



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Diabetes & Metabolic Syndrome: Clinical Research & Reviews

journal homepage: www.elsevier.com/locate/dsx

Breakthrough COVID19 infections after vaccinations in healthcare and other workers in a chronic care medical facility in New Delhi, India



Kanika Tyagi ^c, Amerta Ghosh ^c, Dipti Nair ^c, Koel Dutta ^c, Prakash Singh Bhandari ^c,
Irshad Ahmed Ansari ^c, Anoop Misra ^{a, b, c, *}

^a Centre of Nutrition & Metabolic Research (C-NET), National Diabetes, Obesity and Cholesterol Foundation (N-DOC), SDA, New Delhi, India

^b Diabetes Foundation (India), SDA, New Delhi, India

^c Fortis C-DOC Centre of Excellence for Diabetes, Metabolic Diseases and Endocrinology, Chirag Enclave, Nehru Place, New Delhi, India

A B S T R A C T

Background and aims: Vaccinations for COVID19 are now open to all adults in India. However, spread of COVID19 infection continues unabated. We aimed to ascertain number of breakthrough COVID19 infections after vaccinations in a chronic care, diabetes-centric healthcare facility.

Methods: We reviewed rigorously maintained data of vaccinations, health status, symptoms of COVID19 & RT-PCR testing of all staff (doctors, nurses, paramedical workers, and other staff) in our health care facility from January 16, 2021 till date.

Results: Out of 123 employees, 113 were vaccinated (Covaxin, 28, Covishield, 85). Second dose was completed in 107 (94.7%) and first dose in 6 persons (5.3%). Symptomatic COVID19 infections occurred in 19 persons (16.9%) post any dose of vaccine. Symptomatic breakthrough infections ≥ 14 days after second dose occurred in 15 persons (13.3%). Except one (required hospitalization), all 14 had mild COVID19 disease.

Conclusions: We report mild symptomatic breakthrough infections as seen in our health care facility. Research in breakthrough infections in India should be extended to other institutions and community to obtain larger data.

© 2021 Diabetes India. Published by Elsevier Ltd. All rights reserved.

Introduction

The vaccination campaign for COVID19 in India was started on January 16, 2021 using two vaccines; Covishield (manufactured by Astra Zeneca). At present (May 1, 2021) about 268 million people in India have been fully vaccinated. The recipients of vaccines include health care workers, front line workers & people with more than 45 years of age with morbidities (like diabetes, coronary artery disease etc.). From May 1st onwards vaccination is open to all individuals (>18 y of age) in India.

This brief report describes vaccination status & breakthrough infections in our chronic care, diabetes-centric health care facility (Fortis CDOC Center of Excellence for Diabetes, Metabolic Diseases & Endocrinology, New Delhi, India). This health care facility caters to patients of diabetes with or without complications, related

metabolic disorders & those requiring non-emergency surgeries. The workers in this hospital include doctors, nutritionists, nurses, paramedical workers, and maintenance staff. All patients admitted in our facility rigorously undergo RTPCR test for SARS-CoV2 virus and only those who have negative tests are admitted to the hospital. All staff workers are repeatedly instructed regarding social distancing & wearing double mask. All illnesses in staff are promptly reported and appropriately investigated.

Methods

Facility has 123 employees out of which 113 have received COVID19 vaccinations. Our hospital has maintained detailed data regarding vaccinations and COVID19 infections of all employees. We received data of vaccinations, health status, symptoms of COVID19 & RT-PCR testing in our health care facility from January 16, 2021 till date. All infections after any dose of vaccinations were recorded. Breakthrough infections were defined as infections occurring ≥ 14 days after completing the primary series of

* Corresponding author. Centre of Excellence for Diabetes, Metabolic Diseases and Endocrinology, B-16, Chirag Enclave, New Delhi, 110048, India.

E-mail address: anoopmisra@gmail.com (A. Misra).

Table 1
Summary of vaccinations and breakthrough infections.

Total staff	Vaccinated	Not vaccinated	Vaccination dosing		Type of vaccination		Number of infections		Severity of COVID19 infection	
			1st dose	2nd dose	Covaxin	Covishield	1st dose	2nd dose	Mild	Moderate
123	113	10	6	107	28	85	1	18 (15 breakthrough infections)	18	1

vaccination as per standard definition. All data were double checked. Telephonic interviews with affected individuals were conducted. Descriptive statistics was used.

Results

Results have been described in Table 1. Out of 123 employees [males 75, females 48; mean age 42y (range 22–70y)], 113 were vaccinated (Covaxin, 28, Covishield, 85). Second dose was completed in 107 (94.7%) and first dose in 6 persons (5.3%). Symptomatic COVID-19 infections (17, RTPCR positive, one rapid antigen test positive, and in one person chest CT scan showed bilateral pneumonia suggestive of COVID19 with blood tests suggestive of cytokine storm) occurred in 19/113 persons (16.8%), 18 of them had incurred it after the second dose after a mean of 34.8 days (range 2–51 days). Twelve persons among these were less than 40 years of age. Breakthrough symptomatic COVID19 infections (≥ 14 days after the second dose) occurred in 15 persons (13.3%). All were symptomatic with fever and half of them had sore throat and cough. A few had loose motions and loss of smell and taste. Symptoms lasted from 3–14 days. Except one (required hospitalization for COVID19 pneumonia), all 14 persons with breakthrough infections had mild COVID19 disease.

Discussion

Breakthrough infections after adequate vaccinations are matter of concern but adequate data regarding these infections are not available in real world setting. Vaccines have effectiveness in decreasing risk of getting COVID19 infections by 70–90%, and also shield from severe infection. It is possible, therefore, some people who are fully vaccinated against COVID-19 may get COVID19 infection.

Anecdotal report (unpublished) from India & published reports from other part of world (refer website of Center for Disease Control, USA) indicate these infections are occurring but are rare. In addition, it appears that these breakthrough infections are either asymptomatic or mild in nature. In a study in 75 skilled nursing care facilities in Chicago, among 627 persons with SARS-CoV-2 infection since vaccination began, 22 SARS-CoV-2 infections were

identified among 22 residents and staff members ≥ 14 days after receiving their second vaccine dose. Further, nearly two thirds (14 of 22; 64%) of persons with breakthrough infections were asymptomatic [1]. Recent statement from Indian Council of Medical Research states that 2–4 per 10,000 got infected with COVID19 after vaccinations in India [2], however, this has not been published in an academic journal.

It is possible that in breakthrough infection could be ascribed to COVID19 variants which may bypass vaccine-induced immunity [3]. This important area clearly needs more research. It is reassuring that majority of breakthrough infection seen in our facility are mild. But a significant area of concern is that asymptomatic infections were missed since RT-PCR test was selectively done in symptomatic patients. These asymptomatic patients are likely to promote viral spread.

Limitations of this study is small sample size, and absence of data on obesity and co-morbid diseases which are important determinants of severity of COVID19 [4]. Further, we did not test asymptomatic individual who might harbor COVID19 infection. Finally, such research is needed in hospitals caring for COVID19 patients and in community dwelling individuals.

Conclusion

High prevalence of breakthrough infection is seen in our health care facility. Breakthrough infection in India after complete dose of vaccination should be prime area of research.

References

- [1] Teran RA, Walblay KA, Shane EL, et al. Postvaccination SARS-CoV-2 infections among skilled nursing facility residents and staff members - Chicago, Illinois, December 2020–March 2021. *MMWR Morb Mortal Wkly Rep* Apr 30 2021;70(17):632–8.
- [2] <https://economictimes.indiatimes.com/news/india/only-2-4-per-10000-got-infected-after-vaccination-not-worrisome-balram-bhargava-dg-icmr/video-show/82181979.cms>.
- [3] Hacısuleyman E, Hale C, Saito Y, et al. Vaccine breakthrough infections with SARS-CoV-2 variants. *N Engl J Med* Apr 21 2021. <https://doi.org/10.1056/NEJMoa2105000>.
- [4] Pal R, Bhadada SK, Misra A. COVID-19 vaccination in patients with diabetes mellitus: current concepts, uncertainties and challenges. *Diabetes Metab Syndr* Mar-Apr 2021;15(2):505–8.