



OMICRON - IS IT REALLY A VARIANT OF CONCERN?

Medicine

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ABSTRACT

Omicron is the newest variant of concern of the SARS-CoV-2 which has spread to over 75 countries across the globe and has displayed increased transmissibility as evident by the rapid increase in number of cases. This variant was first reported in South Africa, and later spread to Europe and India by international travel, but now significant community transmission is underway. While the hospitalization rate is lower overall, there is an increase in hospitalization rate seen in pediatric patients with Omicron as compared to the previous strains. The severity of disease caused by this variant is still unclear as South Africa reports decreased hospitalization and mortality while India reports a spike in the case fatality rate. The vaccine efficacy has also decreased in preventing infection, but it might still offer significant protection against severe disease, and individuals taking a booster dose remain as protected as against the other strains. While India has fully vaccinated 40.9 % of its total population, only 26.5 % of the population has taken both the doses in South Africa. We compared the most vaccinated province and the least vaccinated province of South Africa and the data supported the belief that vaccination did not protect people from contracting the Omicron infection. A comparison between South Africa and India, a country where Omicron is starting to gain a stronghold, is also done and the early data shows a higher increase in the number of deaths in India after the introduction of the newest variant.

KEYWORDS

INTRODUCTION

While the Delta variant remains the main variant of concern (VOC) across the world, there has been an introduction of a new variant in the SARS-CoV-2 family. The B.1.1.529 which has been named Omicron was first reported to the World Health Organization (WHO) on 24th November 2021, and the first known case was from a South African specimen collected on 9th November 2021. The next country to have documented a specimen positive for Omicron was Botswana on 11th November 2021. Shortly after having been intimated about the new SARS-CoV-2 variant and a potential global surge in infections with re-imposition of travel restrictions, WHO classified it as a VOC on 26th November 2021.^[1,2] Since then, more than 75 countries have reported confirmed cases of Omicron.^[3]

The early impression is that Omicron is highly transmissible, probably more than the Delta variant, as evidenced by the rapid community spread in the Gauteng province of South Africa which has led to the country experiencing its fourth COVID-19 wave, that has the steepest graph when compared to the previous waves.^[4] Initially, new cases in Europe were mainly linked to a history of international travel, but a preliminary analysis reported to The European Surveillance System (TESSy) revealed that only 13 % cases were linked to travel, while 70 % of the cases reported to TESSy had a local origin. The fact that Belgium, Denmark, Finland, Hungary, Spain, Sweden and Iceland have all reported cases without any history of travel point towards a rampant community transmission.^[3] The total number of confirmed Omicron cases are 300+ in India and are rising day by day, but the actual number may be higher as not all specimens are being sent for genome sequencing. But in spite of higher transmissibility, the trajectory of hospital admissions is flatter in South Africa, which may point towards a less severe disease by the Omicron variant, though the presence of antibodies in a large population due to the previous Delta wave could be a confounding factor.^[4,5] Hence, studies from countries which were relatively spared by the Delta variant or those including only previously uninfected patients who are infected by Omicron are required.

Children are still as unlikely to contract the infection as with the previous variants, with adults being 51 % more likely to be infected with SARS-CoV-2 even during the current Omicron wave. But, worrying data from South Africa reveals that they have a 20 % higher risk of hospitalization due to complications of COVID-19 when infected with Omicron as compared to the earlier strains. Additionally, an increase in infant and under-5 pediatric admissions has been noted

during the current wave led predominantly by the Omicron variant, though this is believed to have confounding factors and more data is required to draw any conclusions.^[4,5]

In-vitro preliminary studies showed concerning results as the antibodies from the serum of vaccine recipients and patients recovered from other variants of SARS-CoV-2 had a lower neutralizing capacity against the Omicron variant as compared to other variants. But, antibodies from the serum of patients who had been infected by SARS-CoV-2 and then also received vaccination later, retained its efficacy.^[6,7,8,9] An increased risk of re-infection has also been seen with the newest variant. A 40 % relative risk of re-infection with Omicron in previously Delta-infected patients, and a 60 % relative risk of re-infection with Omicron in previously Beta-infected patients in South Africa is being reported as compared to those without previous SARS-CoV-2 infection.^[4] These preliminary results point towards major mutations that may possibly lead to changes in virus transmissibility, severity of disease and even nullify the current diagnostic and therapeutic measures including vaccines. During the widely used PCR tests, the S gene is undetectable in cases of Omicron infection, which has been termed as S gene dropout and forms the basis for screening of the new variant. Confirmed cases are reported only after genome sequencing.^[2,10]

The in-vitro studies have been followed up by some preliminary, non-peer reviewed studies about vaccine efficacy in-vivo against the Omicron variant, and the results are not very promising. In a study in South Africa, individuals who have received two doses of the BNT162b2 vaccine had a meagre 33 % protection against infection as compared to the unvaccinated, in the Omicron predominant fourth COVID-19 wave in the country. This is in contrast to 80 % protection seen before the emergence of this latest VOC.^[4] Similar results were attained by Andrews et al in the first such study in the United Kingdom, which measured the efficacy of ChAdOx1 or BNT162b2 vaccines in preventing symptomatic infection. Even as two doses of the vaccines are showing reduced efficiency at preventing infection, there is evidence that individuals taking a booster dose are equally protected against the Omicron as they were against the Delta variant.^[3,4,11] While the vaccine effectiveness against severe disease is yet to be ascertained considering the low number of cases and deaths associated with this variant, the vaccine shows a 70 % protection against hospital admission across all age-groups (above 18 years) and chronic illnesses, though even that is less as compared to the 93 % protection against hospital admission seen in the Delta-predominant wave.^[4]

Methodology

Using data from the South African government website, the most vaccinated province, Gauteng and the least vaccinated province, Northern Cape were compared during the ongoing Omicron-led COVID-19 wave. Further, comparison between South Africa and India was made with data from government websites of the respective countries.^[12,13,14] The parameters of comparison were the increase in the number of new cases and the number of deaths due to COVID-19 after 1 day, 7 days and 14 days, while the figures at the end of 21 days were also compared between India and South Africa, and at the end of 28 days were also compared between the two South African provinces. The first day was considered to be when the first positive specimen of the Omicron variant was found in the country. This was 9th November 2021 for South Africa and 28th November 2021 for India. We also calculated and compared the case fatality rate of COVID-19 after the introduction of Omicron, between India and South Africa. The case fatality rate in India after 28th November 2021 was also compared to that of the Delta-driven second wave.^[15] As of 24th December, India reportedly has 358 Omicron cases according to the government database but, since no widespread data for confirmed Omicron cases in India or South Africa is available, and genome sequencing in every patient is not being done, the comparison was made for total COVID-19 cases and deaths after the advent of the Omicron variant in the country. Further studies with genome-sequencing confirmed cases are required for drawing more accurate conclusions.

RESULTS

- The rise in cases in Gauteng was slightly less as compared to Northern Cape after 1 day (1.15 times v/s 2.69 times) and 7 days (10.94 times vs 13 times), but this was reversed as Gauteng recorded significantly higher rise in cases at the end of 14 and 28 days. (Table 1)
- The rise in the number of deaths was higher in Gauteng province throughout the time period considered (4 times after 1 day, 18 times after 7 days, 39 times after 14 days and 128 times after 28 days). (Table 1)

Table 1: Comparison Of Rise In Cases And Deaths Of Gauteng And Northern Cape Provinces

Gauteng	Northern Cape
Increase in cases after	Increase in cases after
1 day- 115.29% [1.15times]	1 day- 169.23% [2.69 times]
7 days- 994.11% [10.94 times]	7days- 1200% [13 times]
14 days- 13560% [136.6 times]	14 days- 4223% [43.23 times]
28 days- 138721% [1388.2 times]	28 days- 13307.6% [134 times]
Increase in deaths after	Increase in deaths after
1 day- 300% [4 times]	1 day- 162.5% [2.6 times]
7 days- 1700% [18 Times]	7 days- 181.25% [2.81 times]
14 days- 3800% [39 times]	14 days- 262.5% [3.62 times]
28 days- 12700% [128 times]	28 days- 587.5% [6.87 times]

- The rise in cases has been significantly higher in South Africa at the end of 1, 7, 14 and 21 days as compared to India. But the increase in the number of deaths has been higher in India throughout the time period considered. (Table 2)

Table 2: Comparison Of Rise In Cases And Deaths Of India And South Africa

India	South Africa
Increase in cases after	Increase in cases after
1 day- 94.7% [1.94 times]	1 day- 24.48% [2.24 times]
7 days- 617.62% [7.17 times]	7 days- 828.98% [9.28 times]
14 days-1269.71% [13.69 times]	14 days- 2744.89% [28.44 times]
21days- 1836.9% [19.36 times]	21days- 10619.1% [107.19 times]
Increase in deaths after	Increase in deaths after
1 day- 80.5% [11.80 times]	1 day- 137.14% [2.37 times]
7 days- 2011.4% [21.1 times]	7 days- 334.28% [4.34 times]
14 days- 2900% [30 times]	14 days- 708.57% [8.08 times]
21 days- 3713% [38.13 times]	21 days- 1302.85% [14.02 times]

- The case fatality rate of the second wave in India was 0.845 as compared to a case fatality rate of 5.407 since 28th November 2021.
- The case fatality rate since the advent of Omicron is 5.407 in India as compared to 0.295 in South Africa.

CONCLUSION

As evident by early data from South Africa and the United Kingdom,

the latest variant of SARS-CoV-2 is highly transmissible with a shorter doubling time as compared to the Delta variant. While this justifies Omicron's categorization as a VOC, its severity is lesser than that of Delta according to reports from South Africa. This is promising as existing vaccines have shown decreased efficacy against Omicron, and a lower hospitalization rate can help healthcare systems cope up till more efficacious vaccines against this new variant is produced. But, this is in contradiction to the early data from India where a spike in the case fatality rate has been seen, though the time duration is quite less to predict the case fatality rate and hospitalization rate as of now. Further studies at a later point of time will be able to discuss the case fatality rate with more certainty. The inefficacy of vaccines in preventing Omicron infection is evident by the fact that Gauteng, the most vaccinated South African province still had a steeper increase in cases and deaths as compared to Northern Cape, the least vaccinated province in absolute numbers. In addition, even though the existing vaccines have shown poor protection against Omicron infection, it is believed that protection against severe disease will remain substantial and hence, vaccination programmes should continue to be promoted across the world. If this variant follows the same trend as in South Africa, India may experience the next COVID-19 wave within as early as 45 days from the first positive specimen, although the actual rise in cases in the first 21 days has been only 19.36 times in India as compared to 107.19 times in South Africa. Nonetheless, we must be prepared for a probable next wave within the next two months which may or may not have a higher ICU admission rate, and precautionary guidelines by the government must be adhered to halt the spread of the virus. There was large variability in the data from different geographical regions and hence, further targeted studies are required to conclude upon the effects of this new variant on different populations.

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