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Corona Virus Disease-19: The New Challenge for Saving the Human Race

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The Prologue:

The worldwide research being carried out so dedicatedly by those who are affected: The US, China, Canada, UK and the rest of the world will certainly outpace and defeat the viral epidemic. There is light despite all the darkness!

Mankind has witnessed three epidemics recently – severe acute respiratory syndrome (SARS) in China in 2002-04, the Middle East respiratory syndrome (MERS) which started in Saudi Arabia in 2012, and the latest, Corona Viral Disease (Co-ViD19) which started in China too in Nov 2019. It has affected more than 8,00,000 people over 170 countries till date - the common thread lies in the fact that all of them belong to the same family, "Corona Viruses". The crown shaped viruses (hence the name Corona) measures approximately 60 - 140 nm in diameter, has a single long stranded RNA of a genome and a nucleocapsid of helical symmetry (genome size ranging from 27 - 34 kilobases in length). It has spike of glycoproteins on the envelope and is a group of related viruses that causes diseases in mammals and birds and recently is creating a havoc in humans too. Based on genetic and antigenic criteria, CoVs have been organised into four groups: α-CoVs, β-CoVs, γ-CoVs and Δ-CoVs and till date seven human CoVs (HCoVs: HCoV-OC43, and HCoV-HKU1 (beta CoVs of the A lineage); HCoV-229E, and HCoV-NL63 (alpha CoVs); SARS-CoV, SARS-CoV-2, and MERS-CoV (beta CoVs of the B and C lineage, respectively) capable of infecting humans have been identified (Chen, Liu and Guo, 2020; Chan et al., 2020).

Novel Covid-19 is the most dreadful among all types of Corona viruses so far. The first wave of coronavirus disease 2019 (COVID-19) pandemic is currently invading the world, and several countries are now struggling to fight it or trying to delay its start to help smooth its peak size for the purpose of lowering morbidity and mortality, and thereby reduce the overall tension on their health-care system, (Flahault, 2020). Since then, the virus has spread over 170 countries and WHO has declared it as global public health emergency on Jan 30th,2020. By Feb 9th, death toll in China surpassed that of 2002-2003 SARS epidemic with 811 deaths recorded and by Feb 12th 2020, corona virus cases started to spike in South Korea and by Feb 19th and 21st 2020 both in Iran and Italy respectively, the outbreak began on a horrible note. Since then after one month i.e on March 20 and 21st, Italy has reported its highest death toll of 627 and 793 respectively on a single day (Secon et al 2020).

Despite, the original source of the outbreak remains unknown and during the past three weeks, new major epidemic foci of coronavirus disease 2019 (COVID-19), some without traceable origin, have been identified and are rapidly expanding in Europe, North America, Asia, and the Middle East. On the basis of alarming levels of spread and severity, and by the alarming levels of inaction", on March 11, 2020, the Director-General of WHO characterised the COVID-19 situation as a pandemic. Currently, authorities have reported with 8,03,696 positive cases with about 5,92,192 being active and among ongoing cases, there are roughly, 1,72,434 recoveries and 39,070 deaths as per the report on 31st March, 2020 (Worldometers Info, 2020).

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Since the advent of SARS which affected more than 8000 cases around 26 countries in 2003, an upsurgence in the infectious disease is evident worldwide. MERS (Middle east Respiratory Syndrome) Viral outbreak in 2012 affected Saudi Arabia and other countries in the GCC whereas Ebola Virus (2013-2016) affected West Africa particularly the countries of Guinea, Liberia and Sierra Leone. Later in 2015-16, Zika Virus epidemic affected hundreds and thousands of people in Brazil and South and North America in 2015-16, (Marston et al., 2017). However, this time with Corona infection, which has taken the shape of a pandemic, the impact is devastating that has shattered businesses, stilled production, stopped travel, emptied public spaces, crashed economies and broken healthcare systems across the world, however the full blown impact is yet to be evaluated. The underlying fact across all these uprisings is to understand what makes the viruses potentially so threating and what needs to be done to curb them. Among all the potential causes, reported in large number of literature, one common factor that has been observed is that the interaction of the modern human beings with the environment around them has contributed to the success of dangerous viruses.

It is a well-known fact that any virus will replicate only when its been inside the cell of a living being, and spreads most efficiently when there is contact between two individuals. This one the COVID 19, hijacks human lung cells to produce more viruses and their copies, attaching by its spikes to the receptors on human respiratory cells. The viruses in suitable environments can replicate almost instantaneously and in huge numbers, contributing to high rate of mutations. Nevertheless, this invisible, very intelligent predator has been also known to adapt quite quickly to an adverse environment, such as the human immune system or drugs thereby allowing the virus to jump from an animal host to humans contributing to the spread of disease, which might have happened most likely in the case of the spread of Covid-19 and therefore has been seen as the most reliable explanation for the match of the corona virus genome of humans with that of bats and pangolins with 95% and 99% accuracy, (Burki 2020).

The impact of the global pandemic can be assessed from the fact that this virus took 67 days to infect the first 100,000 people while the next got infected in only 11 days. The number reached to 300,000 in another 4 days whereas the 400,000 figure touched in meagre 3 days. The number touched 5 lakhs in just 2.5 days and in the next 48 hours infected the next lakh taking the toll to 6 lakh people, a phenomenon quite unprecedented, (Business Today Report 28th March,2020).Among the various countries, on one hand the developed economies such as Italy, Spain, UK, Iran and now USA are facing their biggest humanitarian crisis, the developing nations in South Asia including India, Pakistan, Bangladesh and the Africa in the West which account for almost 14% of the world population are bracing for a head on collision with the corona virus and effects would be known only in next few weeks, (Kumar 2020; Signe and Fakim 2020).

Having said and done, the intricating questions are what defiance's lies ahead and what needs to be done? The challenges are multiple: Epidemiological, Social, Economical and Mental. As COVID 19 has become pandemic, epidemiological challenge lies in the fact how to halt its spread and prevent it to move to Stage 3 and above, (community transmission) of the disease. In the light of the fact, even the most effective and draconian containment strategies have only slowed the spread of Covid-19, all eyes have turned to the prospect of a vaccine, because only a vaccine can prevent people from getting sick. The critical issue remains here, how early the vaccine against Covid 19 can be developed and what are the bottlenecks. Rapid development of a vaccine against the deadly virus requires basic scientific understanding of the virus its structure, biology, including areas such as genomics. With prior experiences from SARS, H1N1 influenza, Ebola, Zika, the scientific community as well as the vaccine industry were asked to respond urgently to the epidemics. It was noticed that earlier with SARS and later with Zika, the epidemics ended before vaccine development was complete, (Laura 2020; WHO Report 2020).

Therefore, the funds allocated for vaccine development were diverted to other social projects, leaving manufacturers with huge financial losses thereby impeding other vaccine-development programs as well. However, during H1N1 influenza epidemic, the story was different. The vaccine manufacturers were able to be develop the antidote rather rapidly because the influenza-vaccine technology was already matured as well as the legislations regarding vaccine manufacturing using egg- and cell-based platforms for licensing as well as rules used for a strain change were pre-decided. For Corona vaccination, multiple DNA and RNA platforms including recombinant units are under development. The entire process is time-consuming with diversified checks and balances to prevent any mishaps. No RNA vaccines are approved till date however the vaccines have entered clinical trials with regulators reviewing the clinical trial applications and the time span might range from few months to almost a year, (Laura 2020).

Other potential problems likely would be commercial production of the vaccine. As soon as the vaccine would be approved, it will be required in vast quantities and many of the organisations in the COVID-19 vaccine race simply don't have the necessary production capacity. In business terms, vaccine development is a risky proposition. So, on one hand while virus biology and vaccines technology are potential limiting factors, the politics and economics surrounding it would far likely to be other key barriers to immunisation. The recent viral pandemic has posed gargantuan challenges to the world-wide health systems. The escalation of the scale of masses evident from numerous examples of Italy, Iran and now currently US points to the fact that irrespective

of the best of the healthcare available, inability of the national health systems to respond well in time and without adequate preparedness, the consequences can be devastating. On the contrary, China which is the epicentre of the pandemic has been able to counter the challenges effectively where other nations failed miserably irrespective of having developed economies. As more and more cases of COVID-19 have been reported since somewhere January 2020 in China, the entire public health machinery responded swiftly with immaculate planning and disciplined execution. Enormous health infrastructures have been raised, resources and manpower were mobilized for affected patients at lightning speed within a couple of days, a feat which no other country can achieve till now (Lai et al 2020).

The Chinese authorities have introduced numerous unprecedented measures including complete curb on people's movement in and out of Wuhan, the centre of the epidemic, as well as other 15 cities in the Hubei province, home to more than 60 million people. All means of transports were suspended including flights and trains as well as the roads were blocked. Soon after, disciplined enforcement of residential lockdown were extended to other cities with (~760 million people) roughly half of the country's population was asked to be confined to their homes for a period of around 2 months with the condition to venture out only to get food or for medical help. Besides this, rapid testing, rapid diagnosis, social distancing, quarantine of affected individuals as well as along with hospital preparedness to cater to the patients requiring both emergency respiratory care as well general medical care were key winning initiatives for the successful outcomes, (Chen et al 2020).

On Health Intelligence front, beforehand, epidemiologists in China using data and modelling estimated that probability of each corona infected person to pass the viral infections is to two people or more, making it highly contagious. Therefore, strict implementation of such measures helped to reverse the escalating cases. According to a published research paper, using multiple analyses model it was estimated that cutting off Wuhan delayed the spread of disease to other Chinese cities by roughly four days, whereas the ban on air travel stopped four of five cases from being exported from China to other countries for about two to three weeks. However, irrespective of all these measures taken, it was suggested that blocking travel could effectively only slow down the spread but cannot completely curb it. According to another recent study by Lai et al.,(2020), it was predicted that the combined effect of early detection and isolation along with drop in contact between people as well as ban on intercity travel prevented cases from increasing by 67-fold else China would had nearly received 8 million cases by the end of February alone, (Lai et al. 2020; Chen et al 2020).

It is worthwhile to cite the ELVIS (Edenborough and Lothians Viral Intervention Study) which showed that NaCl, sodium chloride can inhibit all types of viruses of common cold. The prevention of viruses is caused by the chloride component of salt, not the sodium, this evidence of chloride-ion dependent innate antiviral response in epithelial cells was used by an open pilot study to treat common colds by Ramalingam et al., (2019). Similar lessons on early detection paid off for both Singapore and South Korea where Diagnostic Testing, Quarantine and Social Distancing were made standard preventive models to curb the rising menace. These models are now being used as standard model for countries such as India, where aggressive social distancing can be one of the prevention methods of this viral epidemic as well, which has been implemented in a complete lockdown for 21 days from 25th March 2020. This has shown positive results so far, as the number of cases has not increased so dramatically. However, reports have also suggested that non-compliance to strict adherence to lockdown can result in humanitarian crisis with mass causalities as visible in Italy, Iran and slowly USA too which has reported the maximum number of cases now.

Though new cases of COVID-19 have slowed dramatically in China, but another fear that some epidemiologists suggest that once the country fully eases its control measures, the virus could start circulating again, which can turn out to be catastrophic, if proper measures are not taken, (Cyranoski 2020). On the social fronts, on one hand catering to the people need irrespective of their social strata is a major challenge, even distribution of the relief measures along with delivering monthly grains and lentil rations to the astonishing 800 million poor (60% of India's population) is a Herculean task, which at present is being taken care of. At a time of humanitarian crisis of such a magnitude, it becomes strangulating for the poor people and daily wagers to get both ends meet, especially in cases of lockdown.

However large scale voluntary work across the nations is taking shape and we look forward for a positive response. Reports suggest that the impact of lockdown on the masses especially the BPL(below poverty line) category people is devastating, as 1.8 million people in the country are homeless and almost 85% of the population work in the informal sector. Besides this, the other health challenges lie in the fact of relatively low numbers of testing levels. To add to these, the poor sanitary conditions in many isolation wards in the government hospitals might force some of those quarantined to escape these facilities. (Chaudhary and Prasad 2020).

Similarly, fake news on social media including misinformation and conspiracy theories as well as sensationalist reporting are key challenges on the information front and can dampen the efforts. To curb the menace of fake news and related information on health or other related information, WHO has recommended a "four-pronged approach," using its WHO Information Network for Epidemics platform to track misinformation in multiple languages and collaborating with social and digital companies such as Facebook, Weibo, and Twitter to rapidly filter out false information, (Ying et al. 2020, WHO 2020). The new coronavirus menace has proved to be an enormous stress test for globalization on the economic

front. As whole world is interconnected with business interests, production and customers of the various MNCs spread across the globe, the pandemic has disrupted the travel industry unprecedentedly both at international and national level, causing unexpected free fall in the global oil prices, affecting industrial production, supply chains been broken down, share markets crashing and henceforth the crisis is forcing a major re-evaluation of the interconnected global economy. The economic interrelationships between the various stakeholders are not only complex but intertwined. On one hand, while globalization has allowed for the rapid spread of contagious disease, at the same time it has fostered deep interdependence between firms and nations that makes them more vulnerable to unexpected shocks, (Bingham and Hariharan 2020).

The economic challenges thrown up have an important lesson for the world economic forum that globalization is fragile, irrespective of its benefits. For decades, the rigorous efforts of the corporate enterprises to eliminate redundancy has generated unprecedented wealth. But these relentless pushovers have also reduced the amount of unused resources referred to as "slack" in the globalized economy. The presence of too little slacks in this time of global crisis, points towards eliminating critical fail-safes causing supply chains to break down. With 26% of the world production been localized to China, majority of the countries have faced critical shortages ranging from medical equipment as simple as face masks or hand sanitizers to complex items such as electronics and other goods. This could be illustrated by the fact that partly as a result of supply chain problems, global production of laptops fell by as much as 50 percent in February, and production of smartphones could fall by 12 percent this coming quarter. Both products are built with components produced by specialized Asian manufacturers i.e China. With tens of millions of workers now in quarantine and parts in short supply, it is struggling to get economic activity back on track. Countries with well-honed crisis risk-management arrangements such as South Korea are faring better at slowing the spread of infection, although that does not make them immune to political and economic pressures (Cheung 2020).

As policymakers around the world struggle to deal with the new coronavirus and its aftermath, they will have to confront the fact that the global economy doesn't work as they thought it did. For developing economies like India, the economic impact from Corona pandemic is multiple. Post 2016, demonetization and GST implementation have made the Indian economy down, bringing the 8.5 % of GDP in 2016 to 4.5% in 2020. The countrywide implementation of lockdown as a result of corona pandemic is expected to bring the GDP to as low as 2.5% as predicted by Moody's Report (Business Today 2020). It is a known fact that even 1% loss in GDP results in loss of lakhs jobs, however there is always a better bounce back of economy in and after such crises, (Kannan and Raveendran 2019). Similarly, mass quarantines in cities or in border areas or stigmatize under lockdown, all these factors have contributed to increase mental health risks as people experience stress, anxiety and a sense of isolation and loss of control over their lives. Even for the affluent class, residential lockdown, travel bans, loss of jobs have resulted in a greater social vacuum. Similarly, suffering from already existing disease/spread of infection or coping with surging care needs, further reduces confidence in the competence level adding to predisposing stress level (Chaudhary and Prasad 2020).

The recent Chinese experience of combining non-pharmaceutical interventions to curb outbreak trends seems rather convincing. Although starting late in the process, authoritarian Chinese authorities succeeded in combining forced isolation of the population with all available social distancing interventions. To what extent, at which pace, and how should they start lifting their intervention and allow people to resume normal social and economic life is a matter of speculation, (Flahault, 2020).

Despite all the challenges, the silver linings lies in the fact that the Corona Infection would be short lived and very soon will be taken over by multitudes of humanitarian efforts. Since the human civilization has not come across a pandemic of such a scale in the last 70 – 80 years of human existence, therefore it has taken people by shock and awe. Nevertheless, Mans indomitable spirit, coupled with science and technology and his great struggle for survival will overcome this difficult challenge very soon. Hope is the only road forward.

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