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## Editorial

## Investigating the aggressiveness of the COVID-19 Omicron variant and suggestions for possible treatment options



## A B S T R A C T

The COVID-19 pandemic has put a strain on all the healthcare systems around the world. The World Health Organization (WHO) stated that the “highly mutated” Omicron variant, known as B.1.1.529, could represent a very high global risk of sudden increases in infections. As a result, it is urgently necessary to explore the most suitable treatments for this variant. The purpose of the study was to investigate the currently available studies regarding the Omicron variant and try to identify any potentially effective therapies for the Omicron variant.

## 1. What do we know about the Omicron variant?

The Omicron variant of SARS-CoV-2 is the latest strain of the coronavirus to be designated a “variant of concern” by the WHO. Researchers worldwide, including South Africa, are investigating this variant in order to better understand many aspects of Omicron, but it will take quite some time to obtain sufficient knowledge. Due to the limited number of available studies, misinformation is spreading worldwide regarding the Omicron variant among general populations, thus posing a significant threat to the healthcare systems around the world, including daily life.

## 2. Is the Omicron transmission capacity higher than that for the COVID-19 Delta variant?

The Omicron variant has raised alarm among epidemiologists who are concerned that the mutations in the new variant could make it more transmissible than previous variants. Further studies are needed to determine whether the Omicron variant is more transmissible than other variants, including the Delta variant. The number of tests for COVID-19 has been steadily increasing around the world. Another serious concern is that this Omicron variant has already been detected in several countries, including Japan, Belgium, Botswana, Hong Kong, Australia, Netherlands, South Africa, and Israel.

In addition to increasing the number of COVID-19 tests, epigenetic studies are urgently needed to clarify any potentially difficult factors associated with the COVID-19 Omicron variant. It is unclear whether the Omicron variant increases COVID-19 severity or not, but preliminary studies have reported that the Omicron variant increased hospitalization for COVID-19 patients in South Africa, which could be related to COVID-19 complications. In addition, it remains unclear as to whether the Omicron variant may promote other variants, including the Delta variant, thereby suggesting that further studies will be needed for full clarification.

## 3. Any practical test for the Omicron variant?

The widely used PCR test is currently being performed to detect the Omicron variant, but further studies will be required to fully understand the effectiveness of other tests, including the rapid antigen detection test.

## 4. Have any suitable treatments for the Omicron variant so far been identified?

Further studies will be needed to examine the potential efficacy of the currently available vaccines from several companies, including Pfizer-BioNTech, against the Omicron variant. The World Health Organization has reported that IL-6 receptor blockers and corticosteroids may be suitable treatments for patients with severe COVID-19.

Several previous studies have stated that anticancer or antiviral drugs could be effective for the Delta variant or other variants [1,2], but more studies will be needed to explore the efficacy of anticancer or antiviral drugs against the Omicron variant.

## 5. Is there any impact of the Omicron variant on the COVID-19 severity in cancer patients?

Previous studies have stated that the Delta variant or other variants may sometimes increase the severity of COVID-19 in cancer patients [3,4]. COVID-19 has been reported to promote cellular senescence, and oxidative stress, which is linked to complications of COVID-19 in cancer patients [5,6]. Additionally, various studies have reported that COVID-19 may lead to a surge in cytokine secretion, which is related to the aggressiveness of COVID-19 [7,8]. However, additional studies will be needed better to understand the impact of the Omicron variant in cancer patients.

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## 6. Are boosters effective against Omicron?

Further studies are needed to determine whether a booster shot might be effective against Omicron. However, the Israeli health minister reported the boosters are effective against the Omicron variant, while the US is currently testing the vaccine's effectiveness.

## 7. What symptoms are associated with the Omicron variant?

The WHO states that there is no specific evidence to suggest that the symptoms related to the Omicron variant are different from the other variants. Nonetheless, the WHO reports that the Omicron variant could possibly increase the mortality rate in line with other COVID-19 variants. The Omicron variant can cause the following symptoms which are similar to those of other COVID-19 variants:

- Headache
- Cough
- Shortness of breath
- Fever
- Fatigue
- Sore throat
- Muscle or body aches
- A loss of taste or smell
- A runny nose

## 8. Do researchers have any suggestions regarding how to reduce the severity of the Omicron variant?

The following instructions noted below could help prevent the aggressive spread of the Omicron variant, as well as other variants, but further studies will be needed to clarify these factors fully:

- Increase the number of people to administer COVID-19 testing.
- Maintain Social distancing.
- Wear a mask in public places.
- Impose travel bans (if required).
- Avoid crowded places.
- Cough or sneeze in the bent elbow or use tissue.
- Always keep your hands clean.
- Make sure to receive COVID-19 vaccinations.
- Be sure to establish and fully staff suitable treatment facilities for older patients and those with chronic comorbidities.

In conclusion, many researchers worldwide are currently trying to obtain adequate knowledge about the Omicron variant, but further studies will be needed to fully understand the severity, transmission capacity, efficacy of diagnostic tests, the efficacy of currently available vaccines, and suitable treatments. Furthermore, we anticipate that there will soon be increasingly more information available to clarify the impact of the Omicron variant on COVID-19 cancer patients and thereby reduce the death rate of COVID-19.

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## Author contributions

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## Competing interests

The authors declare no conflicts of interest in association with the present study.

## Informed consent

Not applicable.

## Ethical approval

Not applicable.

## References

- [1] O. Indari, S. Jakhmola, E. Manivannan, H.C. Jha, An update on antiviral therapy against SARS-CoV-2: How far have we come? *Front. Pharmacol.* 12 (2021) 632677.
- [2] L.Y. Lee, J.B. Cazier, V. Angelis, R. Arnold, V. Bisht, N.A. Campton, J. Chackathayil, V.W. Cheng, H.M. Curley, M.W. Fittall, L. Freeman-Mills, S. Gennatas, A. Goel, S. Hartley, D.J. Hughes, D. Kerr, A.J. Lee, R.J. Lee, S.E. McGrath, C.P. Middleton, N. Murugaesu, T. Newsom-Davis, A.F. Okines, A.C. Olsson-Brown, C. Palles, Y. Pan, R. Pettengell, T. Powles, E.A. Protheroe, K. Purshouse, A. Sharma-Oates, S. Sivakumar, A.J. Smith, T. Starkey, C.D. Turnbull, C. Varnai, N. Yousef, U.K.C.M. P. Team, R. Kerr, G. Middleton, COVID-19 mortality in patients with cancer on chemotherapy or other anticancer treatments: a prospective cohort study, *Lancet* 395 (10241) (2020) 1919–1926.
- [3] C. Liu, Y. Zhao, D. Okwan-Duodu, R. Basho, X. Cui, COVID-19 in cancer patients: risk, clinical features, and management, *Cancer Biol. Med.* 17 (3) (2020) 519–527.
- [4] E. Moujaess, H.R. Kourie, M. Ghosn, Cancer patients and research during COVID-19 pandemic: a systematic review of current evidence, *Crit. Rev. Oncol. Hematol.* 150 (2020) 102972.
- [5] M. Mohiuddin, K. Kasahara, The Emerging Role of Cellular Senescence in Complications of COVID-19, *Cancer Treatment and Research Communications*, 2021, p. 100399.
- [6] M. Mohiuddin, K. Kasahara, The emerging role of oxidative stress in complications of COVID-19 and potential therapeutic approach to diminish oxidative stress, *Respir. Med.* 187 (2021) 106605.
- [7] N. Mangalmurti, C.A. Hunter, Cytokine storms: understanding COVID-19, *Immunity* 53 (1) (2020) 19–25.
- [8] Q. Ye, B. Wang, J. Mao, The pathogenesis and treatment of the 'Cytokine Storm' in COVID-19, *J. Infect.* 80 (6) (2020) 607–613.

Md Mohiuddin<sup>\*</sup>, Kazuo Kasahara  
*Department of Respiratory Medicine, Kanazawa University, Ishikawa, Japan*

<sup>\*</sup> Corresponding author. Department of Respiratory Medicine, Graduate School of Medical Sciences, Kanazawa University, 13-1 Takaramachi, Kanazawa, Ishikawa, 920-8641, Japan.  
*E-mail address:* [mohiuddin@med.kanazawa-u.ac.jp](mailto:mohiuddin@med.kanazawa-u.ac.jp) (M. Mohiuddin).