ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 14, Issue 10, 2021

Online - 2455-3891
Print - 0974-2441

Short Communication

BREAK THROUGH INFECTION FOLLOWING COVID-19 VACCINATION AMONG HEALTH CARE WORKERS IN SOUTH INDIA

JAYAKRISHNAN THAYYIL*, ARDRA MERIN GEORGE

Department of Community Medicine, Government Medical College, Calicut, Kerala, India. Email: drjayakrishnanthayyil@gmail.com

Received: 30 June 2021, Revised and Accepted: 09 September 2021

 DOI: http://dx.doi.org/10.22159/ajpcr.2021v14i10.42878. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a novel human Coronavirus, has spread globally causing the coronavirus disease (COVID-19) pandemic. Since healthcare workers (HCWs) serve in the forefront during pandemics, they are particularly vulnerable. The vaccination for HCW was started on January 16, 2021, all over the country in India [1]. We mainly used Covishield vaccine (ChAdOx1-nCOV) manufactured by Serum institute, India, and Covaxin (BBV-152) manufactured by Bharath Biotech, India, with a reported efficacy of 66.1% (95%CI: 54–75%) and 77.8% (95%CI: 65.2–86.4%), respectively [2,3]. We here reported symptomatic COVID-19 breakthrough infections among HCWs following any of the above vaccines in our institution. Breakthrough infections were defined as "the detection of SARS-Cov2RNA or antigen in a respiratory specimen collected from a person ≥14 days after they have completed two recommend doses of COVID-19 vaccines."

Our medical college is a public sector 2500 bedded tertiary care hospital in Kerala state, South India. Regional Prevention of Epidemic and Infectious Diseases Cell under the Department of Community Medicine, has been conducting surveillance of all communicable disease including COVID-19 and reporting to state authorities on daily basis. As a part of surveillance, we are regularly monitoring COVID-19 symptoms of our HCWs and are doing contact tracing activities. We have collected vaccination details such as type, date of vaccination, COVID-19 status, and symptoms and with the available data a descriptive analysis was done. The results of the symptomatic breakthrough infections after receiving recommended two doses of vaccines among HCWs from February 27 to June 27, 2021, (4 month period) were reported below (Fig. 1).

Total we have received 737 responses from our HCWs, out of which 677 (92%) were vaccinated. Majority of them 644 (95%) received Covishield and rest 33 (5%) received Covaxin. Among them 144 persons were reported to be tested positive for COVID-19 either by RTPCR or RAT test and before their vaccination. As the recovered persons were immune against reinfection for calculating the breakthrough infection, they were (n=144) excluded and rest 533 persons were included in the analysis. Among those 533 persons who have completed two doses of vaccination total 114 (21.3%) were tested positive for COVID-19 after vaccination. Out of this 89 persons have developed any symptoms tested positive 14 days after receiving full course vaccines. Thus, as per operational definition the breakthrough infection rate was 16.7% (95% CI: 13.5–19.9%). All had any of the mild symptoms of COVID such as fever, head ache, running nose, or anosmia. Out of this 36 (40.4%) had undergone isolation in hospital and 53 (59.6%) at their home. None of them need ICU care. On exploratory analysis, the combined vaccine efficacy after two doses was found to be 65.7%.

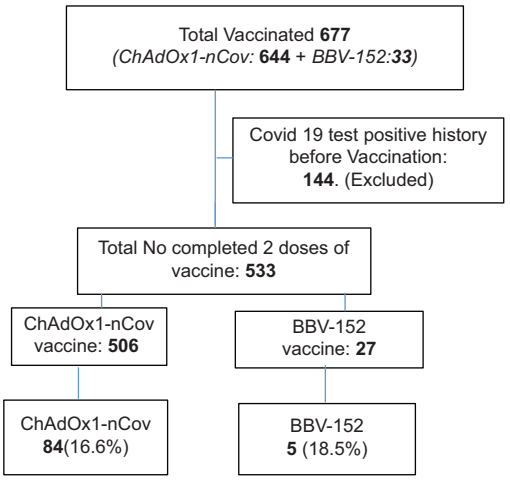

Fig 1. Details of breakthrough infections

Studies from India among HCW in N Delhi (n=107), and in S India (n=7080) reported symptomatic breakthrough infection 16.8% and 9.6%, respectively [4,5]. Similarly, another follow-up study from HCWs in North India (n=3000) reported the incidence of breakthrough infection as 1.6% [6]. In comparison follow-up studies from UK (n=23000), Israel (n=5000), and California (n=28,184) among HCWs reported breakthrough infection 3.8%, 6.9%, and 0.3%, respectively [4,7]. All these countries reported this finding mainly used mRNA vaccine for their HCWs.

Since HCWs were more exposed COVID-19 cases, reported breakthrough infection among them may be high. Since the COVID-19 testing was done regularly, only persons with any symptoms and asymptomatic were never tested, the actual cases of infections may be under reported. This was a significant area of concern so that most of the breakthrough infections are asymptomatic and were missed [4,7]. There was also increased probability of transmission to patients and coworkers. It is possible that in breakthrough infection could be ascribed to COVID-19 variants such as delta which may bypass vaccine-induced immunity [6,7]. High prevalence of breakthrough infection is seen in our health-care facility after complete dose of vaccination is an area of concern and should be prime area of research. For every new vaccine during the initial implementation phases, their post-introduction evaluations will be important to address many of the remaining questions.

ACKNOWLEDGMENT

We express our immense thanks to Dr Rajendran VR, Principal, and Dr Sreejayan MP Superintend, Government Medical College, Calicut,

Kerala, for the supports given for the study and all doctors, nursing officers, and other staffs Government Medical College, Calicut, who participated in this study.

AUTHORS CONTRIBUTION

Dr. Jayakrishnan Thayyil and Dr. Ardra merin George conceived the idea of this study.

"Breakthrough Infection Following COVID-19 Vaccination Among HCWs In South India." Dr. Jayakrishnan Thayyil and Dr. Ardra Merin George developed the questionnaire for data collection and conducted data collection and computations. Both authors conducted data analysis and verified the analytical methods. Both authors discussed the results, interpreted, and contributed to final manuscript.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

AUTHOR'S FUNDING

The authors received no financial support for the research and/or publication of this article

REFERENCES

1. Covid-19 vaccines, Operational Guidelines. Ministry of Health and Family Welfare. Government of India; 2020. Available from: https://www.mohfw.gov.in/pdf/COVID19Vaccine.
2. Ella R, Reddy S, Blackwelder W, Potdar V, Yadav P, Sarangi V, *et al*, The COVAXIN Study Group. Efficacy, safety, and lot to lot immunogenicity of an inactivated SARS-CoV-2 vaccine (BBV152): A double-blind, randomized, controlled phase 3 trial. MedRxiv 2021. DOI: https://doi.org/10.1101/2021.06.30.21259439.
3. Emary KR, Golubchik T, Aley PK. Efficacy of ChAdOx1 nCoV-19 (AZD1222) Vaccine against SARS-CoV-2 variant of concern 202012/01 (B.1.1.7): An exploratory analysis of a randomized controlled trial. Lancet 2021;397:1351-62.
4. Tyagi K, Ghosh A, Nair D, Dutta K, Bhandari P, Ansari I, *et al*. Breakthrough COVID-19 infections after vaccinations in healthcare and other workers in a chronic care medical facility in New Delhi, India. Diabetes Metab Syndr 2021;15:1007-8.
5. Victor PJ, Mathews KP, Paul H, Mammen JJ, Murugesan M. Protective effect of COVID-19 vaccine among health care workers during the second wave of the pandemic in India. Mayo Clin Proc 2021;96:2493-4.
6. Rana K, Mohindra R, Pinnaka L. Vaccine breakthrough infections with SARS-CoV-2 variants. N Engl J Med 2021;385:2.
7. Keehner J, Horton LE, Pfeffer MA, Longhurst CA, Schooley RT, Currier JS, *et al*. SARS-CoV-2 infection after vaccination in health care workers in California. N Engl J Med 2021;384:1774-5.