



Coronavirus Vaccination and Mortality in the Omicron Outbreak in Iran: Mortality Reduction due to Attenuated Pathogenicity and Booster Vaccine Doses

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Received: 15 Mar 2022

Accepted: 20 Mar 2022

More than two years after the first report of the rapidly spreading coronavirus disease 2019 (COVID-19), the coronavirus is still unpredictable by emerging highly divergent variants ¹. Through the highly contagious viral sickness the virus causes, it imposes significant morbidity and mortality on global populations, becoming the second cause of death in people aged 25 to 44 years in January 2021 in the United States. Although mortality rates in disease peaks were significantly reduced as vaccination rates increased, mortality increased again with the outbreak of a variant of concern called Omicron so that the virus became the second leading cause of death in January 2022 in the United States ^{1,2}.

The novel variant, first identified in Botswana and named Omicron (B.1.1.529) by World Health Organization on November 26, 2021, exhibited 36 mutations in the spike protein, the target of antibodies, and a total of 59 mutations throughout its genome. More importantly, 15 mutations occurred in the Receptor-Binding Domain (RBD), which can increase infectivity and mediate virus escape from vaccine-induced antibodies ³. In other words, the highly mutated omicron variant can evade immunity in vaccinated individuals and is associated with vaccine breakthroughs ^{1,3}. The Omicron has a 13-fold increase in viral infectivity, and compared to the Delta variant, it is 2.8 times more contagious and its R_0 , the indicator of contagiousness and transmissibility, can be as high as 10, while for the Delta, it did not reach 7 ⁴. Fortunately, the mortality of this variant is lower than the wild type and Alpha, Beta and Delta variants ⁵. About two years after the first official report of the SARS-CoV-2 outbreak in Iran, like in other countries, the virus is still raging. As in other countries, the peak of the Omicron variant in Iran increased infection, hospitalization, and mortality once again. During the Omicron outbreak in Iran, the maximum number of newly identified cases in one day was more than 39,000, so that the maximum number of active cases in one day reached about 375,000 by mid-February 2022. Although in the previous peak, the maximum number of new cases detected in a day and the maximum number of deaths per day were about 50,000 and more than 700, respectively, the number of deaths per day did not reach 250 in this peak ⁶. This difference may be due to the lower mortality ⁵ and progress of the vaccination process, although vaccine efficacy is negatively affected by new variants ³. Although the percentages of people who have received at least one dose of a vaccine, have been fully vaccinated, and given the booster dose are now about 75%, 65%, and 25%, respectively, these percentages on August 24, 2021, when the highest number of deaths due to COVID-19 were reported in Iran, were about 20%, 7%, and 0, respectively ⁷.

The fastest and most accessible ways to protect against the Omicron variant seem to be wearing medical-grade masks and receiving the third dose of vaccine ⁸. The protection provided by two shots of vaccines is reduced to less than 40% a few months after the second shot, but the third shot seems to cause about 60 to 70% protection in the two weeks after the injection and protect against severe COVID-19 ⁹. It has been shown that vaccine efficacy decreases with increasing time after vaccination ³. There is not much difference in the treatment of the disease caused by this variant, but of the monoclonal antibodies, only sotrovimab appears to be effective and is authorized ⁴. Eventually, updating the current vaccines and pursuing a universal vaccine should be of concern to those in charge ^{8,10}.

Keywords: Coronavirus spike protein, COVID-19 pandemic, Mass active immunization, SARS-CoV-2

Acknowledgement

Reported data were obtained from Worldometer and Our World in Data, and the authors had no higher access to the data than the public. This paper did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of Interest

The authors have no conflict of interest.

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