



Impact of Vaccination in People with Long-term COVID-19

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DESCRIPTION

COVID-19, caused by SARS-CoV-2, is the most lethal communicable disease outbreak of the twenty-first century. The COVID-19 vaccines have significantly reduced the risk of developing severe or critical forms of disease, as well as COVID-19-related mortality. Nonetheless, vaccines appear incapable of completely reducing the spread of SARS-CoV-2 Variants of Concern (VOCs). Following the COVID-19 outbreak, which resulted in hundreds of millions of acute cases and six million deaths, healthcare professionals are facing another crisis caused by the development and/or persistence of symptoms after the acute phase of SARS-CoV-2 infection (typically after 3 months), a condition known as long-COVID or post-COVID.

After a SARS-CoV-2 acute infection, more than 100 symptoms may appear, affecting multiple systems, such as the cardiovascular, respiratory, musculoskeletal, and neurological systems. Several meta-analyses found that nearly half of COVID-19 survivors had lingering symptoms for weeks, months, or even a year after the SARS-CoV-2 infection. Vaccine effectiveness quantifies how well vaccination protects against outcomes such as infection, symptomatic illness, hospitalization, and death. Vaccine effectiveness is typically assessed using observational studies designed specifically to estimate individual protection from vaccination under "real-world" conditions.

First, there are few studies on the effects of vaccines on long-term post-COVID symptoms because most of the studies focused on the risk of long-term COVID in people infected within the first month of being vaccinated. Second, no consistent definition of long-COVID was found. Most studies assessed symptoms within the first month of infection, which may not reflect the reality of long-term COVID, where symptoms can last for months or years.

We included the changes in any symptom that appeared after a SARS-CoV-2 infection. In fact, the post-COVID-19 condition was used in only seven studies (41%). Furthermore, it should be noted that vaccinated individuals were older than non-vaccinated individuals, most likely because global vaccination strategies initially targeted vulnerable individuals. Vaccines provide only partial protection after the first dose, and the second dose boosts that protection. It takes a few weeks after the second dose for protection to reach its peak.

Third, no study distinguished between hospitalized and non-hospitalized patients or between males and females. Similarly, no evidence on the SARS-CoV-2 variants that caused acute infections is available because no study summarized the VOCs included in their population samples; thus, a bias on long-term COVID burden and characteristics attributable to infection with different VOCs cannot be ruled out. As a result, studies examining the impact of COVID-19 vaccines in hospitalized or non-hospitalized patients, males and females, and the various VOCs and potential reinfections are now required to finally determine the effect of vaccine boosters on long-term COVID symptoms. Since booster programmes are increasingly being implemented in several countries, particularly among vulnerable individuals, the impact of a third or fourth booster dose on long-term COVID should be studied. Finally, despite the lack of evidence, vaccination prior to SARS-CoV-2 infection may reduce the risk of developing subsequent long-term COVID. Although the data is preliminary, it appears that two doses of the vaccine may be more effective than one dose. There is currently no data on vaccine boosters. Vaccination's impact on people who were infected, developed long-term COVID symptoms, and then were vaccinated is inconclusive, with both positive and negative effects.

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