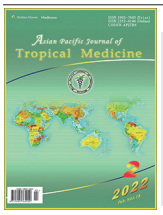

Letter to Editor

Asian Pacific Journal of Tropical Medicine

apjtm.org

doi: 10.4103/1995-7645.338445

5-Years Impact Factor: 2.285

Vaccine equity: The need of the hour in the face of emerging SARS-CoV-2 variants

Mustafa Hussain Ansari[1], Abdullahi Tunde Aborode[2], Youssef Aboufandi[3], Juveriya Hassan[1], Tarun Kumar Suvvari[4]✉, Venkataramana Kandi[5]

[1]*Shadan Institute of Medical Sciences, Telangana, India*

[2]*Healthy Africans Platform, Research and Development, Ibadan, Nigeria*

[3]*Medical University of Sofia, Faculty of Medicine, Bulgaria*

[4]*Dr. N.T.R. University of Health Sciences, Andhra Pradesh, India*

[5]*Department of Microbiology, Prathima Institute of Medical Sciences, Karimnagar, India*

Equity is not equality. The word 'equity' focuses on the individual and takes a need-based approach, whereas 'equality' treats everyone equally irrespective of the rationale. Vaccine equity aims to provide equal access to vaccines to people all around the globe[1]. The World Health Organization (WHO) had set a target for each country for vaccinating 40% of their population by the end of this year, but many countries are far off from the target[1]. Low- and middle-income countries (LMIC), with some exceptions, suffer from a polarisation of vaccinations rates, with the latter suffering the most[1,2].

Coronaviruses have several structural proteins, including the spike protein (S), the membrane protein (M), the envelope protein (E), and the nucleoprotein (N). These alone have mutated to varying extents. There were 687 mutations in the spike protein, 43 mutations in the envelope protein, 124 mutations in the membrane protein, and 378 mutations in the nucleocapsid phosphoprotein[2]. Several variants have been reported in recent years involving multiple mutations in S, such as alpha (B.1.1.7), beta (B.1.351), gamma (P.1), delta (B.1.617.2) and omicron (B.1.1.529). Mutations of this binding motif occur in one variant in alpha, three in beta, gamma, and two in delta, all involved in interactions with the ACE-2 receptor. As a result of increased affinity for ACE2 (seven-fold in alpha, 19-fold in beta, gamma, and two-fold in delta), there may be increased infection or elution of immunity[3,4].

Despite the successive waves of infection caused by the first alpha and later delta variants, large localized outbreaks were still driven by the beta and gamma variants in South Africa and South America, respectively[5]. The *S* gene within Omicron contains a much greater number of mutations compared to the *S* gene in previous variants of concern, such as 30 amino acid substitutions, six residue deletions, and three residue insertions as well as 30 amino acid substitutions in the *S* gene[6]. Sixty-three countries and 64 444 regions within the WHO have detected cases of this variant as of December 9, 2021[5]. Omicrons seem to grow more rapidly in countries with high levels of population immunity than in countries with low immunity levels, regardless of whether this is the result of immune evasion, inherent increased contagiousness, or a combination of both.

Based on the data currently available, Omicron outperforms the Delta option, which is an alternative transport based on community groups. Omicron is still under study in terms of its clinical severity. Preliminary South African data suggest that it may be less severe than Delta. All EU/EEA cases reported so far are mild or asymptomatic, but it is unclear to what extent Omicron is less toxic inherently[7].

Omicron vaccine has been a subject of limited studies, and no peer-reviewed evidence has yet been published on its effectiveness. Preliminary data and the significantly altered antigenic profile of the Omicron spike protein indicate reduced vaccine effect against Omicron-associated infections[7]. To prevent the situation from further getting out of hand, there is a vital necessity for vaccine

✉To whom correspondence may be addressed. E-mail: tarunkumarsuvvari234@gmail.com

How to cite this article: Ansari MH, Aborode AT, Aboufandi Y, Hassan J, Suvvari TK, Kandi V. Vaccine equity: The need of the hour in the face of emerging SARS-CoV-2 variants. Asian Pac J Trop Med 2022; 15(2): 95-96.

Article history: Received 4 February 2022 Revision 24 February 2022
Accepted 25 February 2022 Available online 28 February 2022

equity. Vaccine equity ensures that the citizens of a country are safe from the virus. It also helps in keeping newer variants at bay.

But, unfortunately, due to hoarding, vaccine equity is becoming harder to achieve. In early 2021, vaccine manufacturers estimated to produce around 12 billion vaccines by the end of the year, more than enough to vaccinate 70% of the world population. Most of the vaccines were hoarded by the high-income countries, leaving them with around 1.2 billion vaccines for redistribution[8]. With the emergence of Omicron, a variant of SARS-CoV-2, countries like the UK are rushing to give a 3rd booster dose to their population. This left many middle- and low-income countries at risk of not meeting the 40% vaccination criteria by the end of the year 2021 for all countries across the world[1,8]. Only 8.5% of people in low-income countries have received their jabs and by establishing COVAX, an effort was made to enable access to vaccines to the low- and middle-income countries[9].

Even after the delivery of the vaccine, various problems keep the vaccine rates from rising. Vaccine hesitancy and misinformation are critical underlying problems causing the stagnation of vaccination rates in LMICs. The most common reasons given for such hesitation were the fear of the vaccine's side effects and the belief that the prescribed vaccine won't show any product. Vaccine selection is also essential for the pricing and distribution of vaccines to LMICs.

Although mRNA vaccines have great efficacy rates of 95% and 94.5% from Pfizer and Moderna, respectively, their high cost and requirement for lower temperature storage make them less suitable for administration on a large scale for LMICs[10]. Out of the different vaccine platforms, vaccines based on whole inactivated viruses (WIV) and protein subunit dominate the LMIC vaccine manufacturing strategies[10].

Reaching global equity in the COVID-19 vaccine handout remains challenging to attain[11]. Although robust clinical trials have taken place to provide rapid approval of these vaccines, a clear trend is showing the lack of clinical trial participation from the vast majority of developing countries and few developed countries.

In conclusion, if vaccine equity is not achieved, the road ahead will be long and dreadful, however, this need not be the case. We can overcome the problem of vaccine inequity by taking effective measures, for example, allowing other private firms to produce the vaccines by sharing its blueprint or by setting up bilateral agreements with those countries which have the capacity to produce these vaccines in larger numbers.

Conflict of interest statement

The authors declare that there is no conflict of interest.

Authors' contributions

TKS and VK conceptualized the idea and designed the manuscript. MHA, ATA, YA and JH drafted the manuscript. TKS and VK edited, reviewed and made additional changes of the manuscript. VK did the overall manuscript supervision. All authors approved the final draft.

References

[1] World Health Organization. *Vaccine equity*. [Online]. Available from: https://www.who.int/campaigns/vaccine-equity. [Accessed on 24 December 2021].

[2] Dejnirattisai W, Huo J, Zhou D, Zahradník J, Supasa P, Liu C, et al. SARS-CoV-2 Omicron-B.1.1.529 leads to widespread escape from neutralizing antibody responses. *Cell* 2022; **185**(3): 467-484.

[3] Naqvi AAT, Fatima K, Mohammad T, Fatima U, Singh IK, Singh A, et al. Insights into SARS-CoV-2 genome, structure, evolution, pathogenesis and therapies: Structural genomics approach. *Biochim Biophys Acta Mol Basis Dis* 2020; **1866**(10): 165878.

[4] Sree PC, Kandi VR, Suvvari TK. SARS-CoV-2 variants of concern-An emerging global threat. *Indian J Respir Care* 2022. doi: 10.4103/ijrc.ijrc_120_21.

[5] WHO. *Classification of Omicron (B.1.1.529): SARS-CoV-2 variant of concern*. [Online]. Available from: https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern. [Accessed on 24 December 2021].

[6] Cele S, Jackson L, Khoury DS, Khan K, Moyo-Gwete T, Tegally H, et al. SARS-CoV-2 Omicron has extensive but incomplete escape of Pfizer BNT162b2 elicited neutralization and requires ACE2 for infection. *medRxiv* 2021. doi: 10.1101/2021.12.08.21267417.

[7] Annika R, Riepler L, Bante D, von Laer D, Kimpel J. SARS-CoV-2 B.1.1.529 variant (Omicron) evades neutralization by sera from vaccinated and convalescent individuals. *medRxiv* 2021. doi: https://doi.org/10.1101/2021.12.08.21267491.

[8] Feinmann L. COVID-19: Global vaccine production is a mess and shortages are down to more than just hoarding. *BMJ* 2021; **375**(2021): n2375. doi: 10.1136/bmj.n2375.

[9] World Health Organization. *COVAX publishes first round of allocations*. [Online]. Available from: https://www.who.int/news/item/02-03-2021-covax-publishes-first-round-of-allocations. [Accessed on 24 December 2021].

[10] Hotez PJ, Bottazzi ME. Whole inactivated virus and protein-based COVID-19 vaccines. *Annu Rev Med* 2022; **73**: 55-64.

[11] Meskarpour-Amiri M, Amini H, Tavana AM. How much will be the cost for universal coverage of COVID-19 vaccination and how shall it be financed? *Asian Pac J Trop Med* 2021; **14**(4): 157-158.