

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Anti SARS COV2 Anti-Body Status In Post Vaccinated And Post Infected Population.

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ABSTRACT

Covid 19 was first reported in Wuhan, china and expanded as pandemic causing life threatening disease to overcome this many countries started producing vaccines. In India, Tamilnadu started COVID-19 vaccination in January 2021, initially targeting healthcare and frontline workers. The vaccination was expanded in a phased manner and currently covers all individuals aged 18 years and above. We conducted a cross-sectional study and is based on the estimation of SARS-CoV-2 antibody levels in 50 Post Vaccinated and 50 Post infected population and excluded the Active Covid 19 infected Patients and non-vaccinated and non-infected individuals. 3ml of venous blood sample was collected and analysed for anti SARS COV 2 antibody in chemiluminescent immunosorbant method. Data was analyzed by using SPSS software. This study shows 4(7.3%), and 51 (92.7%) participants showed positive and 31(68.9%) and 14 (31.1%) negative serum SARS-CoV-2 antibody status, respectively. We found the mean titer associated with each antibody status (overall, positive and negative) was clearly differentiated. Post infected population had a significantly higher SARS-CoV-2 IgG antibody titer ($p = <0.001$, respectively). These findings suggest that further studies can be done to implement the role of Booster dose in prevention of the disease.

Key words: Anti SARS covid antibody, vaccinated, post infected, covid 19, frontline workers.

<https://doi.org/10.33887/rjpbcs/2022.13.2.18>

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INTRODUCTION

Coronavirus disease-2019 (COVID-19) is caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). COVID-19 was first reported in Wuhan, China, in December 2019, and the outbreak was subsequently declared a pandemic by the World Health Organization (WHO) on March 11, 2020 [1]. With more than 30 million cases (21,961 cases per million population) and 0.48 million deaths till July 2021. India has the second largest number of COVID-19 cases reported globally [2] and also experienced a more severity of COVID-19 in March–June 2021 faced increased mortality, affecting all states of India [3]. On 16 January 2021, India initiated COVID-19 vaccination with BBV152 (Covaxin; Bharat Biotech International, HyChAdOx1 nCoV-19 (Covishield, Serum Institute of India, Pune) for healthcare and frontline workers. The vaccination expanded in a phased manner to cover individuals aged 60 years and above and those between 45 and 59 years with comorbidities (phase 2, 1 March 2021), all individuals aged 45 years and above (phase 3, 1 April 2021), and all India 18 years and above (phase 4, 1 May 2021) [4]. Antibodies are detected in the blood of people who have been previously infected with or vaccinated against a virus that causes a disease; they show the body's efforts (past infection) or preparedness (past infection or vaccination) to fight off a specific virus. Once they are made, antibodies may protect people from getting that infection or getting severely ill for some time afterward. Antibodies, whether from infection or vaccination, wane (or diminish) over time. How quickly antibodies wane is different for each disease and each person. Tamil Nadu experienced a severe cases of COVID-19 in March–June 2021, affecting all districts and more than 3 lakhs cases and 10000 deaths reported till July 2021, Salem district started COVID-19 vaccination in January 2021, initially targeting healthcare and frontline workers. The vaccine was expanded in a phased manner and currently covers all individuals aged 18 years and above. Although, an RT-PCR test is gold standard method in detecting an active case of COVID-19, In contrast to tracking active cases, antibody detection can provide information on individual and herd-acquired immunity against SARS-CoV-2. In addition, an antibody assay can help to estimate the number of people within a community who remain potential cases. During the pandemic period, we quantitatively evaluated the SARS-CoV-2 antibodies in post vaccinated and infected individuals in Salem district.

MATERIALS AND METHODS

It is a cross sectional study. Ethical clearance was obtained from the institutional ethical committee. After getting consent from the individuals, blood sample of 3ml in plain tubes (clot activator tube) are collected in 50 post vaccinated and 50 post infected individuals SARS-CoV-2 antibody level is performed with eCLIA(e411) Analyser available in our department. The Biochemistry of Govt. Mohan Kumaramangalam Medical College, Salem. SARS-CoV-2 antibody level is Active Covid 19 infected Patients and non-vaccinated and non-infected were excluded in this study.

RESULTS AND DISCUSSION

In total, 100 post vaccinated and post infected individuals were included for this study. From table 1, 4(7.3%), and 51 (92.7%) participants showed positive and 31(68.9%) and 14 (31.1%) showed negative serum SARS-CoV-2 antibody status, respectively.

From table 2 based on chi-square test we found that the mean titer associated with each antibody status (overall, positive and negative) was clearly differentiated. Post infected population had a significantly higher SARS-CoV-2 IgG antibody titer Pearson chi-square value-41.303 ($p < 0.001$). Since the p value is < 0.0001 the association of covid-19 infectious status and raise in antibody titre is highly significant.

Antibody against SARS-CoV-2 will play an essential role in determining the true prevalence of this virus. This is particularly true if one considers the constant discussions around positive and negative predictive values of molecular tests for SARS-CoV-2. Given that the rate of asymptomatic infection with SARS-CoV-2 continues to be refined, with previously reported rates ranging from 4% to 80% across different populations and exposure scenarios, such seroprevalence studies will allow us to establish a more accurate regional or national denominator for the number of infected individuals, which will ultimately help to determine a true case fatality rate [5–9]. It is important to note that natural infection induces both mucosal antibody responses (secretory immunoglobulin A (IgA)) and systemic antibody responses (IgG). The upper respiratory tract is thought to be mainly protected by secretory IgA, whereas the lower respiratory tract is thought to be mainly protected by IgG [10,11,12]. Vaccines that are administered

intramuscularly or intradermally induce mainly IgG, and no secretory IgA. It is therefore possible that most vaccines currently in development induce disease-preventing or disease-attenuating immunity. Our study findings indicated a relatively high frequency of positive SARS-CoV-2 antibody status in post infected population when compared to post vaccinated. In overall statistics both post infected and post vaccinated group shows increase in antibody titre. Our results suggest that COVID-19 might already have been present at the early stage of the pandemic. Several previous studies have evaluated SARS-CoV-2 antibody profiles in patients with COVID-19 [13]; Serial evaluation of SARS-CoV-2 IgG antibody status is likely to reveal risk factors associated with COVID-19 susceptibility and mechanisms of disease spread.

Table 1

Covid19Infectionstatus * ABCAT Cross tabulation				
COVID-19 INFECTION STATUS		ABCAT		Total
		<5	>5	
	INFECTED	4	51	55
		7.3%	92.7%	100.0%
	VACCINATED	31	14	45
		68.9%	31.1%	100.0%
TOTAL		35	65	100
		35.0%	65.0%	100.0%

Table 2

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	41.303 ^a	1	.000		
Continuity Correction ^b	38.639	1	.000		
Likelihood Ratio	45.020	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	100				

SINCE THE P VALUE IS <0.001 the association of covid-19 infectious status and raise in antibody titre is highly significant.

CONCLUSION

Hence, anti SARS-CoV-2 antibody analysis can help for preventing reinfection, severity of the disease and to implement the role of Booster dose in prevention of the disease.

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