The Story of Omicron: people, scientists, and global communities

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Running Title: The Story of Omicron

Since late 2021, a new wave of uncertainty has spread across the globe as the number of Covid-19 cases upraised dramatically, mostly in the African nations. First reported from South Africa on 24 November 2021, a new SARS-CoV-2 variant, B.1.1.529, was designated by the World Health Organization (WHO) as a variant of concern (VOC) and named Omicron (1, 2). Three years ago, when the original SARS-CoV-2 was detected in Wuhan; people, scientists, and global communities did not pay attention too much, until it became the most imperative global health issue. Now Omicron, which was earlier considered as a less dangerous variant, is the world most dominant coronavirus strain and accounted for almost all of the viral sequences in the United States (3, 4).

Originating from immune-compromised hosts or as a reverse zoonosis to the human population, Omicron is the most mutated SARS-CoV-2 variant so far (5, 6). Through the genomic sequences, a huge cluster of mutations has been detected on the Omicron spike protein, of which none of the previous VOCs contain this much. In this regard, 50, 32, and 15 mutations are discovered in the whole genome, spike protein, and receptor binding domain (RBD) of the Omicron (BA.1), respectively, explain the higher rate of infectivity and transmissibility of this strain (7-9). According to a recent narrative review, various Omicron sub-variants, including BA.1, BA.1.1, BA.2, BA.3, BA.2.12.1, BA.4, and BA.5 have shown higher infectivity and transmission rate than Delta variant (10). On the other hand, BQ.1, BQ.1.1, and XBB have replaced and are spreading faster than other SARS-CoV-2 variants in several countries; including but not limited to USA, Singapore, France, and India (4, 11). Besides, the most recent studies confirm that BQ.1.1 and XBB have more immune-escape and neutralizing resistance capacities than previous dominant Omicron sub-variants, BA.2 and BA.5 (12, 13).

This triggered an international alarm about another wave of the COVID-19 pandemic, as the new cases have raised in almost every part of the world again. Evidence suggests that holidays and gatherings can increase the prevalence of COVID-19 cases, which can also be controlled by accurate healthcare policies (14). Therefore, the first move of scientists and global communities should be informing people about a potential threat, as we already passed the New Year's holidays. Also, since the analysis revealed higher levels of stress and lower levels of resilient after the emergence of the Omicron variant, it is a responsibility of all national and international communities to pay more attention to the mental health issues, mostly regarded to the fear and anxiety of COVID-19 infection or death in both healthcare workers and people (15-17). The next step should be focused on the potential therapeutic and preventive ways to control spreading of the Omicron. Several immunotherapeutic methods such as monoclonal antibodies have been used as a promising approach for the management of severe COVID-19 patients, yet their application for patients with Omicron is remained controversial (18, 19). Besides, the regulatory role of miRNAs and lncRNAs in various disorders can also be a guide for their application in the diagnosis and treatment of COVID-19, especially highly mutated variants like Omicron (20-23). Investigating signaling pathways of pathogenesis of the Omicron variant can also be as important as other immune or genetic-based approaches (24); which are all established methods for better diagnosis and management of complex diseases, cancers for example (25, 26).

On the preventive side, studies have reported that vaccines effectiveness (VE) has dwindled against Omicron variant, yet homogenous or heterogeneous booster doses can improve the antibody neutralizing capacity and reduce the symptomatic infection and hospitalization (27, 28). Results of one of the most recently published studies show with 3-doses of mRNA-1273 vaccine,

VE is moderate to high against BA.2, BA.4, BA.2.12.1, and BA.5 variants, yet wanes quickly. Nonetheless, even after the 4th dose, less than a third (30.8%) of healthy participants gained immunity against BA.5 infection, which was also disappeared after 90 days for all Omicron sub-variants (29). Therefore, despite progresses in the development of COVID-19 vaccines, there are still challenges for Omicron-specific vaccines; including longevity, long-term side effects, ethical issues, and equity in access to the vaccines. In addition, aside from safety and efficacy, conflict of interest of pharmaceutical companies to compete in vaccine production line is another problem (30, 31). As a result, primary prevention measures like wearing masks and social distancing would still be better options. Whit more than 6.7 million deaths and about 65 million individuals experience long COVID symptoms, today it is more than a social responsibility to protect ourselves from both short- and long-term side effects of COVID-19 infection, especially with the rage of Omicron variant (32, 33). In the meantime, scientists and communities should stay alert against all changes that could happen in the spreading pattern or infection rate of the coronavirus. As of 13 January 2023, four Omicron sub-variants (XBB, BA.2.75, BQ.1, and BF.7) are under monitoring of WHO's Technical Advisory Group on SARS-CoV-2 Virus Evolution (TAG-VE) to alarm the world as soon as they become a real threat (34).

After all, it is a new era in the COVID-19 pandemic that despite the vast amount of vaccination, newly infected cases continue to arise from all over the world. Scientists, hand in hand with people and global communities are trying to find safer, yet more effective and convenient ways to tackle COVID-19 more than ever. However, governments and some influencers can share wrong and politicized information about the situation of the COVID-19 pandemic and Omicron variant, leading to intentional or unintentional misinformation about the current situation (35).

Therefore, providing fast and accurate data as well as supporting healthcare systems to share correct and valid reports, are as crucial as other actions (36, 37).

Some models estimated that COVID-19 will be an endemic disease in near future, but it is hard to predict the situation, mainly due to differences in the characteristics of the COVID-19 variants (38, 39). Therefore, rather than waiting for a sweet end or disappointing from the future, it is a must for all of us to stay alert and protected; since “the pandemic is far from over” (40).

Authors' Contribution

SR conceptualized the study; SR and SAN prepared the first draft and edited the manuscript; NR critically revised the manuscript, finalized the draft, and supervised the project. All of the authors have read and approved the final draft of the manuscript.

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Not applicable.

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