

Review of: "COVID-19 Vaccine Effectiveness Against Long-COVID-19 Condition in Pakistan"

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Potential competing interests: No potential competing interests to declare.

The study addresses the effectiveness of COVID-19 vaccines against long-COVID-19, which is a critical area of ongoing research, particularly in the context of global efforts to manage the pandemic. It also includes a large sample size (3,140 patients) with diverse demographic characteristics, which enhances the generalizability of the findings. However, it would be much better if they had conducted a multi-centric study.

The authors employed logistic regression and general linear models to analyze the data, allowing for a detailed examination of factors influencing long-COVID-19 outcomes.

The exploration of vaccination timing in relation to COVID-19 diagnosis adds a unique perspective to understanding how vaccine timing may influence long-term COVID-19 outcomes. However, the aim of this study is not clear when you compare its title with the body. Also, timing should be described in a simpler way to be comprehensible for readers.

The study's novelty lies in its focus on the timing of vaccination relative to COVID-19 diagnosis and how this timing might influence long-COVID-19 outcomes. This is a relatively underexplored area, particularly in the context of diverse populations in low- and middle-income countries like Pakistan.

The findings contribute to the broader understanding of long-COVID-19, particularly regarding the role of vaccination timing and demographic factors. This can help inform public health strategies and vaccination campaigns in similar contexts.

The study's results could guide healthcare providers in optimizing vaccination schedules to mitigate the risk of long-COVID-19 and improve patient outcomes.

The study mentions demographic factors and comorbidities but does not adequately address potential confounding variables such as the severity of the initial COVID-19 infection, which could influence long-COVID-19 outcomes independently of vaccination status.

While the study provides data on vaccination timing, the results regarding the effectiveness of vaccination in preventing long-COVID-19 are inconclusive. This lack of a clear association may be due to methodological limitations, including potential biases in data collection or analysis.

The retrospective nature of the study limits the ability to establish causality between vaccination and long-COVID-19

outcomes. Prospective studies would be more robust in this regard. As a suggestion, add the type and dose counts of the vaccination. Perhaps long COVID-19 conditions may differ in patients vaccinated by each type of vaccine or in how many doses of vaccines they had.

The use of electronic health records (EHR) is appropriate, but the study might benefit from a more detailed description of how data accuracy and completeness were ensured, given the reliance on retrospective data.

The logistic regression and general linear models are suitable for this type of analysis. However, the study could improve by including sensitivity analyses to test the robustness of the findings, especially given the potential for residual confounding.

The definition of long-COVID-19 used in the study (symptoms lasting 12-20 weeks post-diagnosis) is reasonable, but the study should clarify how it handled patients with symptoms overlapping with other conditions, which could affect the accuracy of long-COVID-19 diagnosis. Also, add a reference from similar studies for the definition of long-COVID-19 used in this study.

Consider adding more control variables, such as initial COVID-19 severity and socio-economic status, to improve the robustness of the findings, whether they are available.

Discuss the potential reasons for the lack of a significant association between vaccination and long-COVID-19 more thoroughly, including the limitations of the study design and data. Please add a thorough explanation and compare your findings with previous studies in the discussion.

If possible, include data or references from other countries to contextualize the findings and

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In conclusion, the manuscript provides valuable insights into the relationship between COVID-19 vaccination and long-COVID-19 outcomes, particularly in the context of vaccination timing, and can be accepted with few modifications.

However, the study's weaknesses, particularly concerning confounding variables and the retrospective design, should be addressed to strengthen the conclusions.