

Emerging concerns regarding COVID-19; second wave and new variant

To the Editor,

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which emerged in December 2019 has been the cause of tremendous panic around the globe for the past whole year. The virus has spread to over 200 countries, claiming up to 2 million lives globally (data till February 9, 2021). During the current health crisis when the scientific community is battling hard to contain the first wave of coronavirus disease-19 (COVID-19), the globe has been hit recently by a second wave.¹ Historically, pandemics have occurred from time to time, infectious diseases have had a profound and lasting impact on global societies, shaping their politics, economy, and civilizations.² Researchers refer to the Spanish flu pandemic to understand and control the COVID-19 pandemic. Even though the coronavirus is from a different family of viruses than the influenza virus, they are significantly similar as both silently attacked the world and the societal as well as the political response to both pandemics is closely alike.³ Historical records of the 1918 influenza pandemic and unpredictability of the second wave have caused distress among people as the first wave of that outbreak (Spanish flu) proved to be relatively mild as compared to its second wave which was much worse.⁴ Among the coronaviruses, at the beginning of 21st century, severe acute respiratory syndrome (SARS) that emerged in 2002–2003 was recognized as a global public health threat. A decade after the SARS outbreak, another even more severe respiratory disease emerged in 2012 that is known as the Middle East respiratory syndrome (MERS).⁵ Both the SARS and MERS epidemics affected human health significantly and some aspects of these pathogens could be compared to SARS-CoV-2 as they share many similarities but obvious differences exist as well.⁶ Both SARS and MERS affected humans differently even though they are related to the novel coronavirus. COVID-19 shows distinct epidemiological, pathogenetic, and clinical features as compared to SARS and MERS, so it is difficult to predict the COVID-19 situation from the data available on the novel coronavirus has a fatality rate of 2.3%, which is much lower than that of SARS which was 9.5% and even lower than that of MERS with a fatality rate of 34.4%. Hence, it is estimated that COVID-19 spreads more easily than MERS and SARS even if it is not as fatal.⁷ The second wave of the COVID-19 has been experienced by many countries and governments have started confinement measures to limit the spread of infection. People are tired of following the precautionary actions against COVID-19 and frustrated due to lockdown for months, canceled activities, stress, and economic challenges. All these factors are contributing to the apogee of COVID-19.⁸ The current global COVID-19 situation is represented in Figure 1.

Researchers have urged that for herd immunity to work, approximately 60%–70% of the population has to be immune against COVID-19.⁹ In comparison, immunity to other seasonal coronaviruses is usually transitory. Limited COVID-19 re-infection cases have been reported, which means people are not immune to this virus for long enough to develop herd immunity.¹⁰ Research suggests that strict measures like social distancing and self-isolation help in suppressing the spread of COVID-19 but allowing it to spread to gain herd immunity in a population does not control the transmission or infection rate.¹¹

Countries around the world have prevented the spread of coronavirus by restricting travel and social activities.¹² The relaxation of precautionary measures like restricted outings, avoidance of gatherings, self-isolation and lockdowns have resulted in the quick escalation of COVID-19 cases across Europe, therefore governments have started to limit social activities again to counter the second wave of COVID-19.¹³ The most effective way to fight the spread of COVID-19 to date is to prevent it by following the suggested precautionary measures to prevent it that includes hand hygiene, social distancing and quarantine and increased testing to reduce secondary cases.¹⁴ Australia fought the pandemic most effectively by following strict lockdown rules for a longer period during the start of the pandemic. However, the prevention wasn't without consequences and Australian society and economy have been adversely affected.¹⁵ As the several regions of the world are clearly in the grip of the second wave of COVID-19, strict lockdown cannot be imposed as travel restrictions are being lifted and governments in different countries want to resume their economies, however, no mass vaccination is in sight yet, some supportive and pharmacological treatments such as remdesivir, dexamethasone, and convalescent plasma can help reduce the severity of infection in serious patients of COVID-19 to decrease the case fatality ratio in the world.¹⁶ Moreover, measures to protect public health must be kept in mind: social distancing, hygiene, and the rigorous use of face masks in public areas should be strictly followed.

Another challenge that the world is facing along with the second wave of COVID-19 is that viruses constantly get modified through a mutation that could lead to the birth of new variants of a virus over time.¹⁷ The year 2021 is expected to be the one where humanity gets rid of COVID-19 and becomes successful in winning against the pandemic through large-scale immunization. Vaccinations have been started to immunize people in several parts of the world, but scientists are uncertain about their long-term effectiveness due to the emergence of the new variants of coronavirus. Evolution and mutation may result in variants that might be more contagious than their parent virus.¹⁸ Three SARS-CoV-2 variants alarmed the scientific community: the B.1.1.7 that

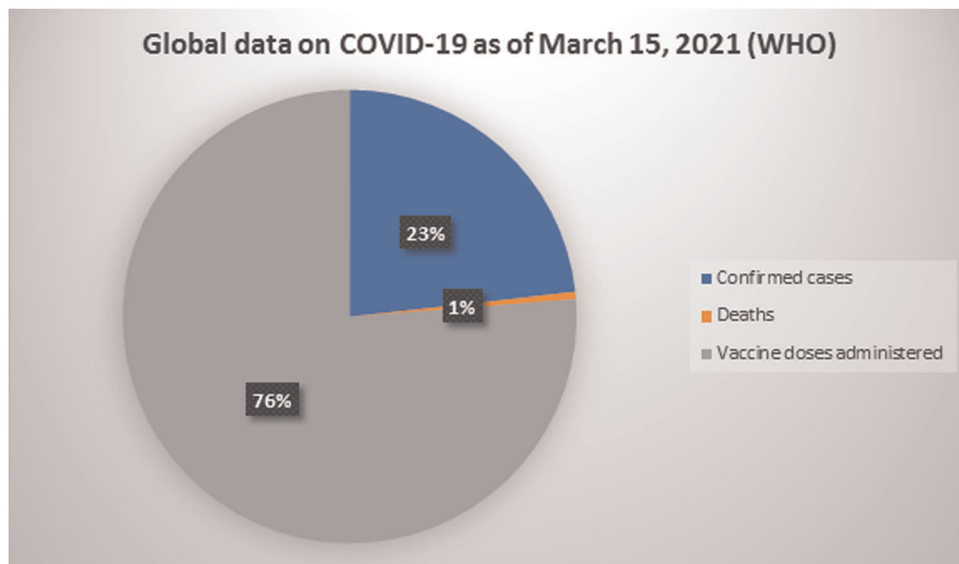


FIGURE 1 Current global COVID-19 situation. The data have been collected from World Health Organization²³

was first reported in the United Kingdom in December 2020, 501Y.V2 found in December 2020 in South Africa and P1 identified in Brazil in January 2021. None of these variants have proved to be more fatal than their respective parent virus. However, the transmission capability of some of these variants may be enhanced due to spike protein alterations such as the N501Y mutation which is the part of the virus that attaches to human cell receptor ACE2, which are also major targets for vaccines. Another mutation of concern is E484K, which also affects the spike protein's receptor-binding domain in variant 501Y.V2. Current vaccine doses distributed around the world are showing results of effectiveness against the new coronavirus variants because the spike protein has not altered to an extent so as to render the vaccines unprotective. Human antibodies target multiple parts and not just one region of the spike protein of coronavirus, if a mutation modifies one of the antibody target regions, it could decrease that specific antibody's binding activity.¹⁹ Fortunately, the human body has a large number of other antibodies that are not binding to that region. In addition to antibodies, vaccines trigger the activation of T helper cells that help in the production of B cells, which in turn produce antibodies and cells that are infected by a virus. A key cytokine produced by T cells called interferon gamma plays a significant role in controlling the viral infection.²⁰

Viral evolution is triggered by fast transmission of the virus from person to person, therefore standard operating procedures should be applied/followed to decrease transmission rates and eventually slow down rate of mutation. Furthermore, the viral co-infections could also further aggravate the over-burdened health systems of the developing countries and could increase the risk of viral diseases endemic in some regions, that is, polio in Pakistan and Afghanistan.^{21,22}

Therefore, drastic measures need to be taken and such issues must not be ignored while fighting against COVID-19. In the case of COVID-19, vaccine doses are reported to create strong immune responses, and there's a need for further investigations to follow if any

viral variants escape the vaccine-induced immunity. Research is underway by vaccine manufacturers such as Pfizer-BioNtech and Moderna, which are most recommended (to-date) to respond quickly if a future variant of SARS-CoV-2 is unresponsive to existing vaccines; they can be updated quickly and government regulators would keep a check on them whether the vaccine is still safe and effective after the required modifications. It is the need of the hour to vastly increase the genomic sequencing of coronavirus so that mutations can be tracked efficiently and vaccines could be updated accordingly.¹⁸

CONFLICT OF INTERESTS

The authors declare that they do not have any conflict of interests.

AUTHOR CONTRIBUTIONS

Sara Hafeez and Misbahud din: *Initial draft preparation and study design.* Fatima Zia: *Data collection and illustration.* Muhammad Ali: *Supervision and editing.* Zabta Khan Shinwari: *Reviewing and editing.*

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