



SEROPREVALENCE OF ANTISARS COVID-IgG ANTIBODIES IN HEALTHCARE WORKERS AT JLN MEDICAL COLLEGE AND HOSPITAL, AJMER

Clinical Microbiology

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ABSTRACT

Background- Healthcare workers are a high risk population due to patient contact. Aim of this study is to investigate the seroprevalence of Anti-SARS CoV-2 IgG antibodies among healthcare workers of JLN Medical College, Ajmer. **Methodology-** A prospective cross-sectional study was conducted from November 2021 to April 2022 on 160 healthcare workers. 30 patients samples received for routine serological investigation were used as control. Blood samples were collected ELISA was used to detect antibodies and questionnaire was filled for other parameters of participants. **Results-** Out of total 160 Healthcare workers, 95 (59.37%) were positive for Anti-SARS CoV-2 IgG antibodies. Out of 95 seropositive HCWs, majority (54%) were in age group of 21-30 yrs, 46 were male and 49 were female participants. Out of 106 (covishield), 62 (58.4%) were positive for IgG antibody for SARS-CoV-2. Out of 54 (covaxin), 33 (61.1%) were positive for the same. Seropositivity in general population was 60%. **Discussion and conclusion** - Seropositivity in HCWs was 59.38% and in general population was 60% which is almost equal which could be because both groups are fully vaccinated and prior had covid exposure too.

KEYWORDS

HCWs, ELISA, SARS

INTRODUCTION

Since Dec 2019, a number of cases of "unknown viral pneumonia" related to a local sea food wholesale market were documented in WUHAN CITY, CHINA. In just few months the virus has spread all over the world. It was initially named Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). The pneumonia caused by Severe Acute Respiratory Syndrome Coronavirus-2 is named Corona Virus Disease 2019 (COVID-19). WHO declares COVID-19 a pandemic on 11th march 2020¹. Most patients with COVID-19 demonstrates mild symptoms with a good prognosis while some severe, patients rapidly develop to Acute Respiratory Distress Syndrome (ARDS), acute respiratory failure and other serious complications¹. According to World Health Organisation interim guidance, the respiratory tract specimen with nasal or oropharyngeal swab was used to diagnose COVID-19 using real time reverse transcription polymerase chain reaction (RT-PCR) as the gold standard. However the efficiency of RT-PCR has been reduced due to various factors in practical applications, which is also time consuming for promptly obtaining diagnostic result. Healthcare workers (HCWs), including doctors, nurses and other paramedical staff, are the frontline personnel of a medical health care system. Due to the prolonged exposure, HCWs are the most vulnerable cohort at a high risk of COVID-19 infections compared to the general population². Infected HCW may have risk to patients, family members and to the community as well. Therefore, the safety of HCW is essential to safeguard continuous care of patients. Serology can provide more information on SARS CoV-2 infection as an antibody response of IgG formed following infection. Antibody tests are very helpful for detecting previous infection when measured two weeks after the onset of symptoms, but the duration of elevated antibody levels remains unknown. India introduced a mass COVID-19 vaccination programme (Covishield and Covaxin) with two vaccines doses from 16 January 2021 after the Emergency Use Approval³. In many countries, Health Care Workers (HCWs) were among the first to be vaccinated. Almost All the Health Care Workers (HCWs) in our tertiary care hospital completed two doses of either Covishield or covaxin vaccine by May 2021. Together with vaccination and natural immunity will help to

achieve herd immunity, a state where proportion of a population needs to be immune to an infectious agent. This study investigates the seroprevalence of Anti SARS CoV-2 IgG antibodies among healthcare workers of JLN Medical College, Ajmer.

MATERIALS AND METHODS

A prospective cross sectional study was conducted from November 2021 to April 2022 on 160 Health care workers of JLN Medical College and associated group of hospital, Ajmer, Rajasthan. 30 patient's samples received for routine serological investigation were used as control. Health care workers of all age groups and both sexes were included with proper consent. A written informed consent was taken from all health care workers included in the study. History taking, relevant clinical findings were taken for the same. 5 ml of venous blood was collected under aseptic precautions. Sera was separated by centrifugation at 2500 rpm for 10 minutes. Clear serum was pipetted out in labelled sterile screw capped vials and stored at -80°C until further testing. The stored sera was thawed before starting testing around half to one an hour. Ethical Approval from Institutional Ethical Committee of Hospital was taken before the start of the study. Estimating specific IgG antibodies against SARSCoV-2 was carried out using an enzyme-linked immunosorbent assay (ELI Safe Covid-19 IgG ELISA detection kit, HIMEDIA) according to the manufacturer's instructions. The questionnaires were initially checked for completeness, and data was cleaned for errors and missing values. The corrected data was then entered into Microsoft Excel after preparing a Master-chart. Data analysis was done using licensed SPSS software version 21.0 (Chicago, Illinois). Univariate analyses was done and the results were presented with the help of tables, text, bar-diagrams and pie-charts. Categorical variables were expressed in frequency and percentages. As for continuous variables mean and standard deviation were used. Chi-square test and t- test were used to calculate the statistical differences between categorical and continuous variables respectively. A p- value of ≤ 0.5 was considered as statistically significant.

RESULT

Out of 95 seropositive HCWs, majority (54%) were in age group of 21-30 yrs but finding was statistically not significant (Chi square 6.890, P value 0.075). The higher positivity in age group of 21-30 years may be because of number of participants were highest in this age group. Out of 95 seropositive HCWs, 48.13% were males and 51.88% were females so there is no significant gender difference in seropositivity of participants (Chi square 0.008, P value 0.927 (NS), CI 0.783 to 1.308). In current study the seropositivity rate is 59.38%. The higher seropositivity rate may be because India witnessed a severe second wave of COVID-19 in March–June 2021 and almost population is fully vaccinated. Out of 106 (Covishield vaccine), 62 were positive for IgG antibody for SARS-CoV-2. Out of 54 (Covaxin), 33 were positive for the same and this relation is not significant. This study shows that HCWs, positive for IgG antibody had myalgia 52%, fever 33%, 21% pain at injection site, 1% headache and 32% had no AEFIs. Out of 160 HCWs 30 took precaution dose and out of 30, 21% were positive for IgG antibody.

Table no.1- Seroprevalence of IgG antibodies against SARS-CoV-2 by selected characteristics

Characteristics	HCWs	General Population
Age		
21-30	52(54.7%)	3(16.6%)
31-40	27(28.42%)	4(22.2%)
41-50	8(8.4%)	6(33.3%)
≥50	8(8.4%)	5(27.7%)
GENDER		
Male	46(50%)	9(50%)
Female	49(51.5%)	9(50%)
VACCINE TYPE		
Covishield	62(65.2%)	8(44.4%)
Covaxin	33(34.73%)	10(55.5%)
Precaution dose	20(21%)	0
AEFIs		
Fever	32(33.6%)	15(83.3%)
Myalgia	50(54.73%)	7(38%)
Pain at injection site	20(21.05%)	4 (22.2%)
Headache	1(1.05%)	0
NIL	31(32.6%)	0
IgG Antibody		
Positive	95/160 (59.38%)	18/30 (60%)

Seropositivity in HCWs was 59.38% and in general population was 60% which is almost equal. The seropositivity in HCWs and general population is statistically not significant which could be because both groups are fully vaccinated and prior had covid exposure too.

DISCUSSION

Table no. 2- comparison with various studies

Study	Vaccination era	Study time period	Seropositivity percentage
Heydar Ali Balou et al4	Pre vaccination	April -may 20 (2 months)	33.9%
Abdol Sattar Pagheh et al	Pre vaccination	September 22, 2020 to January 26, 2021(5 months)	24.4%)
Manoj V . Murhekar et al5	Pre vaccination	December 2020–January 2021 (2 months)	25.6%
Divyaa Elangovan et al6	Post vaccination	Jan 21-April21 (4 months)	59.37%
Manoj V. Murhekar et al	Post vaccination	June–July 2021 (2 months)	85.2%
Current study	Post vaccination	Jan-may 22 (5 months)	59.38%

The seropositivity as shown in table reflects that previous studies have less seropositivity rate as that time all were not vaccinated. In current study the good seropositivity rate (59.38%) is similar in study with Divyaa Elangovan et al which is 59.37%. The higher seropositivity rate may be because India witnessed a severe second wave of COVID-19 in March–June 2021 and almost population is fully vaccinated.

CONCLUSIONS

This study reflects good seropositivity rate among healthcare workers as well as control group however 40% of the population is still seronegative and due to the lack of vaccines directed against the

current strain of COVID-19 among adults so should concentrate on other precautionary interventions such as avoiding gatherings, maintaining social distancing, and uses of face masks in public places, to prevent the transmission of SARS-CoV-2 in India. The immunity acquired through natural infection as well as vaccination is expected to wane over time so multiple booster doses are directed against current mutant strain. Increase in COVID-19 cases is due to emergence of new mutant variants, therefore necessary to continue monitoring the emergence of variants of concern.

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