

## The COVID-19 pandemic: a dynamic infection with unpredicted public health emergency of the decade

Good health is a major global concern. The coronavirus known since 1930 used to cause mild upper respiratory infections (common cold) and gastrointestinal symptoms (like vomiting, diarrhoea) and those infected would recover without any serious problems. The novel coronavirus is a new strain with a distinct change in its structure, which was identified in Wuhan, China in December 2019. It was claimed that the virus had spread from bats in a wet market. It caused the COVID-19 disease (as named by the World Health Organization (WHO) on 11 February 2020) and was declared a pandemic by WHO on 11 March 2020. According to the data reported in *JH U CSSE*, as on 1 May 2021, the total number of COVID-19 cases in India was 19,925,604, of which 16,293,003 had recovered and 218,959 died. Globally, the total number of cases was 153,500,734, of which 131,532,623 had recovered and 3,216,418 died.

The coronavirus is airborne and spreads from person to person by droplet infection through coughing, sneezing and talking loudly. A study by WHO shows that the incubation period of the virus is 1 to 12.5 days, median 5–6 days and the longest period is 14 days. Its infectivity is 1.5 to 3.5 people and fatality rate is 0.7–3.4%, almost double that of seasonal flu. It fatally affects the elderly and people with co-morbidities. Among the confirmed infected cases of 44,672 in Wuhan, China, 89% stayed at home with mild disease, 13.8% with severe disease needed hospitalization and 4.7% became critical. The mortality rate was: up to 9 years of age (0%), 10–39 years (0.2%), 40–49 years (0.4%), 50–59 years (1.3%), 60–69 years (3.6%), 70–79 years (8%) and 80 plus (14.8%). The US data as reported by the Center for Disease Control and Prevention (CDC) in 2021 appears to be similar.

According to China Centre for Disease Control 2020, common symptoms of COVID-19 infection are: fever (99%), fatigue (70%), dry cough (59%), anorexia (40%), myalgia (35%), dyspnea (33%), sputum with wet cough (27%), acute respiratory distress syndrome (ARDS, 20%) and mechanical ventilation (12.3%). Difference in clinical features has been observed in children in the age groups 0–9 years and 10–19 years. In 0–9-yr-old children, it was observed that 46% developed fever, 36%

cough, 7% shortness of breath, 14% diarrhoea, 15% headache, 13% sore throat, 10% myalgia and 1% loss of smell or taste. In 10–19-yr-old children, fever was noted in 35%, cough in 41%, shortness of breath in 16%, diarrhoea in 10%, headache in 42%, sore throat in 29%, myalgia in 30% and loss of smell or taste in 10%.

The Government of India's Department of Health and Family Welfare jointly with the WHO Office in India prepared a training tool kit for the facilitators during the H1N1 pandemic in 2009 to prepare for any future flu pandemics. In any pandemic there will be various phases where public health personnel get prepared to handle the situation. Phases 1 and 3 witness spread of the disease in animals with a few human infections. In phase 4, there will be sustained human to human transmission of the disease. In phases 5 and 6, widespread human infection occurs globally. After the pandemic, there is a post-peak relapse with possible recurrence of events involving a new strain. Then there will be a post-pandemic phase where the activity of the virus will become seasonal.

During the pandemic phase, the following instructions are given by the policy-makers to protect ourselves and others: (1) Staying at home and self-isolating if one feels unwell, even with mild symptoms. (2) Cleaning the hands with soap and water for 40 s or with an alcohol-based hand rub. (3) Covering the nose and mouth with a disposal tissue or flexed elbow when you cough or sneeze. (4) Avoiding touching of one's eyes, nose and mouth. (5) Maintaining a physical distance of at least 1 m from others. (6) Staying away from crowds and poorly ventilated indoor spaces. (7) Using fabric face masks. (8) Using surgical masks in case of those at higher risk. (9) Cleaning and disinfecting frequently touched surfaces regularly.

During the pandemic our leadership valued life over livelihood, and supported and appreciated the frontline workers (*Lancet*, 18 April 2020). While anxiously waiting for the vaccine to be produced with an enhanced budget of 137%, we were able to get it in 8 months with all clearances, while the standard procedure takes over 8 years (*JH U CSSE* WHO/EPI WIN/infodemic management-37). We also distributed the vaccine to other needy

countries. This humanitarian action is appreciated globally. The UN Chief Antonio Guterres lauded India on 29 January 2021 and said, 'India's vaccine production capacity is one of the best assets the world has today'. The WHO Chief Tedros Adhanom Ghebreyesus appreciated our concern for humanity in distributing the vaccine.

The lockdown period due to the pandemic led to the closing down of educational institutions, industries and construction work (resulting in large-scale migration of the poor), caused social disturbance, stress on agriculture and tremendous psychological, sociological and economic burden. During this period of dark clouds, the silver lining was the improvement of air quality due to decreased greenhouse gas emissions from vehicles and industries which led to better visibility, decreased noise pollution, decreased water pollution, enhanced human kindness, return of birds and wild animals into urban outskirts, enhanced traditional values and change in economic health policy (Paramesh, H. *et al.*, *ENRICH Bull.*, April–June 2020).

After the first wave of infection peak, a second wave is expected in any pandemic. India is witnessing the second wave. However, the second wave has resulted in a crisis in the healthcare system in the country. Higher infectivity, doubling time of seven days compared to one month during the first wave, faster rate of spreading, infection among younger people and earlier onset of lung damage leading to a greater demand for oxygen and ventilators, increase in the number of deaths under difficult conditions characterizing the second wave – all have led to this crisis. However, fortunately the percentage of mortality has not increased compared to the population.

The reason for the second wave could be a change in the nature of virus. The novel coronavirus has changed its pattern by genetic mutation which has helped it to increase the rate of infection (communicability), increase virulence (severity) and the ability to escape vaccine-induced immunity. We have isolated the UK, South African, Brazilian and the US variants of the virus. These have replaced the original virus. Now we have the double-variant mutant strain in India from the UK strain B.117 with altered spike protein, which has predominantly infected North India. Now the double mutant B.1.617 strain with a combination of mutation not seen anywhere in the world has been observed in India (*Archives of Practical Paediatrics*, 1 April 2021, vol. 3(4)). Scientists

have recently identified triple mutation B.615 and N440K viruses in South India, which are more contagious. Even the experts could not predict the rapid spread in the second phase.

The other contributing factor could be the 'Peltzman effect', which states that when the safety measures are mandated, people's perception of risk decreases. This might have led to change in the behaviour of people not adhering to preventive measures such as using masks, social distancing, overcrowding during festivals, and participation in election rallies and religious gatherings. Laxity in vigilance, testing, tracing of contacts and treating those infected, managing oxygen demand and intensive-care beds for critical cases and poor coordination also have contributed to the spread of the disease.

The magnitude of the second wave has brought to light the fragility of the public healthcare system in our country and the need for improvement. While we are handling the burden of the second wave, there is a talk of the third wave, which is disturbing. If the third wave occurs, it would be mainly from a more virulent strain of the virus and when we are not able to vaccinate enough people.

The second wave may reach its peak in a few weeks. Let us all face the crisis by strictly following the preventive measures, relaxing our mind with good sleep, regular exercise, good nutrition and through mass vaccination. Adherence to the doctors' advice is a must. No doubt we are facing a healthcare crisis beyond any expert's imagination, just as many other countries. It has taught us lessons to rectify ourselves, developing goodwill (such as sharing of vaccines with poor countries). We should overcome this crisis through coordination of the State and National Health Policy authorities, implementation of strict preventive measures as recommended and a lockdown, if warranted. A statement by Ratan Tata may be appropriate in this context: 'Human motivation and determined effort can overcome any crisis. We will defeat the Corona hands down and the Indian economy will bounce back in great manner.'

H. Paramesh

Divecha Centre for Climate Change,  
Indian Institute of Science,  
Bengaluru 560 012, India  
e-mail: drhparamesh@gmail.com