

Covid-19 Vaccine Efficacy on Omicron Variant

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Introduction:

The introduction of coronavirus (CoV) shocked our planet in December 2019, resulting in over five million deaths worldwide over the previous two years [1]. Physical and social separation is required as a precautionary step for this infectious and transmissible pandemic. There are several mutant variations of the original SARS-CoV-2. Because of its striking similarities to SARS-CoV, the new coronavirus was first termed SARS-CoV-2 (2019-nCoV), but was later designated Coronavirus Disease-19, or COVID-19 [2,3]. At the moment, the variety of greatest concern is Omicron, also known as B.1.1.529. Omicron was discovered in South Africa and Botswana in early November 2021 [4]. South African scientists were the first to identify it as a consequence of employing genome sequencing to assess an alarming spike in cases. The most frightening aspect is the large number of mutations [5]. COVID-19 is the seventh CoV discovered to infect humans. Before SARS-CoV-2, six other CoVs strains were identified to infect humans. These groupings also include HCoV229E (229E), HCoV-OC43 (OC43), HCoV-NL63 (NL63), HCoV-HKU1 (HKU1), SARS-CoV, and MERS-CoV [6].

It was stated at the outset that omicron is more dangerous and lethal than the preceding ones, and that it spreads quickly. It has already expanded to 57 nations, including Austria, Belgium, Denmark, Germany, Israel, and the United Kingdom as well as African countries. This variation has around 32 alterations, some of which are bothersome [7]. There isn't much known regarding its severity or transmissibility, and nothing can be deduced just based on sequence characteristics [8]. According to the South African scientist who discovered omicron, HIV patients may be accountable for Omicron variations [9]. The likely impact of the viral mutation is based on past strain mutations and lab test findings. The virus infects the population by attaching itself to cells and uses spike proteins to do so. Fifteen of the 32 mutations work with the spike proteins to attach to particular antibodies as well as ACE-2 receptors [10].

On the advice of the WHO's Technical Advisory Group on Virus Evolution, the World Health Organization (WHO) recognised B.1.1.529 or Omicron variant as a concern on November 26, 2021. Whether the Omicron variety is more contagious or produces more severe symptoms COVID-19's relationship to other SARS-CoV-2 variations, especially the Delta form, is unclear [11]. Several epidemiological investigations are underway in South Africa, the first nation to identify the Omicron form, as the number of COVID-19-positive people rises. In comparison to other

COVID-19 variations, there is currently no information on various Omicron-related symptoms. Persons who have previously been infected with COVID-19 are at a higher risk of contracting the disease with Omicron-variant [12]. The method of Omicron variant identification is continuous reverse-transcriptase-polymerase-chain reaction (RT-PCR). Recent research in England found that after 15 weeks of two doses of BNT162b2 (Pfizer) vaccination, the vaccine effectiveness was about 88.0 percent, however there was no impact against Omicron variant after two doses of ChAdOx1 (AstraZeneca) vaccine. The efficacy of presently available therapies [13].

Omicron has by far the largest number of mutations among all SARS-CoV-2 variants. In particular, there are 32 mutations located within Spike protein, which is the key viral component that determines the infectivity and antigenicity of the virus. Furthermore, 15 of 32 mutations are located right at the receptor-binding region (RBD) of Spike protein. These mutations cover almost all the key mutations of the previous variant of concern (Alpha, Beta, Gamma, and Delta), including K417N, E484A, and N501Y and other known mutations which are proved to change the sensitivity of the virus to neutralization by protective antibodies [14]. This finding suggests that the monoclonal antibodies that have been approved by the Food and Drug Administration (FDA) may be less effective against the omicron variant [15]. It was suggested that the complicated mutations in Spike may lead to escape from immunity induced by prior infection or vaccination, and may cause a large number of breakthrough infections or re-infection with mutated viral strains [16]. Omicron is a very highly transmissible variant with studies from South Africa and the UK reporting doubling times of 3.38 d (95% CI 3.18–3.61 d) and 2–2.5 d, respectively with the basic reproduction number (R0) above 3. This property is accounting for its rapid spread and displacement of the prevailing delta variant [17].

Omicron has also been found in India, originally in individuals who had arrived from trips abroad and now in people who had no prior travel history. Of the last few days, there has been a dramatic increase in cases in Mumbai and Delhi [18]. The third wave of SAR-COV-2 in India, powered by omicron, has arrived.

Declarations

Conflict of Interest

The author declares no conflict of interest.

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Ethical Approval

Not Required.

References

1. Kumari R, Kaur J, Hussain S. (2020). Management of diabetes with Covid-19: A review. *Int J Pharm Pharm Sci.* 12(12):1-6.
2. Hussain S, Mohapatra C, Trivedi K, Gupta L, Baweja H. (2021). SARS-CoV-2 and The Gastrointestinal Disorders. *TMR Theory and Hypothesis.* 4(4): 549-558.
3. Mohit, Hussain MS. (2021). Potential Role of Curcumin as a Treatment Option for Covid-19: A Review. *Plant Archives.* 21:296-305.
4. Gu H, Krishnan P, Ng DY, Chang LD, Liu GY, et al. (2021). Probable Transmission of SARS-CoV-2 Omicron Variant in Quarantine Hotel, Hong Kong, China. *Emerging Infectious Diseases.* 28(2).
5. Vaughan A. (2021). Omicron emerges. *New Sci.* 252(3363): 7.
6. Hussain S, Mohit, Pamma P, Kumari B. (2021). Treatment modalities of the covid-19 pandemic through repurposed drugs and status of vaccines. *International Journal of Applied Pharmaceutics.* 13(2):48-58.
7. Chen J, Wang R, Gilby NB, Wei GW. (2021). Omicron (B. 1.1. 529): Infectivity, vaccine breakthrough, and antibody resistance. 2112.01318.
8. Callaway E, Ledford H. (2021). How bad is Omicron? What scientists know so far. *Nature.* 600(7888): 197-199.
9. Healy M. (2021). Did failure to adequately treat HIV patients give rise to the Omicron variant? *Los Angeles Times.*
10. Baxter AL, Schwartz KR, Johnson R, Rao A, Gibson RW, et al. (2021). Rapid initiation of nasal saline irrigation: hospitalizations in COVID-19 patients randomized to alkalization or povidone-iodine compared to a national dataset. *medRxiv.* 1-14.
11. World Health Organization. (2021). "Update on Omicron".
12. Andrews N, et al. (2021). "Posted on December 14, 2021. Effectiveness of COVID-19 vaccines against the Omicron (B.1.1.529) variant of concern". *medRxiv.*
13. Burnett S, Schmidt F, Pardo E. (2021). COVID: How dangerous is the omicron variant? *Science.*
14. Takashita E, Kinoshita N, Yamayoshi S, Sakai-Tagawa Y, Fujisaki S, Ito M, et al. (2022). Efficacy of Antibodies and Antiviral Drugs against Covid-19 Omicron Variant. *The New England Journal of Medicine.*
15. Rawat S, Hussain MS, Mohapatra C, Kaur G. (2021). An Overview of Monoclonal Antibodies and Their Therapeutic Applications. *Nat. Volatiles & Essent. Oils.* 8(6): 4121-4130.
16. Zhang L, Li Q, Liang Z, Li T, Liu S, Cui Q, et al. (2022). The significant immune escape of pseudotyped SARS-CoV-2 variant Omicron. *Emerging Microbes & Infections.* 11: 1-5.
17. VanBlargan LA, Errico JM, Halfmann PJ, Zost SJ, Crowe Jr. JE, Purcell LA et al. (2022). An infectious SARS-CoV-2 B.1.1.529 Omicron virus escapes neutralization by therapeutic monoclonal antibodies. *Nature Medicine.*
18. Wibmer CK, Ayres F, Hermanus T, Madzivhandila M, Kgagudi P, Oosthuysen B, et al. (2021). SARS-CoV-2 501Y.V2 escapes neutralization by South African COVID-19 donor plasma. *Nature Medicine.* 27:622-625.



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