

The Impact of History of Diabetes Mellitus at Baseline on Incident of Ischemic Stroke in Central India

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ABSTRACT

It was known as “madhumeha” (honey urine) by Indian physicians because it attracted ants. Specific diets such as the oat-cure, the milk diet, the rice cure, and overfeeding to compensate for fluid and weight loss were the only treatments for diabetes in the early 1900s. However, with no real medical attention, a 10-year-old with diabetes had a one-year life expectancy. High Blood Pressure, diabetes, smoking and dyslipidaemia are all major risk factors for stroke. Diabetes has long been known as a risk factor for stroke. Due to some pathologic changes in blood vessels in several places, and if the arteries of the brain are directly affected, it can lead to strokes.

KEY WORDS: MADHUMEHA, STROKE, DIABETES, T2DM AND INSULIN.

INTRODUCTION

T2DM is a common condition in which its prevalence is predicted to double by 2030 (Zimmet P et al., 2020). In India, diabetes has now been diagnosed in more than 30 million people. CPR (Crude Prevalence Rate) in Indian cities is estimated to be about 9%. The incident is estimated at 3% of the total population in rural areas. The incidence of diabetes increases with age, rising between the ages of 55 and 74. 66.7% of 55- to 74-year-olds have diabetes and another 36.85% have diabetes, resulting in diabetes and diabetes with 29.9% and 36.85 percent, respectively. A person diagnosed with type 2 diabetes currently has an incidence of 14.9 years (males) and 17.0 years (ladies), and a reduction of 7.3 years (males) and 9.5 years (ladies) over a lifetime (Cowie CC et al., 1988). Obesity and moderate obesity range from 11.8 percent to 31.3 percent and 16.9 percent to 36.3 percent,

respectively, according to a 2015 ICMR-INDIAB study (Stein CJ et al., 2004). The incidence of obesity was also higher for adults over the age of 55, with 76.5 percent men and 72.5 percent women being overweight or obese (Flegal KM et al., 2012).

High BP, diabetes, smoking and dyslipidaemia are all major risk factors for stroke. Diabetes has long been known as a risk factor for stroke. It can cause pathologic changes in blood vessels in several places, and if the arteries of the brain are directly affected, it can lead to strokes. In addition, patients with uncontrolled glucose levels have a higher mortality rate and side effects after stroke. In Phase III clinical trials, it will be investigated whether strong hyperglycemia control is associated with better results in the acute phase of the stroke. Managing diabetes and other risk factors is an important way to avoid physical and frequent strokes.

Diabetes is a major risk factor for stroke and heart disease, among other things (CVD). Diabetes was estimated to affect 415 million people worldwide in 2015, with diabetes accounting for 12% of global spending (US \$ 673 billion). In recent years, a steady increase in type 2 diabetes (T2DM) linked to unhealthy eating habits, obesity, and malnutrition has resulted in unprecedented growth of

Biosc Biotech Res Comm P-ISSN: 0974-6455 E-ISSN: 2321-4007



Identifiers and Pagination

Year: 2021 Vol: 14 No (7) Special Issue

Pages: 108-112

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DOI: <http://dx.doi.org/10.21786/bbrc/14.7.26>

Article Information

Received: 18th April 2021

Accepted after revision: 06th June 2021

diabetes-related heart disease worldwide. The trend is expected to accelerate as research, technology and health care services extend the life span of people. It has previously been advised that atherothrombotic infarction (ATI) and lacunar infarction (LI) may be two different components of ischemic stroke with different sets of related risk factors, and ATI is more closely associated with atherogenic risk factors than LI (Ohira, E 2006). In addition, the risk factors for both ischemic stroke subtypes are less well known. In T2D and non-diabetic patients, however, a decrease in insulin sensitivity (IS) was observed in both ATI and LI, which was often associated with compensatory hyperinsulinemia (K. Matsumoto et al., 1999).

Obesity is a major cause of many non-communicable diseases such as heart disease, T2DM, obesity, heart disease, and certain types of cancer. In addition, it leads to a variety of psychological and physical problems. According to the WHO, obesity and high blood pressure cause up to 44 percent of people with diabetes and 23 percent of heart disease (Fried M et al., 2013). Lipoprotein lipase, which is involved in the formation of both triglyceride particles and high-density lipoproteins (HDL), is one of the pharmacological components associated with obesity and diabetes. Lipoprotein lipase is a factor that affects serum triglyceride levels and HDL levels (Lutsey PL et al., 2010).

It is well-known that being overweight or obese increases the risk of developing type 2 diabetes, especially if you are already overweight. Stomach cells release chemicals that 'fight inflammation' in the stomach, which can make the body more susceptible to insulin production by affecting the activity and response capacity of insulin-responsive cells. And insulin resistance, which is a major cause of death. Medium or abdominal obesity refers to excess fat in the stomach (eg high waist), which is a very dangerous form of obesity. Obesity is believed to contribute to the metabolism. Fatty tissue (adipose tissue) releases fatty molecules from the blood as a result of this mutation, which can affect insulin-responsive cells and reduce insulin sensitivity. Another theory proposed by scientists about how obesity can trigger T2DM is that obesity causes prediabetes, a pre-diabetes metabolic syndrome (Hart CL et al., 2007).

Obesity and type 2 diabetes are closely related, and in addition to good eating habits and regular physical activity, obesity will increase rapidly with type 2 diabetes. cancer in people with diabetes. According to the NHS, 5% weight loss combined with moderate exercise reduces the risk of type 2 diabetes (Brettfeld C et al., 2016). Obesity in the general population is considered to be correlated with increased mortality and morbidity and is established risk factor in the stroke (Flegal KM et al., 2005). Its effect on stroke outcomes, however, is still under debate. Several studies in obese patients, in fact, have shown a better clinical post-stroke outcome than those of normal weight, commonly called a "obesity paradox," such as better functional outcomes, lower re-hospitalization and lower re-occurrences (Kernan WN et al., 2013).

Aim And Objectives

Aim:

- The Impact Of History Of Diabetes Mellitus At Baseline On Incident Of Ischemic Stroke In Central India.

Objectives:

- To estimate the level of HbA1c before and after treatment in elderly diabetic patients
- To estimate the level of lipid profile before and after treatment in elderly diabetic patients
- To study the Relationship between BMI and Blood sugar level before and after treatment in elderly diabetic patients
- To examine Relationship between BMI and Ischemic Stroke among before and after treatment in elderly diabetic patients.
- To find the incidence of obesity in elderly diabetic population.
- To find the incidence of ischemic stroke in old age diabetic population.

Need Of Research: Overweight refers to the development of T2DM. In several vascular disorders, while the obesity paradox has been proposed, little information is available on stroke patients with T2DM. So I want to study that either obesity acts as risk factor or protective factor for T2DM in elderly patients.

MATERIAL AND METHODS

Study Setting: The study will be carried out in General Medicine department in collaboration with central clinical laboratory at Acharya Vinoba Bhave Rural hospital (AVBRH), a tertiary care hospital attached to Jawaharlal Nehru Medical College (JNMC), Datta Meghe Institute of Medical Sciences (DMIMS), situated in rural area of Sawangi (Meghe) Wardha, in Central India.

Duration of study: The duration of study will be from Jan 2020 to October 2021.

Study Group: Elderly (>55 years) diabetes mellitus patients attending outpatient department (OPD)/admitted in Inpatient department (IPD) of Medicine department AVBRH, Sawangi (Meghe) fulfilling the diagnostic criteria.

Inclusion Criteria:

Cases fulfilling the WHO criteria of hypertension as follows:

- Age: more than 55 years.
- Diagnosed case of diabetes mellitus patients.
- Willing to participate in study.

Exclusion Criteria:

- Patient with past history of Stroke and TIA.
- Patients having HIV.
- Patients with Endocrinopathy.
- Patients having Immunocompromised Disorder.

Study Design: Unmatched cohort study

Sample Size:

Calculated using Epi Info statistical software.

Two-sided confidence level = 95%

Power (% chance of detecting) = 80%

Ratio of Unexposed to Exposed = 1

Percentage outcome in unexposed group = 50%

Least extreme Risk ratio to be detected = 1.53

Least extreme odds ratio to be detected = 3.33

Percentage outcome in exposed group = 76.9%

n = 114 (57: Exposed and 57: Unexposed)

METHODS

The patients, diagnosed as diabetic as per WHO criteria were evaluated for detail history taking, clinical examination and were subjected to following investigations.

BMI: Quetelet index is calculated by dividing body weight by square meter height, and expressed in kilograms per square meter (kg / m²).

WHO: Categories of Body Mass Index (BMI) for Asia-Pacific Region	
Categories	BMI (kg/m ²)
Under weight	<18.5
Normal weight	18.5-24.9
Obese	>25
Height: in cms Weight: in kgs	

Investigations:

- Liver Function Test [SGOT/SGPT/Bilirubin] is to be done by using Auto Analyzer.
- Kidney Function Test [Serum urea/Serum creatinine] is to be done by using Auto Analyzer.
- Random Blood Sugar is to be done by using Auto

Analyzer.

- TC (total Cholesterol) is to be done by CHOD-PAP method.
- TG (triglyceride) is to be done by glycerol phosphate oxidase (GPO) - Tinder method.
- HDL (high density lipoprotein) is to be done by Precipitation method.
- HbA1c is to be done by Biochemistry Beckman Coulter.
- Complete blood count done by using cell counter

Review of Literature: The incidence of diabetes and its effect on stroke outcomes have been the subject of systematic reviews and meta-analyses by Lau L et al (2019). Narrative analysis was performed on the effects of diabetes and various diagnostic methods on the effects of stroke. There were 66 books in total that met the requirements for inclusion. The prevalence of diabetes was calculated to be 28 percent (interval of 95% 26-31) in the meta-analysis of 39 studies (n = 359,783). Patients suffering from Ischemic stroke have a higher rate of relapse (33 percent, 95 percent confidence 28-38) than patients with bleeding disorder (26 percent, 95 percent confidence interval 19-33). Diabetes has been found to affect about a third of all patients with a stroke. To identify people with diabetes and design strategies aimed at reducing the negative effects in this high-risk area, similar post-stroke screening methods are needed.

Chen Y et al (2018) conducted a longitudinal study and found that 4174 of the 211833 members developed diabetes within 3.1 years, resulting in a median age adjustment of 7.35 years per 1000 people. With basic growth, the probability of diabetes increases equally. There was a correlated relationship between BMI and diabetes risk across all age groups, with a strong correlation between BMI and diabetes incidence in older groups (age BMI correlation, p0.0001). The authors conclude that having a high BMI is linked with a higher probability of developing diabetes in young adults, and that the effects of BMI on diabetes in children are greater in young adults.

Cut-off Points of the World Health Organization		
Indicator	Cut off Point	Risk of Metabolic Complication
Waist Circumference	>94 cms(M),>80 cms (F)	Increased
Hip Circumference	>102 cms(M),>88 cms(F)	Substantially Increased
Waist Hip Ratio	>0.90 (M),>0.85 (F)	Substantially Increased

A study by Jain S (2014) looked at BMI and its relationship to type 2 diabetes. The aim of the study was to use BMI as a metric to determine the role of body weight, especially obesity, in type 2 diabetes. There were 600 patients with type 2 diabetes mellitus tested in this study, with 369 men (61.5%) and 231 women (38.5%). There were 418 patients with hypertension and coronary artery disease (280 males and 138 females), while the remaining 182 patients had high blood pressure in 121 cases (66.48 percent), arterial disease in 12 cases. 38 (20.87 percent),

and 23 patients had both CAD and HTN (12.63 percent). According to the findings, there is a link between BMI and T2DM, both complex and straightforward. Obesity is most common in patients with T2DM. The best indicator of obesity is BMI.

The relationship between BMI and diabetes, hypertension, and dyslipidemia: a comparison of evidence from a national study reported by Bays H et al (2007). SHIELD had a mean BMI of 27.8 kg / m² and NHANES had a

mean BMI of 27.9 kg / m². In both studies, high BMI was linked with a higher incidence of diabetes, high blood pressure and dyslipidemia (p 0.001). More than 75% of patients with each disorder have a BMI of less than 25 kg / m². Diabetes, high blood pressure, and dyslipidemia were found to be more common in all BMI levels in this study, but increased with higher BMI. However, this metabolic disorder was not present in all obese or overweight patients, and not all patients with these conditions were obese or overweight. SHIELD and NHANES were equal without the spread of dyslipidemia. Consumer panel testing can be an effective way to gather data on the connection between BMI and metabolic disorders.

Physical activity, BMI, and the risk of type 2 diabetes in patients with normal or dysfunctional glucose were studied by Hu gang et al (2004). At the start of the study, Finnish 2017 women and 2352 Finnish women aged 45 to 64 with no history of diabetes were closely monitored. Cox's equilibrium variables were used to determine the different and related correlations between exercise, body mass index (BMI), blood glucose levels and the risk of type 2 diabetes. , sex, systolic blood pressure, smoking, and education. There was a correlation between BMI and the risk of type 2 diabetes. According to the findings, weight loss will reduce the risk of type 2 diabetes. Exercise has been shown to have a positive effect on studies with high BMI and high blood sugar levels. A number of studies on various aspects of diabetes were reported.

Singhal et. al. reported on assessment of capillary blood glucose levels as a prognostic indicator in acute ischemic stroke. Pratapa et. al. reported a case of a Case of Vertebro Basilar Territay Stroke. Mishra et. al. reported on regaining activities of daily living in patient with middle cerebral artery stroke.

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