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Editorial

Vaccination and Future of Coronavirus

In March 2020, the World Health Organization (WHO) officially declared a pandemic of COVID-19.[1] Since July 22, 2022, the SARS-CoV-2 has infected over 570 million individuals and claimed over 6.39 million lives worldwide. As the number of COVID-19 cases continues to increase, and treatments are limited to symptom management and supportive care with a limited number of antivirals that are ineffective, there is an urgent need for a prophylactic solution capable of preventing or reducing the severity of SARS-CoV-2 disease. Regarding previous experiences, the world requires at least one decade to develop an effective vaccine against this novel pathogen.

However, extraordinary global will and cooperation among all stakeholders resulted in the sequencing of SARS-CoV-2 and the subsequent development of safe and effective mRNA, viral vector, protein, and other COVID-19 vaccines. Following the global administration of the vaccines, new COVID-19 cases, hospitalization, and deaths due to COVID-19 began to decline among vaccinated populations.

While the precise efficacy of vaccines in preventing SARS-CoV-2 transmission still remains unknown, more research is being conducted to determine the protective nature of the effective vaccines in use against severe symptomatic COVID-19 and death.[2-5] However, after emerging, the highly contagious delta variant and new omicron sub-variants such as BA.4 and BA.5 cause asymptomatic infections and mild illnesses with high respiratory viral loads, making them significant sources of viral spread even in vaccinated people. In this situation, achieving herd immunity is far more difficult due to factors such as vaccine hesitancy, a newly mutated virus, and global inequity in vaccine distribution. Furthermore, according to recent data, the majority of the world seems to have lost control over the COVID-19 pandemic due to the respiratory route of SARS-CoV-2 spread and lack of strict adherence to effective public health protocols, such as maintaining social distancing and mask use among the community. Therefore, in addition to loosening governmental regulations and obligations, these factors have contributed to the current surge in COVID-19 new cases and hospitalizations. Consequently, our only weapon is the development of safe and effective vaccines that can be widely administrated to provide herd immunity and thus control viral spread. In other words, while new antivirals are essential to reduce the disease burden of the pandemic, effective vaccines are required to keep it from spreading.

Future Vaccination Requirements

At the beginning of the COVID -19 pandemic, the majority of world authorities anticipated that herd immunity would be induced after approximately 67% of the population had been immunized.[6] However, the recent spread of the new SARS-CoV-2 variant among immunized individuals has necessitated a reconsidering of some previous assumptions. The expectation of severe disease prevention, and a reduction in hospitalization and mortality in all vaccine recipients was altered by this realistic understanding of the effectiveness of vaccination. Thus, in order to deal with SARS-CoV-2, we can adjust our expectations and goals based on what we have experienced so far.

Aside from vaccination objectives, it is crucial to specify what we expect from an approved SARS-CoV-2 vaccine. The vaccine should be both safe and effective. Furthermore, a single dose vaccine that does not require a cold chain would provide accelerated large-scale, global vaccination.

On the other hand, ensuring global access to COVID-19 vaccinations remains a priority. Although some wealthy nations have access to an effective vaccination, this does not necessarily mean that everyone, particularly the poorest and most disadvantaged, will have this same access. Hence, to put an end to this epidemic, it will be critical that people in all countries, not just rich countries, receive the required protection by an effective vaccine. Recently, by the end of July 2022, 66.8% of the world population had received at least one dose of a COVID-19 vaccination, however just 19.4% of people in low-income countries had received at least one dose. These figures highlight the importance of timely and fair vaccination distribution around the world in ensuring victory in the battle.

Another major issue contributing to countries' unattainable high vaccination rates is vaccine hesitancy. According to research conducted around the world, factors preventing vaccination include concerns about safety and side-effects of the vaccine, effectiveness, lack of trust, misinformation, and anti-vaccine campaigns.[7] The most significant concern expressed by Europeans who were unsure about getting vaccinated was potential side effects.[8] These studies indicated that different factors contribute to vaccine hesitancy in different countries, and that there is a need to define a more in-depth understanding of why some individuals are hesitant to participate in the vaccination program. This points to the necessity for a tailored approach to vaccine communication, and in particular, a differentiated reaction to vaccination hesitancy in different communities, in order to fulfill global herd immunity targets.

To put an end to the global SARS-CoV-2 pandemic, a vaccine is required. Any vaccine that is dependable, effective, long-lasting, and widely available is a suitable choice. However, viral particles might mutate, rendering vaccines ineffective. Therefore, it is critical to develop a safe and dependable vaccine in advance for future outbreaks of SARS-CoV-2 variants.

One of the most critical questions about the SARS-CoV-2 virus is "Is there a chance for the disease to be eradicated by itself, as was the case with SARS-CoV-1 in previous years?"

Regarding the nature of the virus and high rate of RNA change with natural replication that caused varying transmissibility in pathogenicity of unlimited variants, as well as ongoing concern about antigenic changes affecting vaccine protection, it is critical to recognize that it is not possible to completely eradicate this virus from the world, and that we must develop long-term plans for dealing with it after the control of future disease surges and mortality by available vaccines. Therefore, in addition to decreasing antiviral antibodies, we should repeat the vaccine at unpredicted intervals due to the antigen diversity of newly emerging subspecies.

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