Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Correspondence/Letter to the Editor

Prevalence of Omicron variant during the third wave of COVID-19 at a tertiary care hospital in Western Maharashtra

Dear Editor,

Many variants of Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) emerged after the onset of the COVID-19 pandemic in December 2019. Till November 2021, four variants of concern (VoC) of SARS-CoV-2, such as Alpha (B.1.1.7), Beta (B.1.351), Gamma (P.1), and Delta (B.1.617.2), were known. The emergence of these different variants was associated with new waves of the pandemic.[1]

During the first wave of COVID-19, several VoCs, i.e., Alpha (B.1.1.7), Beta (B.1.351), and Gamma (B.1.1.28.1), were circulating in India. However, the second wave was predominantly associated with the Delta variant (B.1.617.2). The increased transmissibility of Delta VoC was associated with multiple factors like higher viral load, ability to escape from natural immunity, and longer duration of infectiousness. Hence, it becomes imperative to be vigilant and keep looking for the dominant VoC among the population.

On November 26, 2021, WHO identified the fifth VoC and named it Omicron.[2] First case of Omicron in India was reported in the first week of December 2021, and it marked the onset of third wave.[3] Among all the VoCs, the Omicron variant has the most significant number of mutations. There are more than 30 mutations, including those in spike protein and receptor-binding domain.[4] This resulted in higher viral binding affinity, increased transmissibility, and higher ability to escape from neutralizing antibodies. One of the significant concerns regarding this variant was the effectiveness of currently used vaccines. It was found that there is a reduction in neutralizing antibodies against the Omicron variant compared with other variants in vaccinated individuals. It was also thought that many diagnostic kits already used in laboratories may miss the Omicron cases.

As S-gene in the Omicron variant is heavily mutated, the absence of the S-gene (S-gene dropout) and the detection of Omicron-specific mutations are used to identify Omicron variants. However, sequencing is required for the final confirmation of Omicron variant. This observational cross-sectional study was carried out to look for the prevalence of Omicron variant using ready-to-use real-time PCR-based kit in January 2022, when a sudden increase in positivity for SARS-CoV-2 was observed at our institute. This study was carried out using stored COVID-19 positive samples from January 11, 2022 to January 20, 2022. This study period was chosen as the positivity rate for our center crossed 50% during this period (Fig. 1) at a tertiary care center in Pune in western Maharashtra, India. Study samples were known SARS-CoV-2 positive using CoviPath™ COVID-19 RT-PCR Kit (Invitrogen Bioservices Private Ltd., India).

All these study samples were tested using TATA MD CHECK RT-PCR OmiSure Kit (TATA Medical & Diagnostics Ltd., Mumbai (Maharashtra), India), approved by ICMR on January 29, 2022 for the detection of Omicron variant. This kit is used to identify Omicron (B.1.1.529, BA.1 and BA.2) SARS-CoV-2 VoC using extracted RNA from a specimen collected in Viral Transport Media (VTM). The primer and probe sets used in the Tata MD CHECK RT-PCR OmiSure kit are designed to detect a combination of S-gene dropout or S-gene target failure (SGTF) and S-gene mutation amplification (SGMA) specific to the Omicron variant, and RdRP-gene of SARS-CoV-2 along with human internal control RNase P in a single tube assay.

Out of 104 samples subjected to TATA MD CHECK RT-PCR OmiSure RT-PCR, 103 samples were found to be the Omicron variant. Most of the samples were from male patients (n = 80, 76.9%). The age of these patients ranged from 4 years to 75 years with median age of 32 years. Most of the samples included in this study were from symptomatic patients (n = 93, 89.42%). A total of 93 patients were fully vaccinated, and all of them received the Covidshield vaccine. The remaining 11 patients were not vaccinated, including seven patients below the age of 15 for whom there was no vaccine available at that time.

The prevalence of the Omicron variant was found to be 99.03% during the study period. Among 103 samples positive for Omicron variant, 85 samples had shown both SGTF or S-gene dropout and SGMA. Further 16 samples had shown SGTF, but SGMA was absent. Two samples showed absence of SGTF or S-gene dropout, but both of them had SGMA. Only one study sample was found to be a variant other than the Omicron in which both SGTF and SGMA were not found (Table 1).

Several variants of SARS-CoV-2 emerged after the onset of the COVID-19 pandemic in December 2019. The Omicron has

Please cite this article as: Singh SP et al., Prevalence of Omicron variant during the third wave of COVID-19 at a tertiary care hospital in Western Maharashtra, Medical Journal Armed Forces India, https://doi.org/10.1016/j.mjafi.2022.08.009

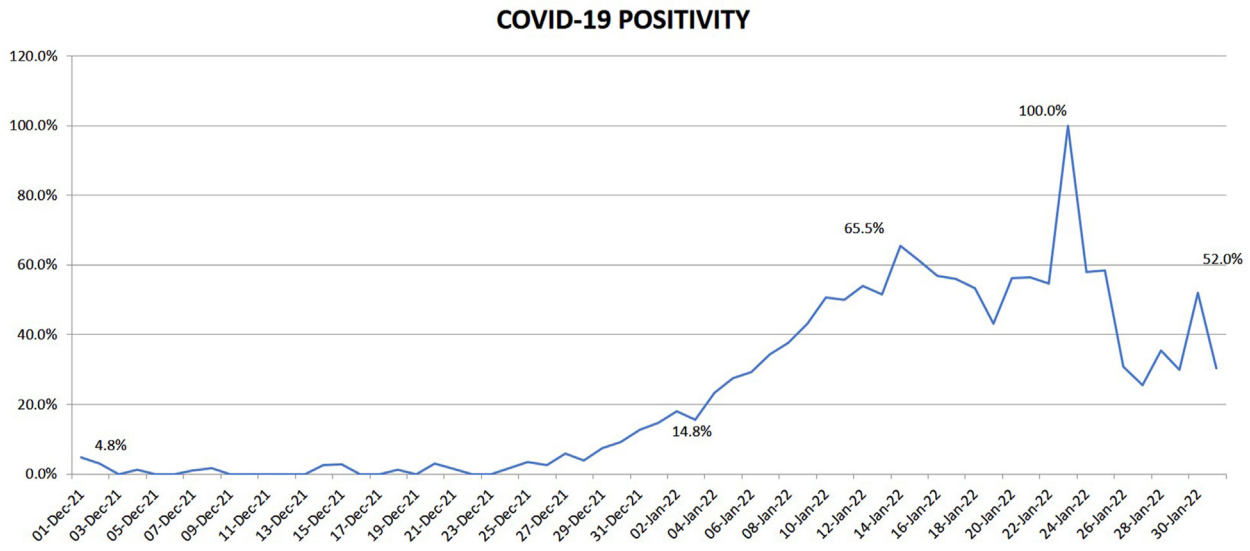

Fig. 1 – Positivity rate of COVID-19 at our center during December 2021 to January 2022.

Table 1 – Result of the 104 known COVID-19 positive samples tested with the Tata MD CHECK RT-PCR OmiSure kit for detection of Omicron variant.

SGTF	SGMA	RdRP	RNase	Interpretation	No. of samples
+	+	+	+	Indicates the presence of Omicron	85
+	–	+	+	Indicates the presence of Omicron	16
–	+	+	+	Indicates the presence of Omicron	02
–	–	+	–	SARS-coV2 detected, But Omicron not present	01

rapidly spread worldwide and has replaced all other circulating strains. This new variant was transmitted far more quickly than other variants.

We observed that the majority of the patients in this study were already fully vaccinated. This indicates vaccine breakthrough, i.e., a reduction in protection from vaccines against COVID-19 infection with the Omicron variant. Wilhelm et al. have also found similar findings in their in vitro studies, where the neutralization efficacy of vaccine-elicited sera against Omicron was severely reduced in contrast to the previously circulating Delta variant.[5]

The gold standard to detect Omicron variant is gene sequencing. However, it is expensive and not readily available at all laboratories. Recently, ready-to-use kits based on real-time PCR have been made available to detect Omicron variant. These kits decrease the load on sequencing and allow healthcare authorities to assess the evolution of variants and take timely action to control spread. Additionally, samples negative for Omicron by these kits can be prioritized for sequencing, as chances of detecting newer mutations are higher in these samples.

The emergence of newer variants can pose various problems, including different presenting symptoms, difficulties in detecting new variants by existing kits, and decreased efficiency of the existing vaccines. Therefore, public health authorities need to be vigilant and keep an eye on the ever-changing dynamics of COVID-19.

A very high prevalence of Omicron variant was noted among the study samples. This Omicron variant harbors multiple mutations and, hence, its high transmissibility can be due to potential immune evasion. Variant-specific vaccines and monoclonal antibody agents may be required to treat COVID-19 due to Omicron and other emerging VoC in the future.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.mjafi.2022.08.009.

REFERENCES

1. Fontanet A, Autran B, Lina B, Kieny MP, Karim SSA, Sridhar D. SARS-CoV-2 variants and ending the COVID-19 pandemic. *Lancet*. 2021;397(10278):952–954.
2. WHO. *Classification of Omicron (B.1.1.529): SARS-CoV-2 Variant of Concern*; 2021. Published https://www.who.int/news/item/26-11-2021-classification-of-omicron-(b.1.1.529)-sars-cov-2-variant-of-concern. Accessed March 24, 2022.

Please cite this article as: Singh SP et al., Prevalence of Omicron variant during the third wave of COVID-19 at a tertiary care hospital in Western Maharashtra, Medical Journal Armed Forces India, https://doi.org/10.1016/j.mjafi.2022.08.009

3. Hindustan Times. *India's First Omicron Cases Detected in Karnataka*; 02 Dec 2021. https://www.hindustantimes.com/india-news/indias-first-omicron-cases-detected-in-karnataka-101638445884205.html. Accessed March 24, 2022.
4. Concern EC for DP and CI of the Further Emergence and Spread of the Sarsc-2 B 1. 1. 52. Variant of, Update. (Omicron) for the EU/EEA — First, December 2 2021 (https://www.ecdc,.europa.eu/sites/default/files/documents/.Threat-assessment-covid-19-emergence-sars -cov-2-variant-omicron-december-2021.pdf).
5. Wilhelm A, Widera M, Grikscheit K, et al. Reduced neutralization of SARS-CoV-2 omicron variant by vaccine sera and monoclonal antibodies. *medRxiv*. 2021.

S.P. Singh
Professor & Head, Department of Microbiology, Armed Forces Medical College, Pune, India

Kundan Tandel*
Associate Professor, Department of Microbiology, Armed Forces Medical College, Pune, India

Dinesh Kumar Kalra
Associate Professor, Department of Microbiology, Armed Forces Medical College, Pune, India

Bhagya Babu
Junior Resident Department of Microbiology, Armed Forces Medical College, Pune, India

Pratik Thosani
Senior Resident, Department of Microbiology, Armed Forces Medical College, Pune, India

Kavita Bala Anand
Professor, Department of Microbiology, Armed Forces Medical College, Pune, India

*Corresponding author.
E-mail address: tandel.kundan@yahoo.co.in

20 May 2022
Available online xxx

0377-1237/$ – see front matter

https://doi.org/10.1016/j.mjafi.2022.08.009