Perspective

Going Viral – Covid-19 Impact Assessment: A Perspective beyond Clinical Practice

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Abstract

In the realm of infectious diseases, a global outbreak is a worst-case scenario. In the past, outbreaks such as plague, Spanish flu, severe acute respiratory syndrome, and H1N1 (swine flu) have caused great human suffering. The novel coronavirus, christened as Covid-19, is a zoonotic disease which originated from the Wuhan province in China and spread like wildfire killing people and devastating the global economy. Mammoth efforts are still on to control this viral strain from further spread. Cities have been blocked, air travel banned, ships have been quarantined, and panic-stricken people have been evacuated from China. As Covid-19 continues to ravage countries across the globe, this article is an effort to provide an overview of the impact of Covid-19 and tickle wits of intellectuals to think how easily a nanometer organism can virtually bring down superpowers of the world.

Keywords: Artificial intelligence, Covid-19, diagnosis, economy, quarantine

INTRODUCTION

History beckons that the Black Death of the 14th century altered the course of the world economy. It ended feudalism and established capitalism. The Spanish flu of 1918 affected approximately 1 billion people (half the world’s population then) and caused 50 million deaths, mostly in the productive age group of 20–40 years. The severe acute respiratory syndrome (SARS) affected 26 countries with 8000 cases and 774 deaths, a high case fatality ratio of almost 10%. The delayed reporting of early SARS cases from China prompted the World Health Organization (WHO) to update the International Health Regulations in 2006 and further in 2016.[1] On June 11, 2009, the WHO declared that a global pandemic of H1N1 (Swine Flu) was underway as more than 70 countries reported cases of novel H1N1 infection.

The novel coronavirus outbreak in China, now officially christened as Covid-19, has already affected (as on going to the press) more than 80,000 individuals causing around 3000 deaths with 131 cases of transmission solely out of China in 37 countries.[2] The WHO declared the outbreak as a public health emergency of international concern on January 30, 2020. While the medical fraternity around the world struggles to find answers for the origin of the new strain and its containment, treatment, and prevention, Covid-19 continues to not only cause human fatalities but collaterally rampage the social and economic fiber of the world order. In this article, our effort is to provide an overview of the impact of a highly contagious novel viral strain in today’s world ethos of the global village and borderless countries.

THE COVID-19 MYSTERY: A RE-EMERGING DISEASE OR A BIoweAPON

Movie buffs and media have drawn an unnerving parallel of the Covid-19 outbreak with the film “Contagion,” a 2011 thriller based on a lethal airborne virus called Nipah and how the world’s medical community battled to control the disease and find a cure. Interestingly enough, another such...
evidence was found in the book by Dean Koonz called “Eyes of Darkness” from 1981 which describes a Chinese military laboratory in Wuhan creating a made-up virus called Wuhan 400 as a bioweapon.\(^3\) The conspiracy theory enthusiasts have since long harbored the idea of a pandemic triggered by an accidental/intentional release of a bioweapon. These fictitious ideas are not simply a figment of imagination but have a historical background. During World War II, Germany, Japan, Britain, and the US developed plague, syphilis, and botulinum toxin. It took 22 years in 1972 when 179 states ratified the Biological Weapons Convention, the first multilateral disarmament treaty banning an entire category of weapons, along with chemical weapons and nuclear weapons. In the present scenario, however, it is still not clear whether Covid-19 is indeed a bioweapon or simply an emergence/re-emergence of human coronavirus due to mutation and amplification from a zoological source.\(^4\)

**PUBLIC HEALTH MEASURES AND LEGAL FRAMEWORK OF EPIDEMICS**

The appropriate exercise of public health laws is to minimize the transmission of infectious diseases and it depends on the seriousness of the disease, mode of transmission, and how easily the disease is transmitted. Screening individuals at the port of entry of a country through air, land, or sea is a primary core strategy. Isolation and prompt treatment of the cases and quarantining the contacts during an ongoing outbreak are further preventive steps. Public health orders are legal directives when applied to a person or a group may place restrictions on the activities undertaken, including movement restrictions or monitoring by a public health authority, for the sake of protecting the public’s health. The public health orders may be issued to enforce isolation, quarantine, or conditional release. As per the Center for Disease Control (CDC), Covid-19 meets the definition of severe acute respiratory diseases and hence is a quarantinable communicable disease.\(^5\) Appropriate guidelines have been promulgated by the CDC for risk assessment and public health management, including isolation and quarantine of persons with potential coronavirus disease.\(^6\)\(^7\)

Governments across the world including India have mobilized the Armed Forces in lifting healthy individuals from the Wuhan province and quarantining them in large military bases in respective countries for 14 days, the maximum incubation period as reported by the CDC. China implemented the largest quarantine in history when it closed off the Hubei province on lockdown with effect from January 23, 2020, to prevent the spread of the disease from the epicenter of the infection. Commercial cruise ships with passengers have been quarantined at ports of different countries, sparking off debates.

**THE VIRUS**

Full-genome sequencing and phylogenetic analysis indicate that Covid-19 is a betacoronavirus with structural similarity to the SARS virus, as well as several bat coronaviruses, albeit with a different clade. It thus appears likely that bats are the primary source but whether the virus transmitted directly from bats or through an intermediate host is unknown. Coronaviruses are classified as a family within the Nidovirales order, viruses that replicate using a nested set of mRNAs (“nido” for “nest”). Some reports had surfaced regarding the diagnostic accuracy of the present coronavirus test,\(^3\) and CDC has now developed a new test kit called the “Centers for Disease Control and Prevention (CDC) 2019-Novel Coronavirus (2019-nCoV) real-time reverse transcriptase polymerase chain reaction diagnostic panel.” The test kits are being made available in international WHO surveillance centers.\(^9\) Chinese authorities changed the diagnostic modality of Covid-19 to include white patches in computed tomography scans. The same day there were 14,840 new cases and 242 people died.

The treatment of the disease remains a mystery; several drugs such as chloroquine phosphate, favipiravir, and remdesivir are in different phases of clinical trials by researchers. Chloroquine phosphate, which has been used against the coronavirus for many years now, has been found to be effectively inhibiting coronavirus infection during *in vitro* trials and is being tested in human trials.\(^10\) For now, symptomatic treatment of the infected individuals is the only option available. Several vaccine trials have also commenced including one in India.\(^11\) However, the way the viruses are mutating to emerge as a new strain, vaccine trials which anyways takes around a year to come to the market, might become superfluous.

**IMPACT ON THE GLOBAL ECONOMY**

The timing of the outbreak of the Covid-19 at Lunar New Year is unfortunate. It caused countless travel cancellations in Asia and beyond, the closing down of casinos in Macao, a prolonged new year’s break for Chinese stock markets and cancellation of important trade fairs and sporting events in the Asian region. The global economic impact of Covid-19 is expected to be substantially more significant than that of SARS, primarily because China has gone from being a small player in the global economy in the early 2000s to an economic powerhouse today. In early 2000, China accounted for just over 4% of global gross domestic product (GDP), compared with 16% today.\(^12\) China has become an integral part of the global manufacturing supply chain, accounting for about one-fifth of global manufacturing output. As per the Dun and Bradstreet analysis, at least 51000 companies, including 163 Fortune 1000 companies around the world, have one or more direct suppliers in the Hunan region of China. Business activities across China have been stopped in order to contain its spread, causing an inevitable supply deficit in the near future.\(^13\) The economic body blow to China is severe and will increase further until the virus is restrained. As per the Moody’s analysis report, it might affect an approximate 1% global GDP loss.\(^14\) India is dependent on Chinese imports...
across sectors from pharma, mobiles, TV panels, solar power parts, and other electronic goods and can make the already ailing economy worse. On the other hand of course, this could be an opportunity for India to promote the “Make in India” program flourish and expand its exports.

**Psychosocial Impact – Panic Reactions**

There is a loss of mental and social order during the peak of a high impact outbreak. Studies post-SARS pandemic or post-Ebola indicate that even after recovering physically from the disease, individuals suffered from social and psychological problems. A survey in a convalescent hospital in Hong Kong showed that approximately 50% of recovered SARS patients showed anxiety, and approximately 20% were fearful, including panic attacks, feelings of depression, or stigmatization. In addition, health professionals who worked in SARS units and hospitals during the SARS outbreak also reported depression, anxiety, fear, and frustration. Similar panic attacks were noted during the Ebola outbreak as well. Despite these glaring evidences, common mental health problems and disorders found among patients and health workers working in epidemic settings are often ignored by the scientific fraternity. It is essential that along with public health emergency response measures, protocols to identify, treat, and prevent mental health problems should be instituted for both patients and health-care professionals in the midst of the Covid-19 epidemic.

**Artificial Intelligence Based Outbreak Analytics**

According to media reports, BlueDot, an artificial intelligence (AI) startup from Canada raised the first alarm of an outbreak of a respiratory disease a few days earlier to the official announcement of the outbreak. AI researchers can use deep machine learning techniques to collect data from social media chats of people talking of fever with respiratory distress, from the web where such cases are reported by doctors and other data of subtle signs of the spread of the disease and locate them. In fact, several visualizations have been created to depict the spread of the coronavirus based on these methods. However, since the data are obtained from different sources in different forms, the biggest challenge is to process the best available data in an efficient manner. Outbreak analytics using big data and AI stands at the crossroads of public health planning, field epidemiology, methodological development, and information technologies, waiting to open up exciting opportunities for specialists in these fields to work together and meet the needs for effective and timely epidemic response.

**Conclusion**

In conclusion, in today’s jet age, the spread of infectious agents across borders is practically uncontrollable, and hence, depending on the virulence of the agent, in a short duration, regional outbreaks become epidemics and then pandemics. The impact of pandemics is beyond imagination and not limited to the loss of human lives but can threaten the economic stability and existence of affected countries. Hence, countries should prepare plans to prevent, contain, and, in the worst-case scenario, minimize the effects of future pandemics because in the lighter vein, by the time the present pandemic of Covid-19 subsides, the only people smiling would be facemask manufacturers.

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**Conflicts of interest**

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