Effectiveness of partial COVID-19 vaccination on the outcome of hospitalized COVID-19 patients during the second pandemic in India

INTRODUCTION

COVID-19 vaccination was launched in India on January 16, 2021. The vaccination for adults aged >60 years with or without comorbidities and for adults aged 45–60 years with specified comorbidities was rolled out from March 1, 2021. Two vaccines—Covishield® and Covaxin®, were only available during this period; however, the effects of partial COVID-19 immunization on the survival of hospitalized patients were not much known at that time. From the end of March 2021, a sudden surge of COVID-19 cases (second pandemic) was noted across different parts of India. This second pandemic in India was probably due to a highly infectious B.1.617.2 (delta) variant.[1] The effectiveness of the above vaccines against delta mutants was never investigated during the vaccine development. We retrospectively investigated the effectiveness of COVID-19 vaccination on the outcomes (deaths and duration of hospitalization) and severity of the illness in hospitalized COVID-19 patients.

PATIENTS AND METHODS

We retrospectively collected the data of laboratory-confirmed COVID-19 cases. COVID-19 patients aged ≥45 years who were hospitalized at a tertiary care teaching hospital (Raipur, India) from March 1 to June 30, 2021, were included. The Institutional Ethics Committee approved the study protocol.

The enrolled individuals were stratified as unvaccinated and vaccinated (received either one or both vaccine doses). We classified the severity of COVID-19 illness into mild, moderate, and severe based on the requirement of oxygen delivery devices and ventilatory support during hospitalization. We collected the vaccination details by telephone calls to patients or their family members. Univariate and multivariate logistic regression analyses were used to calculate the odds ratio of deaths with a 95% confidence interval (CI) (\(P < 0.05\)).

RESULTS

Among COVID-19 patients admitted during the study, 1560 (male: 932) met our inclusion criteria. We were unable to collect the vaccination details of 140 patients, and they were excluded from the analysis. The final cohort size was 1430 (male: 854) patients aged 59.5±10.5 years. Among them, 817 (male: 475) were unvaccinated (58.7%) and 576 (male: 379) were vaccinated (41.3%) at the time of acquiring COVID-19 infection. Among the vaccinated, only 43 were fully vaccinated (received two doses of vaccine) before acquiring COVID-19 infection. Eighteen patients were unable to recall their vaccination date. The median interval between the last vaccination dose and microbiological confirmation for COVID-19 disease was 16 days (IQR: 11–26, range: 0–93).

The overall prevalence of mild, moderate, and severe COVID-19 was 56.1%, 24.2%, and 19.7%, respectively. Mild COVID-19 disease was significantly higher in the vaccinated (62.5% vs. 51.7%, \(P < 0.001\)). The prevalence of moderate (20.9% vs. 26.4%, \(P < 0.001\)) and severe (16.6% vs. 21.9%, \(P < 0.001\)) COVID-19 disease was significantly less in the vaccinated. The median hospitalization for those who were discharged from the hospital was ten days (IQR: 8–15). The median of hospitalization in the vaccinated group was significantly less (median: 10 days; IQR: 7–13; \(P < 0.01\)) than that in the unvaccinated group (median: 11 days; IQR: 8–15).

A total of 389 (27.9%) patients died during hospitalization. In addition, 17 patients died within 15 days after discharge. Therefore, we considered total deaths in our study as 406 (28.5%). The number of deaths was significantly more in men than in women (32.8% vs. 23.2%; \(P < 0.001\)). Irrespective of the vaccination history, deaths recorded in mild, moderate, and severe COVID-19 disease were 7.5%, 37.3%, and 77.3%, respectively. The mortality in the vaccinated was significantly less than that in the unvaccinated (25.2% vs. 30.7%, \(P < 0.05\)). The unadjusted odds for deaths among the vaccinated was 0.76 (95% CI:
The adjusted (adjusting gender, age, and presence of comorbidity) odds for deaths in the vaccinated was 0.67 (95% CI: 0.53–0.86, \( P < 0.01 \)). The odds for death in those who developed COVID-19 infections within ≤20 days of vaccination was 1.06 (95% CI: 0.72–1.58, \( P > 0.05 \)).

DISCUSSION

This study was a real-world evidence of the effectiveness of partial COVID-19 vaccination on the mortality and severity of the disease among hospitalized patients at the time of introduction of COVID-19 vaccination program in India.

A previous study demonstrated that two doses of Covishield® have nearly double effectiveness compared to a single dose.[1] The effectiveness of Covisheild® for the prevention of hospitalization and death starts 14 to 20 days after vaccination and increases up to 60% during 28 to 34 days after vaccination.[2] On the contrary, we observed that those who developed infection >20 days of receiving the vaccine were not at a lower risk of death. A previous study reported higher odds of a positive COVID-19 report within the initial few days of vaccination.[3] We observed that 25.3% of our study population developed the infection within ten days of vaccination.

The major limitations of the present study were the small cohort and was a single-center study.

Our preliminary study showed that vaccination even a single dose of vaccination (partial vaccination) reduces deaths, duration of hospitalization, and disease severity.

CONCLUSION

This study showed that even a single dose of COVID-19 vaccination significantly reduces the severity of the disease, mortality, and length of hospitalization.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Sajal De, Dibakar Sahu, Diksha Mahilang, Ranganath T. Ganga, Ajoy Kumar Behera
Department of Pulmonary Medicine, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India

Address for correspondence: Dr. Dibakar Sahu,
Department of Pulmonary Medicine, All India Institute of Medical Sciences, Raipur - 492 099, Chhattisgarh, India.
E-mail: sahu.dibakar@gmail.com
Received: 18-02-23, Revised: 12-06-23, Accepted: 13-06-23, Published: 09-01-24

REFERENCES

1. Lopez Bernal J, Andrews N, Gower C, Robertson C, Stowe J, et al. effectiveness of the Pfizer-BioNTech and Oxford-AstraZeneca vaccines on covid-19 related
2. Chakraborty C, Sharma AR, Bhattacharya M, Agoramoorthy G, Lee SS. The current second wave and COVID-19 vaccination status in India. Brain Behav Immun.
3. Lopez Bernal J, Andrews N, Gower C, Gallagher E, Simmons R, et al. Effectiveness of Covid-19 Vaccines against the B.1.617.2 (Delta) Variant. N Engl J Med.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com