Following third dose of BNT162b2, adverse events increased in those with prior COVID-19

By Dr. Chinta Sidharthan

Feb 23 2023

Reviewed by Benedette Cuffari, M.Sc.

In a recent study published in *PLOS Global Public Health*, researchers investigate whether a third booster dose of the Pfizer-BioNTech BNT162b2 coronavirus disease 2019 (COVID-19) vaccine resulted in adverse reactions in healthcare workers in Northeast England who had a prior history of COVID-19 or were recently vaccinated against influenza.

Study: Increased adverse events following the third dose of BNT162b2/Pfizer vaccine in those with previous COVID-19, but not with concurrent influenza vaccine. Image Credit: Studio Romantic / Shutterstock.com

Background

The BNT162b2 vaccine is one of the three COVID-19 vaccines that are predominantly used in the United Kingdom. Since healthcare workers were at a higher risk of contracting severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, they were one of the targeted priority groups for vaccination. Although phase III clinical trials evaluated the safety of COVID-19 vaccines, mild to moderate adverse reactions had been reported after the first and second booster doses of the BNT162b2 vaccine.

To date, about 40 million individuals in the U.K. have received a third booster dose of the COVID-19 vaccine. Furthermore, healthcare workers were advised to receive the third booster dose around the same time that the seasonal influenza vaccine is routinely administered.

Whether a third booster dose also results in adverse reactions, and if these adverse reactions are worse in individuals with a history of COVID-19 or those who have recently received their influenza vaccine, remains unclear.

About the study

In the present descriptive and retrospective observational study, healthcare workers from three hospitals in Northeast England were invited to complete an anonymous online structured and multiple-choice questionnaire. This questionnaire aimed to determine any adverse reactions that the healthcare workers might have experienced after receiving the first, second, and third booster doses of the BNT162b2 vaccine.

Adverse reactions were documented according to the United States Food and Drug Administration (FDA) toxicity grading scale. Self-reported COVID-19 polymerase chain reaction (PCR) assay or other test results were used to confirm a prior history of COVID-19.

The study participants were also asked to report whether they received the influenza vaccine the week preceding their COVID-19 booster dose. If the influenza vaccine was administered earlier, these individuals were asked to report any adverse reactions they experienced after receiving the influenza vaccine.

For all three booster doses of the BNT162b2 vaccine and non-concomitant influenza vaccines, the number of adverse reactions that persisted beyond one

day was calculated. For the first two booster doses of the BNT162b2 vaccine, adverse reactions were considered only if the participants reported them as being similar to or worse than their current symptoms. Factors such as gender, age, and ongoing COVID-19 symptoms were considered during the analysis.

Study findings

For all three booster doses of the BNT162b2 vaccine, a cluster of systemic adverse reactions was observed among healthcare workers with a prior history of SARS-CoV-2 infection. However, the frequency of adverse reactions did not reduce with each booster dose of the BNT162b2 vaccine.

Nevertheless, the number of mild to moderate adverse reactions to booster doses of the BNT162b2 vaccine reported in this study was higher than those reported in other studies that used the same grading system to assess adverse reactions.

Contrary to results from previous studies by the same researchers, wherein females reported more adverse reactions following the first two booster doses of the BNT162b2 vaccine than males, the study findings indicate that gender did not have an impact on adverse reactions to these booster vaccine doses.

While self-reported ongoing COVID-19 symptoms did not have any effect on the adverse reactions experienced after the third booster dose, younger healthcare workers experienced an overall higher number of adverse reactions than older healthcare workers.

Irrespective of the duration between the influenza vaccine and the third booster dose of the BNT162b2 vaccine, there was no change in adverse reactions associated with the influenza vaccine. Although the number of healthcare workers who had received the influenza vaccine within one week of receiving the third booster COVID-19 vaccine was limited, there was no difference in the number or intensity of adverse reactions reported by them and those reported by healthcare workers who received their influence vaccine and COVID-19 booster dose more than a week apart.

Conclusions

Although concomitant administration of influenza vaccines and the third booster

dose of the Pfizer vaccine BNT162b2 did not worsen adverse reactions, previous SARS-CoV-2 infection was found to exacerbate the adverse reactions experienced after receipt of the third booster dose.

Gender and self-reported ongoing COVID-19 symptoms did not influence the frequency or intensity of adverse reactions after the third booster dose. However, younger individuals were found to experience a higher number and severity of adverse reactions.

Journal reference:

- Raw, R. K., Rees, J., & Chadwick, D. R. (2023). Increased adverse events following the third dose of BNT162b2/Pfizer vaccine in those with previous COVID-19, but not with concurrent influenza vaccine. *PLOS Global Public Health 3*(2) e0001053. doi:10.1371/journal.pgph.0001053

Written by

Dr. Chinta Sidharthan

Chinta Sidharthan is a writer based in Bangalore, India. Her academic background is in evolutionary biology and genetics, and she has extensive experience in scientific research, teaching, science writing, and herpetology. Chinta holds a Ph.D. in evolutionary biology from the Indian Institute of Science and is passionate about science education, writing, animals, wildlife, and conservation. For her doctoral research, she explored the origins and diversification of blindsnakes in India, as a part of which she did extensive fieldwork in the jungles of southern India. She has received the Canadian Governor General's bronze medal and Bangalore University gold medal for academic excellence and published her research in high-impact journals.