Arch Clin Infect Dis. 2021 October; 16(5):e122784. doi: 10.5812/archcid.122784.

Published online 2022 February 22. **Editorial**

What We Know About Omicron?

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Received 2022 January 18; **Accepted** 2022 January 19.

Keywords: Omicron, Mutation, Vaccination

The identified novel severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) variant, B.1.1.529, was reported to the World Health Organization (WHO) by South Africa on November 24, 2021. Firstly, B.1.1.529 was detected in specimens collected on November 11 and 14, 2021, in Botswana and South Africa, respectively (1).

A variant of concern (VOC) was the WHO classification according to epidemiological data demonstrating a rise of infections in South Africa in recent weeks that simultaneously occurred with the identification of Omicron. Numerous concerning spike protein replacements have been reported for Omicron, a number of which are recognized from other variants to be in relation to decreased susceptibility to accessible monoclonal antibody therapeutics or decreased neutralization by convalescent and vaccine sera. Moreover, the B.1.1.529 variant was classified by the European Center for Disease Prevention and Control as a VOC owing to issues concerning immune escape and potentially increased transmissibility in comparison to the Delta variant (2).

At a minimum 30 amino acid replacements, 3 small deletions, and 1 small insertion are the characteristics of the spike protein of the Omicron variant. In particular, 15 of the 30 amino acid replacements are reported in the receptor-binding domain (RBD). Additionally, several changes and deletions are observed in other sites (1).

At present, the efficient way of the person-to-person transmission of the Omicron variant has not been recognized. In South Africa, the substitution of Delta by Omicron as the main variant increases worries over the possibility of the higher transmissibility of the Omicron variant, compared to Delta; however, on account of the small number of patients in South Africa during Omicron emergence, the higher transmissibility of this variant than Delta is uncertain. In addition, the documentation of a comparatively small number of patients up to now causes difficulty in the estimation of transmissibility. The investigation of spike protein changes demonstrates the likelihood of the increased transmission of the Omicron variant in comparison to the initial SARS-CoV-2; nevertheless, the higher transmissibility of Omicron than Delta is challenging to deduce (1).

At present, the association of Omicron with further severe diseases is uncertain. On account of the limited number of patients with the Omicron variant, the evaluation of disease severity is hard. The initial data from South Africa show no unusual symptoms related to Omicron infection. Moreover, regarding other variants, several patients are asymptomatic (3).

Furthermore, no available data are obtained for the assessment of sera ability from vaccinated individuals or patients with a history of SARS-CoV-2 infection for Omicron neutralization. Nevertheless, the cooperation of the United States Government SIG and global public health aims at generating the aforementioned data in laboratory settings. Moreover, they will continue observing epidemiological and clinical indicators (1).

The main target of the immunity induced through vaccination is the spike protein. More changes in the spike protein, including 15 in the RBD, have been noticed in the Omicron variant than in other variants. According to the number of replacements, the site of these replacements, and data from other variants with similar spike protein replacements, it is predicted to have significant decreases in neutralizing activity of sera from vaccinated or previously infected cases, indicative of the possibility of decreased protection from infection.

It is required to carry out laboratory and epidemiological investigations to evaluate how the Omicron variant affects vaccine efficacy and breakthrough infections, including in individuals receiving booster doses. Nonetheless, vaccination is predicted to continue to provide protection

against hospitalization and mortality. Additionally, vaccination continues to have a crucial role in COVID-19 pandemic control (1).

At present, no virus-specific data are accessible for the evaluation of whether monoclonal antibody therapies will maintain efficacy against the Omicron variant. According to the information from other variants with remarkably fewer changes in the RBD, the susceptibility of the Omicron variant to several monoclonal antibody therapies is anticipated; however, others variants might have less potency in this regard (1).

It is expected to detect the Omicron variant using the CDC 2019-novel Coronavirus (2019-nCoV) real-time RT-PCR diagnostic panel and flu and SARS-CoV-2 multiplex assay.

Concerning the possibility of the emergence of a novel variant on account of Omicron mutation, a growing body of evidence is observed on numerous individuals infected with Omicron worldwide. Moreover, additional worries are reported regarding the fact that Omicron is only the starting point for the emergence of further variants, potentially retaining its high level of transmissibility but with a possibility of greater virulence.

Due to the emergence of novel variants, such as Omicron, the range of groups at risk of the severe disease following infection becomes broader, which is considered of the highest concern (4). A possibility is the emergence of variants from an individual immunocompromised in one way or another. Additionally, this individual acts as an incubator that permits the development of the variant after some time. Another possibility is the ability of individuals with normal immune systems to retain the virus longer than it is firstly considered or transmission from another source. If the transmission is from an immunocompromised patient, it would be particularly worrying as it is indicative of the possibility of the emergence of such variants at multiple and near-random times in the future. However, in case of proving the less severity of Omicron infections, considered a notable condition, the evolution within an individual probably could better aid to give an explanation for this (4).

Scientists are trying to acquire further knowledge about the Omicron variant to better perceive the possibility of its easy transmission and the efficacy of the present authorized or approved medical countermeasures, such as vaccines, therapeutics, and diagnostic tests, against this variant. There is a rapid emergence of new data on the virologic, epidemiologic, and clinical features of the Omicron variant. The Centers for Disease Control and Prevention (CDC) and other federal agencies are trying to work closely with international public health agencies to closely observe the situation. The updates will be provided by the CDC as further information and data become available (1, 5).

To sum up, In Iran, after successful control of the fifth pick, which led to the high rates of morbidity and mortality, we have witnessed the incidence of the Omicron variant from early 2021 December. Hence, it is suggested that a booster dose of the COVID-19 vaccine be administered to all people, which can help reduce community statistics.

Footnotes

Authors' Contribution: Masoud Mardani is the only author of the article and the study was solely carried out by the author.

Conflict of Interests: Not declared by the author.

Funding/Support: Not declared by the author.

References

1. Centers for Disease Control and Prevention. *Science Brief: Omicron (B.1.1.529) Variant*. Atlanta, Georgia, USA: Centers for Disease Control and Prevention; 2021, [updated Dec 2, 2021]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/scientific-brief-omicron-variant.html#.
2. European Centre for Disease Prevention and Control. *Threat Assessment Brief: Implications of the emergence and spread of the SARS-CoV-2 B.1.1. 529 variant of concern (Omicron) for the EU/EEA*. Stockholm, Sweden: European Centre for Disease Prevention and Control; 2021, [updated Nov 26, 2021]. Available from: https://www.ecdc.europa.eu/en/publications-data/threat-assessment-brief-emergence-sars-cov-2-variant-b.1.1.529.
3. National Institute for Communicable Diseases. *Frequently Asked Questions for the B.1.1.529 Mutated SARS-CoV-2 Lineage in South Africa*. Sandringham, Johannesburg, South Africa: National Institute for Communicable Diseases; 2021, [updated Nov 26, 2021]. Available from: https://www.nicd.ac.za/frequently-asked-questions-for-the-b-1-1-529-mutated-sars-cov-2-lineage-in-south-africa/.
4. Cunningham A. *How might Omicron impact potential future COVID-19 variants?* Birmingham, United Kingdom: University of Birmingham; 2021. Available from: https://www.birmingham.ac.uk/research/perspective/omicron-impact-on-future-covid19-variants.aspx.
5. U.S. Food and Drug Administration. *SARS-CoV-2 Viral Mutations: Impact on COVID-19 Tests*. Silver Spring, Maryland, USA: U.S. Food and Drug Administration; 2021, [updated Dec 28, 2021]. Available from: https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/sars-cov-2-viral-mutations-impact-covid-19-tests.