RESEARCH

TO DETERMINE THE INCIDENCE OF COVID-19 CASES AMONG HEALTH CARE PROVIDERS EXPOSED TO SARS-COV-2 INFECTION DURING POST VACCINATION FOLLOW UP FOR 6 MONTHS IN A TERTIARY CARE CENTRE - NATIONAL CAPITAL REGION OF DELHI, INDIA

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Abstract

Background: The coronavirus disease (SARS-COV-2) is an infectious disease caused by a coronavirus (Covid-19), which was first detected in clusters of pneumonia-like diseases in Wuhan City of china on December 31st, 2019. WHO already declared a global pandemic in April 2020 when this infection spread to more than 230 countries. Overall, 20—30 % of cases in the United States have required hospitalisation, resulting in a substantial burden on health care workers and the U.SHealth care system and other world economies including developed and developing countries like India. The Indian national expert group on vaccine administration for covid-19 (NEGVAC) will guide all aspects of covid-19 vaccine planning in India. In response to alleviate the severity of Covid-19 infection spread, our scientists have developed one vaccine with AstraZeneca collaboration, as Covishield and another Covaxin from serum institute. The aim is a prospective study on the effectiveness of the Covid-19 vaccine among health care providers. Aim: The study aims to describe the role of the vaccine in health care providers exposed to sars-cov-2 infection during the post-vaccination period of 6 months duration. The objective is to Primary To evaluate the efficacy of the Covid-19 vaccine among health care providers. Secondary – evaluation of the effectiveness of Covid-19 vaccine among different age groups of health care providers, detected Covid-19 positive by RT-PCR Test before vaccination. Evaluation of the effectiveness of covid-19 vaccine among a subgroup of Health care providers in which RT-PCR tests were found negative before vaccination. **Materials and Methods:** This project was completed after covid-19 vaccines among exposed health care providers with and without prior history of covid-19 infection and followed up for a post-vaccination period of 6 months to assess the incidences of Covid-19 cases. The covid-19 vaccine intelligence network(CO-WIN) systems digital platform will be utilised to track the enlisted health care and frontline workers for vaccination and administration of vaccine on a real time basis. **Result:** The total number of RT-PCR confirmed cases among participants was 126(11%) out of 1140; which comprises of; in fully vaccinated, partially vaccinated and non-vaccinated participitants were 39(5.5%), 77(19.25%) and 10(26.31%) respectively. **Conclusion:** The covishield vaccine provides significant protection against the covid-19 infection, hence rapid vaccination along with other social measures likes hand sanitization, use of mask and social distancing are the most important weapons of humanity to fight this horrible disease named covid-19 Infection.

INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (sars-cov-2) pandemic since its onset in December 2019 in Wuhan city of china had affected more than 132 million people and caused about 2.7 million deaths worldwide till 2 April 2021.[1,2,3,4]

Vaccination is one of the safest and most cost-effective public health interventions for infectious disease prevention and control, especially in a pandemic situation.[5]

In the absence of curative therapy and the difficulty of imposing strict Covid-19 appropriate behaviors in society, the demand for a safe and effective vaccine emerged early, leading to its development at an unprecedented pace.

On 16 Jan 2021, India launched its immunization program against covid-19 infection. As of 30 May 2021, two covid-19 vaccines, Covaxin and Covishield are in use in India. The Covaxin is developed and produced by Bharat biotech while Covishield (chadox1 ncov-19; recombinant chimpanzee adenovirus vector vaccine) is manufactured by the serum institute of India in collaboration with oxford university and AstraZeneca.[6]

Ever since the launch of the Covishield vaccine in India and other countries, there has been apprehension regarding the efficacy/effectiveness of the vaccine. The serum institute of India manufactured the vaccine claims the efficacy of 53.28% (-3.21 to 8.86) to 78.79(37.63 to 92.79) depending on the dosing interval between the first and second dose.[7]

Different phase ii/iii vaccine efficacy trials in the United Kingdom, Brazil, and South Africa have also reported similar efficacy (54.4 to 74.0%).[8]

Experts believe that a more appropriate marker for the vaccine effectiveness would be the rate/reduction in the occurrence of death and need/duration of hospitalization among vaccinated individuals.[9]

Various studies from the United Kingdom indicate that post-vaccination deaths from covid-19 among the older population (more than 80 years) reduced by 62% and by 51% among people between 65 and 79 years.[10,11]

To resolve the conundrum of the effectiveness of the Covishield vaccine, there is a need for a study about the occurrence of covid-19 infection in health care providers (Fully vaccinated, Partially Vaccinated, and Non-vaccinated). Our present study was carried out to determine the effectiveness of vaccines among 1140 health care providers at a Tertiary Care Centre, National Capital Region (NCR), India.

MATERIALS AND METHODS

Covid-19 vaccination was offered to all 1140 health care providers of GS Medical College and Hospitals, Pilkhuwa, Uttar Pradesh, India, from 1st April 2021 to 30th September 2021 and was followed up till the closing date of study i.e. 30th September 2021. All the cases diagnosed with covid-19 infection during the study time were contacted on mobile phone /or by supervising Team and detail of vaccination, demographic profile including age, sex, and whether asymptomatic or symptomatic at the time of diagnosis were obtained telephonically. All cases were confirmed by the RT-PCR test.

Fully vaccinated (FV) was defined as those individuals who had received both doses of the Covishield vaccine and more than 2 weeks had elapsed following the second dose.[12,13]

Partially vaccinated (PV) individuals were those who had taken only one dose and more than 2 weeks had elapsed after one dose till being tested positive for covid-19 infection or till the result were analyzed.

The non-vaccinated group (NV) included individuals who either did not receive even a single dose of the vaccine due to any reason or had received the first dose within 2 weeks of testing positive for covid-19 or till the result were analyzed. Vaccine details of the individuals who did not get infected with Covid-19 infection during the study period (1st April 2021 to30th September 2021) were obtained from the Medical Record Department/ CMS office of the institute. The study was already approved by the Institutional Ethical Committee (IEC) of the institute.

Sample Size: 1140 Health Care Providers employed in G.S Medical College and Hospitals, Hapur, U.P.

Study Period: From 1st APRIL 2021 TO 30th SEPTEMBER 2021.

Inclusion Criteria

Vaccinated Health care providers (doctors, nursing staff, technicians, typists, general duty attendants, housekeeping, security guards among different subgroups based on age, sex, religion, socio-economic status.

Exclusion criteria

Health care providers unwilling to participation

Health care providers are not willing to vaccination

Health Care Providers planning to leave before 6 months.

Data Collection

The Data was collected through Medical Record Form to abstract information from Health care Providers, those found positive after the RT-PCR Test were enquired about the type of treatment received. The Data of admitted patient's cases were collected from IPD and ICU wards and through MRD & CMS Office Record on monthly basis till 30th September 2021.

Statistical Analysis

Continuous variables have been represented in terms of mean and SD and Categorical variables as proportions. Extracted data were entered from predesigned forms into an electronic spreadsheet (Microsoft excel©) and analyzed using statistical

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software SPSS version 17.0, Chi-square test was used to compare proportions. A P-Value less than 0.05 was taken as significant.

RESULTS

Out of 1140 Health Care Providers, there was a predominance of male workers 679 (59.56 %) as compared to female workers 461 (40.4 %). The Fully Vaccinated participants were 702 (61.5%), Partially Vaccinated 400 (35.08%) and 38 (3.33 %) were non-vaccinated respectively.

During the study period of 6 months duration from 1st April 2021 to 30th September 2021, the Total Number of Breakthrough Cases after confirmation by RT-PCR Test have detected 39 cases (5.5 %) in the Fully Vaccinated Category, 77 (9.25%) cases from Partially Vaccinated category and 10 (26.31 %) from Non- Vaccinated Category respectively.

Thus the total number of Covid-19 cases among participants (confirmed by RT-PCR) was found to be 126 out of 1140.

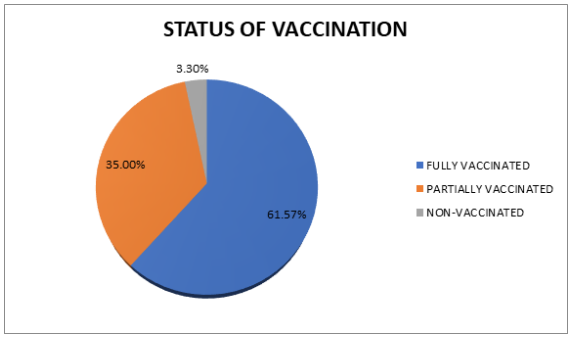

Figure 1: Status of vaccination among the participant

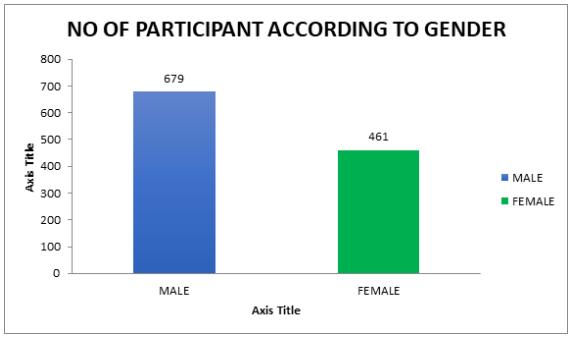

Figure 2: No of participants according to gender

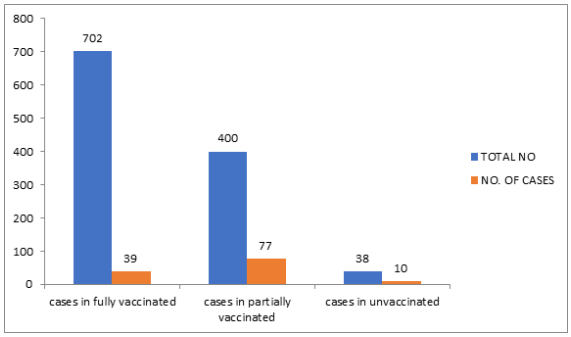

Figure 3: No. of cases in various groups according to vaccination status

DISCUSSION

The covid-19 vaccination program was started in our tertiary care center at Hapur, Uttar Pradesh with the Nation on 16 January 2021 and has achieved more than 98 percent vaccination coverage of health care workers and supporting staff. In this study, we present the analysis of 1140 Health Care Providers that occurred at least two weeks after administration of the first dose i.e. from 1st February 2021 to 31st March 2021 in both vaccinated and non-vaccinated individuals.

The incidence of covid-19 infection among Non-vaccinated/Partially vaccinated was higher as compared to the incidence among the fully vaccinated individuals. This difference was significant and very prominent among all the categories (doctors, paramedics, and supporting staff). The overall vaccine effectiveness was found to be …88.6%. (81.55-92.37%……) in Fully vaccinated and 44.1% (4.55-67.3) in Partially vaccinated individuals. These results concern that the Covishield vaccine was found to be significantly effective against the occurrence of covid-19 infection.[14]

However, the occurrence of cases among the vaccinated persons is a matter of concern but it cannot be completely attributed to vaccine efficacy/effectiveness alone. The dynamic of vaccination and subsequent protection against covid-19 infection are complex and are often influenced by age and co-morbidity related factors, changing prevalence of infection in the community, and degree of compliance of social preventive measures such as keeping 6 feet distance, the frequent washing of hand with a sanitizer, use N-95 mask, avoid crowded places.

The interval between the doses of the vaccine has been reported to determine the vaccine effectiveness/efficacy significantly. The Covishield vaccine efficacy has been reported to be higher in those with a longer interval between the two doses (vaccine efficacy 81.3% [95%, 60.3-91.2] at >12 weeks) intervals rather than in those with a short interval vaccine efficacy of 55.1% [33.0-69.9] at < 6 weeks).[15]

The studies have shown better results among youth participants ranging from 94 to 99% with less morbidity and mortality as compared to 60 to75%among elderly participants, especially with co-morbidities.[16]

Vaccination was shown to reduce 60 to 75% reduction in breakthrough infections.

Single mortality of one male case was reported in the unvaccinated group. The observed confidence intervals were extremely variable after compared with other studies, thus no valid statistical conclusion can be drawn in the early phase.

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CONCLUSION

The 2 doses of the Covishield vaccine provide significant protection against covid-19 infection, hence rapid vaccination seems to be an effective public health strategy with proper use of covid appropriate behavior like the use of masks and social distancing, and proper sanitization.

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Ethical consideration
Approval/clearance has been obtained from the Institutional Ethics Committee of GS Medical College and Hospital, Pilkhuwa, Uttar Pradesh, India to undertake the research study on "To Determine the Incidence of Covid-19 Cases among Health Care Providers exposed to Sars-Cov-2 Infection during Post Vaccination follow up for 6 months in a Tertiary Care Centre, NCR, India" vide their letter no. GSMCH/2021/IEC/Approval/048 dated: 14/01/2021.

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