were lacking in confidence, there was no group participation between the sessions. Some students did not complete within time limit. Some students were unable to maintain eye to eye contact with the class. A longitudinal study conducted by Vishal Indurkar to inculcate teaching skills and teaching behaviors in Post Graduate students to develop the interest in teaching of PG students. Total eight 1st year Post Graduate students were selected for this study. These students performed their teaching skill. Study completed in two sessions. Result shows that overall average percentage of was improved from 42% in session I to 59% in session II, observations were statically significant p=0.000 (Paired 't' test).("(PDF) MICROTEACHING -A TOOL USED TO IMPROVE TEACHING SKILLS AND

TEACHING BEHAVIOR IN POST GRADUATE STUDENTS | Editor International Journal of Clinical and Biomedical Resaerch (IJCBR) - Academia.edu," n.d.).

Feedback from the peer was that they did not follow the rule for power point presentation. Spelling mistake was there. Mannerism was not good. Need to improve vocabulary. So here microteaching helps them to improve their teaching skill. Whatever feedback they got from peer and teacher they can show improvement in their lacking areas. According to Syed Sadat Ali, Rakesh Mittal microteaching also provides skilled supervision with an opportunity to get a constructive feedback to improve the content and methods of teaching.("Indian Journals," n.d.).

Findings of this study is match with another study done by Edwin G. Ralph this study has confirmed earlier research findings regarding the benefits of the microteaching technique in assisting individuals to develop their professional competence and confidence The aim of this study was to examine teacher-candidates perspectives on the effectiveness of microteaching as a method to help them acquire instructional skills, prior to their placement in the 16-week extended practicum (internship) program in pre-K to grade 12 schools. The study finding shows that these new budding teachers get help from microteaching a teaching tool to improve their teaching. (Ralph, n.d.).

## CONCLUSION

The present cross sectional descriptive study done to assess the teaching skill of post graduate nursing students. Findings show that microteaching helps the student teacher to improve teaching skill of post graduate nursing students. It helps to raise their confidence level. It helps how to use AV aids during class presentation. Feedback from the peer group helps them for motivation. Feedback helps them to improve their lacking areas improve their teaching ability. Microteaching is a teaching tool it can be implemented for improving teaching skill and it can be used by all the trainee teachers.

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