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Original Article

Internal Medicine Section

Prevalence of SARS-CoV-2 Infection among Healthcare Workers of a Hybrid Tertiary COVID-19 Hospital in Kerala, India

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ABSTRACT

Introduction: Healthcare Workers (HCWs) have more risk of exposure, and those working in critical care units are likely to have exposure to higher viral inoculum load from aerosol generating procedures. The risk of acquisition of infection is higher in those who work in hybrid hospitals compared to those designated as Coronavirus Disease-2019 (COVID-19) hospitals.

Aim: To estimate the prevalence of Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) infection among Healthcare Workers (HCWs) of a hybrid COVID-19 treatment hospital in Kerala.

Materials and Methods: This cross-sectional study was conducted in the Central Biochemistry Laboratory, Government Medical College, Thiruvananthapuram, Kerala, India, during the period 8th January 2021 to 19th January 2021. Among 3550 HCWs, 979 subjects were selected and grouped into high risk and low risk category, based on their job profile in the hybrid hospital.

Results: Finally, 940 HCWs were analysed in the study grouped as high risk (n=859) and low risk (n=81). SARS-CoV-2 Immunoglobulin (Ig) was detected in (19.1%) 180/940 of them. Seroprevalence among the high-risk group was 20.3% (174/859) and that in low-risk group was 7.4% (6/81) (p=0.005). In high-risk group, seropositivity was noted in 30.54% (76/249) of nurses, 19% hospital attenders (30/158), 18.9% (59/312) resident doctors and 6.4% (9/140) consultant doctors. In those with a positive history of SARS-CoV-2 infection, seropositivity was found among 75.4% (101/134). In those who were COVID-19 positive during July 2020, 33.3% (6/18) were still IgG reactive.

Conclusion: The study reported 19.1% SARS-CoV-2 IgG reactivity among HCWs. Seropositivity was significantly higher in high-risk group compared to low-risk. Antibody decay kinetics was comparable to that in published literature. Infection control challenges in hybrid hospitals account for higher seropositivity in this study, compared to overall seroprevalence among HCWs in Kerala.

Keywords: Antibody decay kinetics, Coronavirus disease-2019, Immunoglobulin, Severe acute respiratory syndrome-coronavirus-2

INTRODUCTION

The Coronavirus Disease-2019 is a multisystem disease with predominant involvement of the respiratory system. COVID-19 transmission dynamics include droplet, contact and airborne transmission in specific settings. HCWs are in close contact with COVID-19 patients, and so the probability of getting infected is very high as evidenced by studies from across the world [1]. As around 40% of SARS-CoV-2 infections are asymptomatic [2], the exact prevalence among HCWs can be identified only by a seroprevalence study.

The first national population-based serosurveillance study, conducted by Indian Council of Medical Research (ICMR) during May 2020 to June 2020, found that 0.73% of adults in India were exposed to SARS-CoV-2 infection [3]. The same study which was conducted among adults aged 18 or older in 21 states, showed the prevalence across three districts of Kerala in May, August and December 2020 to be 0.33%, 0.73% and 11.6%, respectively [3]. This survey showed that the seroprevalence in India during the same time period was 0.8%, 6.60% and 21.50%. Majority of the studies (one of them being a preprint) from across the world have shown that seroprevalence among HCWs is higher than that in the community [4,5]. This is because HCWs have more risk of exposure, and those working in critical care units are likely to have exposure to higher viral inoculum load from aerosol generating procedures. A preprint study reported that the risk of acquisition of infection is higher in those who work in hybrid hospitals compared to that in designated COVID-19 hospitals [4]. This is because in hybrid hospitals, both COVID-19 and non COVID-19 cases are admitted whereas in designated hospitals only confirmed COVID-19 cases are admitted. Infection prevention and control is more challenging in hybrid hospitals than in the designated ones.

Seroprevalence among HCWs vary from hospital to hospital, and depends on the stage of the pandemic in the district during the study period and infection control practices adopted in the hospital. In India, a cross-sectional study done among 25% of HCW of a tertiary care hospital, conducted over six weeks in July 2020 to August 2020, had shown 11.94% seroprevalence [6]. According to Indian Council of Medical Research (ICMR), third round seroprevalence study conducted in December 2020 to January 2021, 25.7% of HCWs in India have COVID-19 antibodies [7]. A study conducted from 11th July 2020 to 24th July 2020 among HCWs of a hospital in Kerala showed no prevalence of SARS-CoV-2 IgG [8]. But during the study period, seroprevalence in Kerala was only 0.2% [3].

There is no published study related to seroprevalence of COVID-19 among HCWs from a hybrid COVID-19 hospital in Kerala, after a surge of cases occurred and population seroprevalence increased from 0.2 to 11.6% [9]. This study was undertaken to estimate the prevalence of SARS-CoV-2 infection among HCWs of Government Medical College Thiruvananthapuram (GMCT), a hybrid tertiary care centre. Persistence and decay kinetics of SARS-CoV-2 IgG among this population was studied.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Central Biochemistry Laboratory, Government Medical College, Thiruvananthapuram,

Kerala, India, from 8th January 2021 to 19th January 2021. Institutional Ethical Committee clearance from GMC was taken. (HEC no 07/58/2020MCT dated 28.11.2020). Informed consent was taken for participation in the study.

Sample size calculation: Sample size was calculated using the following formula:

$$n=Z^2_{1-\alpha/2}P(1-P)/(\varepsilon P)^2$$

where P=anticipated population proportion, ε=relative precision. The sample size was fixed at 979 assuming the prevalence of COVID-19 to be 11% [10] with a relative precision of 20% and 95% desired confidence level.

Inclusion criteria: All HCWs under the administrative control of principal GMCT were eligible to participate in the study.

Exclusion criteria: HCWs who were not willing to participate in the study were excluded.

Procedure

From 3550 HCWs at GMCT, 979 were selected using stratified random sampling. Risk categorisation, into high-risk and low-risk, was done based on job setting. High-risk group HCWs was defined as those involved in direct care of patients with COVID-19 and low-risk group included HCWs working in the non COVID-19 pool.

Study Participants

After obtaining informed written consent, demographic variables, clinical history with regard to symptomatology in case of a positive history of COVID-19, infection prevention and control measures adopted etc., were taken on a pre-structured proforma. Anti SARS-CoV-2 IgG test was performed on serum using Chemiluminescent Immune Assay (CLIA) (VITROS Anti SARS-CoV-2 IgG reagent pack and VITROS Anti SARS-CoV-2 IgG calibrator, on VITROS ECi 3600 Immunodiagnostic system). Quality checks and calibration was done as per Clinical and Laboratory Standards Institute (CLSI) guidelines [10]. VITROS Anti SARS-CoV-2 IgG Assay kit, used for the study, has United States (US) Food and Drug Administration (FDA), Emergency Use Authorisation (EUA), Conformitè Europëenne (CE) certification and is recommended by ICMR for sero-surveillance purpose [3]. The sensitivity and clinical specificity of the assay kit is 90% and 100%, respectively. Using VITROS immunodiagnostic system, results are calculated automatically as signal/cut-off (s/co values). In a serosurvey study, convalescent plasma therapy done for COVID-19 at Mayo clinic using the VITROS IgG kit, a s/co value between 1.0-4.64 denoted low titer, 4.62-18.45 medium titer and above 18.45 high titer [11].

STATISTICAL ANALYSIS

Numerical variables are presented as mean and standard deviation. Categorical variables are presented as frequency and percentage. A 95% Confidence Interval (CI) of observed prevalence and true prevalence was adjusted for sensitivity and specificity of the reagent kit. The corresponding 95% CI for adjusted prevalence was calculated by Blaker's method using R software. IgG reactivity among various categories of participants were analysed by Chi-square test. A two-sided probability value of <0.05 was considered statistically significant. Random sample numbers were generated and data analysis was performed Using R software (R version 3.6.2 (2019-12-12) Copyright (C) 2019. The R Foundation for Statistical Computing Platform:x86_64-w64-mingw32/x64 (64-bit)) and Statistical Package for Social Sciences (SPSS) version 16.0.

RESULTS

Total of 940 participants were analysed, Severe Acute Respiratory Syndrome-Coronavirus-2 (SARS-CoV-2) IgG seropositivity was identified in 180 cases, resulting in an observed prevalence of 19.1%. Reagent sensitivity and specificity was 90% and 100%, respectively. When 95% CI was adjusted for test sensitivity and specificity using Blaker's method, the true prevalence was 21.2%. Out of the 940 study participants [Table/Fig-1], 765 (81.4%) were below and equal to 50 years and 175 (18.6%) were above 50 years of age. There were 69.4% females and 30.6% males. There were 859 (91.4%) participants in the high-risk group and 81 (8.6%) in the low-risk group. Among the high-risk category, majority were residents (33.2%, n=312/940) followed by nurses (26.5%, n=249/940). Low risk category included doctors (n=26/81, 2.8%), technicians (39/81,4.1%) and Junior Laboratory Assistants (JLAs) (n=16/81, 1.6%).

Study participants	Variables	n (%)
Demographic variables		
Age (years)	≤50	765 (81.4)
	>50	175 (18.6)
Sex	Male	288 (30.6)
	Female	652 (69.4)
Risk categorisation		
High risk group* (n=859 (91.4%))	Doctors at high risk	140 (14.9)
	Residents	312 (33.2)
	Nurses	249 (26.5)
	Attenders	158 (16.8)
Low risk group* (n=81(8.6%))	Doctors at low risk	26 (2.8)
	Technicians	39 (4.1)
	Junior laboratory assistant	16 (1.7)

[Table/Fig-1]: Baseline characteristics N=940.
*High risk group HCWs was defined as those involved in direct care of patients with COVID-19 and low risk group included HCWs working in the non COVID pool

History of COVID-19 positivity and seropositivity is shown in [Table/Fig-2]. Overall, 134 participants had been tested positive (RT-PCR) in the past for SARS-CoV-2 infection. Among these 134, 101 (75.4%) were SARS-CoV-2 IgG reactive. Of the 536 subjects who had tested COVID negative in the past, 51 (9.5%) were seropositive for SARS-CoV-2 IgG. In 270 subjects, who had never undergone a COVID-19 test in the past, 28 (10.4%) were seropositive (p<0.001}.

COVID-19 test	Total	IgG Non reactive	IgG reactive
Positive	134	33 (24.6)	101 (75.4)
Negative	536	485 (90.5)	51 (9.5)
Not done	270	242 (89.6)	28 (10.4)
Total	940	760 (80.9)	180 (19.1)

[Table/Fig-2]: Association of Coronavirus disease-2019 (COVID-19) Immunoglogulin (Ig) positivity and COVID-19 test.

Prevalence as per age and sex is shown in [Table/Fig-3]. Seropositivity below 50 years was 148 (19.3%), and above 50 years was 32 (18.3%) (p-value 0.748). Seropositivity among females was statistically higher (21%) than males (14.9%) (p-value 0.029).

Seropositivity based on risk and job category [Table/Fig-3]: Among HCWs in High-risk group 174 (20.3%) and among low risk group 6 (7.4%) were seropositive with a statistically significant p-value=0.005. Among high-risk group, 6.4% of Doctors (n=9), 18.9% residents (n=59), 30.54% of nurses (n=76) and 19% of attenders (n=30) were seropositive with a statistically significant p-value <0.001. In the low risk group, 11.5% of doctors, 5.1% of technicians and 6.3% of junior laboratory assistants were seropositive.

Seropositivity and co-morbidities [Table/Fig-3]: Among 180 seropositive subjects, 24.8% had atleast one co-morbidity. Of them, 22.9% were hypertensives, 25.9% were diabetic, 17.6% had coronary artery disease and 35.7% had bronchial asthma.

		Total (n)	Test positive- n (%)	p-value
Age (years)	≤50	765	148 (19.3)	0.748
	>50	175	32 (18.3)	
Sex	Male	288	43 (14.9)	**0.029**
	Female	652	137 (21)	
Job category	**High-risk**	**859**	**174 (20.3)**	**<0.001**
	High risk doctors	140	9 (6.4)	
	Residents	312	59 (18.9)	
	Nurses	249	76 (30.54)	
	Attenders	158	30 (19)	
	Low-risk	**81**	**6 (7.4)**	
	Low risk doctors	26	3 (11.5)	
	Technicians	39	2 (5.1)	
	JLAs	16	1 (6.3)	
Risk category	High risk	859	174 (20.3)	**0.005**
	Low risk	81	6 (7.4)	
Co-morbidities	HTN	83	19 (22.9)	0.364
	DM	54	14 (25.9)	0.192
	CAD	17	3 (17.6)	0.874
	Bronchial asthma	14	5 (35.7)	0.112
	Kidney disease	1	0	0.626
	Any co-morbidities	129	32 (24.8)	0.079

[Table/Fig-3]: Factors associated with SARS-CoV-2 IgG positivity.
JLA: Junior laboratory attenders; HTN: Hypertension; DM: Diabetes mellitus; CAD: Coronary artery disease

Symptomatology in SARS-CoV-2 IgG seropositive subjects [Table/Fig-4]: Of the subjects who were seropositive for SARS-CoV-2 IgG, 45% had fever, 60% vomiting, 69.6% anosmia and 78.3% ageusia. Other symptoms like diarrhoea, fatigue, sore throat, rhinorrhoea and cough were present in roughly one-third of patients. Overall, 32.6% of the subjects had atleast one of the above symptoms during the last six months.

Symptomatology		Total (n)	Test positive- n (%)	p-value
COVID-19 Symptoms	Fatigue	123	51 (41.5)	**<0.001**
	Sore throat	170	53 (31.2)	**<0.001**
	Running nose	141	44 (31.2)	**<0.001**
	Cough	105	36 (34.3)	**<0.001**
	Fever	160	72 (45)	**<0.001**
	Anosmia	46	32 (69.6)	**<0.001**
	Ageusia	23	18 (78.3)	**<0.001**
	Vomiting	10	6 (60)	0.001
	Diarrhoea	35	9 (25.7)	0.314
	Any symptoms	353	115 (32.6)	**<0.001**
Symptoms among subjects who had tested positive for COVID-19 infection and are sero reactive	Fatigue	48	38 (79.2)	0.446
	Sore throat	46	40 (87)	**0.024**
	Running nose	30	24 (80)	0.504
	Cough	25	22 (88)	0.104
	Fever	59	48 (81.4)	0.154
	Anosmia	36	31 (86.1)	0.08
	Ageusia	20	17 (85)	0.279
	Vomiting	6	5 (83.3)	0.643
	Diarrhoea	11	9 (81.8)	0.605
	Any symptoms	93	74 (79.6)	0.089
	No symptoms	41	27 (65.9)	0.089

[Table/Fig-4]: Association of COVID-19 positivity, COVID-19 symptoms and symptoms among who were COVID test positive.

Symptomatology in subjects who had tested positive for COVID-19 and are seroreactive [Table/Fig-4]: In COVID-19 tested positive subjects who were seroreactive, more than 80% of subjects cough, sore throat, anosmia, ageusia, fever and or rhinorrhoea at the time of diagnosis of COVID-19. Trends in SARS-CoV-2 IgG antibody reactivity in relation to month in which subjects were detected to have COVID-19 [Table/Fig-5].

COVID-19 test	COVID-19 test positive	IgG reactive out of those who tested COVID-19 positive	p-value
July	18 (13.4%)	6 (33.3%)	0.001
August	37 (27.6%)	27 (73.0%)	
September	24 (17.9%)	19 (79.2%)	
October	23 (17.2%)	20 (87.0%)	
November	18 (13.4%%)	16 (88.9%)	
December	14 (10.4%)	13 (92.9%)	
Total	134 (100%)	101 (75.4%)	

[Table/Fig-5]: Trend in COVID-19 IgG antibody reactivity among cases detected from July to December 2020 (N=134).
p-value <0.05 considered significant

Of the 134 subjects who were diagnosed to have COVID-19 in the past, 101 (75.4%) were detected to be seropositive for SARS-CoV-2 IgG during the study period (8th January 2021 to 19th January 2021). Seropositivity among subjects detected to have COVID-19 in July, August, September, October, November and December were 33.3%, 73%, 79.2%, 87%, 88.9% and 92.9%, respectively. A low titer signal/cut-off (s/co) was present in 43.6% and medium titer s/co was present in 56.4% of study subjects with past history of COVID-19 who were SARS-CoV-2 IgG reactive [Table/Fig-6]. None of the study subjects had a high titer s/co.

	IgG		Total
	1.0-4.62 s/co	4.62-18.45 s/co	
Month	n (%)	n (%)	N (%)
July	3 (50%)	3 (50%)	6 (100%)
August	12 (44.4%)	15 (55.6%)	27 (100%)
September	7 (36.8%)	12 (63.2%)	19 (100%)
October	10 (50%)	10 (50%)	20 (100%)
November	10 (62.5%)	6 (37.5%)	16 (100%)
December	2 (15.4%)	11 (84.6%)	13 (100%)
Total	44 (43.6%)	57 (56.4%)	101 (100%)

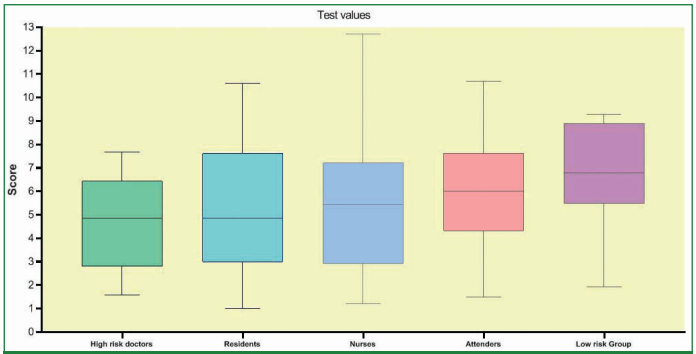
[Table/Fig-6]: Trend in COVID IgG antibody titer among cases detected from July to December 2020.
IgG: Immunoglobulin; S/co: Signal/cut-off

S/co values of SARS-CoV-2 IgG reactive HCW [Table/Fig-7,8]: Among SARS-CoV-2 IgG reactive HCWs, 43.6% had value between 1.0-4.62 (low titer) and 56.4% had value between 4.62-18.45 (medium titer). No subjects had high s/co titer in this study [Table/Fig-7,8].

		Test value		
Antibody titer	n	Min-Max	Median (IQR)	Mean±SD
High risk				
Doctors	9	1.59-7.67	4.87 (2.79-6.45)	4.704±2.024
Residents	59	1.01-10.6	4.86 (2.98-7.63)	5.285±2.795
Nurses	76	1.2-12.7	5.43 (2.91-7.228)	5.281±2.782
Attenders	30	1.49-10.7	6.005 (4.305-7.645)	5.862±2.561
Low risk group	6	1.93-9.3	6.78 (5.47-8.90)	6.703±2.602

[Table/Fig-7]: COVID IgG Antibody titer across risk categories.
IQR: Interquartile range

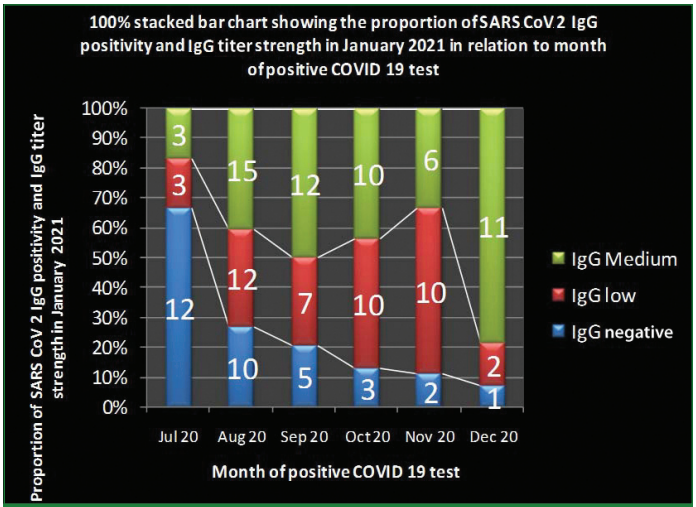
The relation between time since infection and antibody titer is shown in [Table/Fig-9]. Antibody titer of subjects infected six months prior to testing showed 33% positivity with rates inversely proportionate



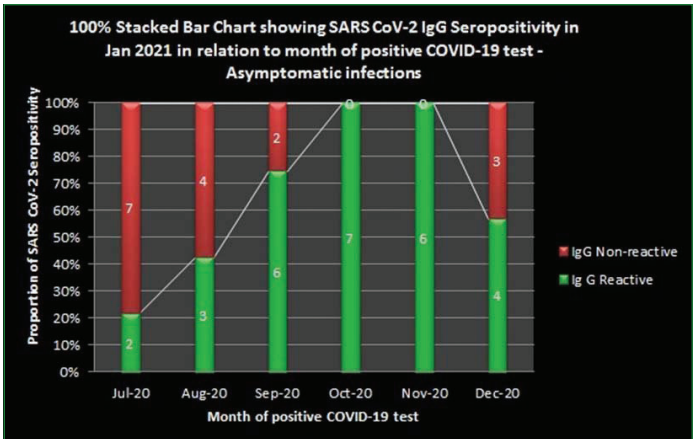
[Table/Fig-8]: Box plot representing SARS-CoV-2 IgG Antibody titres across risk categories.

to time from infection. At one month after infection, only one patient had negative titer.

When COVID-19 antibody positivity titres were analysed among symptomatic and asymptomatic groups, antibody titres showed a decrease with time from infection in both groups and are depicted in [Table/Fig-9-11].



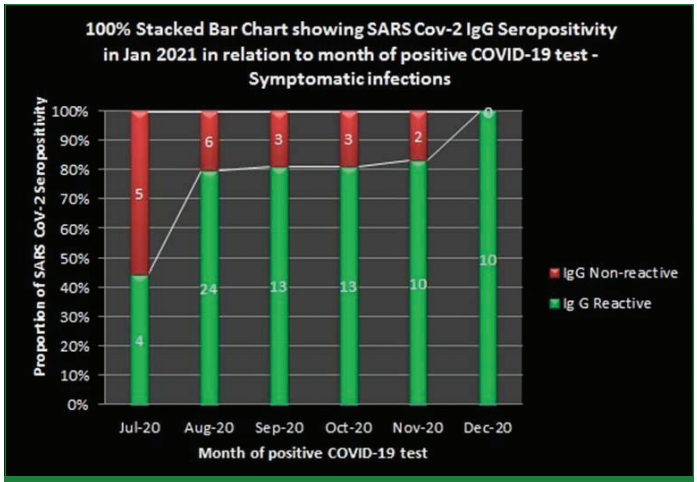
[Table/Fig-9]: A 100% stacked bar chart showing the proportion of SARS-CoV-2 IgG positivity and IgG titer strength in January 2021 in relation to month of positive COVID-19 test.



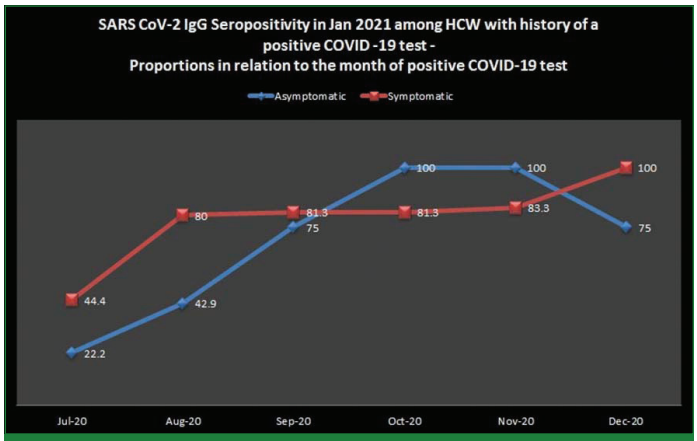
[Table/Fig-10]: A 100% stacked bar graph showing SARS-CoV-2 IgG seropositivity in January 2021 in relation to month of positive COVID-19 test- Asymptomatic infection.

DISCUSSION

Kerala was the first state in India to report COVID-19 case on 29th January, 2020. First COVID-19 patient got admitted to GMCT on 13th March 2020. GMCT, a 3250 bedded tertiary care hospital, was converted to a hybrid COVID hospital catering to both non COVID as well as patients with moderate and severe SARS-CoV-2 infection. Being a border district and due to multiple coastal clusters, Thiruvananthapuram district had the maximum number of cases in Kerala with epidemic peak in October, 2020. Till date, more



[Table/Fig-11]: A 100% stacked bar graph showing SARS CoV 2 IgG seropositivity in January 2021 in relation to month of positive COVID-19 test – Symptomatic infection.



[Table/Fig-12]: Showing SARS CoV 2 IgG seropositivity in January 2021 among HCW with history of a positive COVID-19 test- proportions in relation to the month of positive COVID-19 test.

than 10000 COVID-19 patients have been admitted to GMCT and 936 HCWs have been diagnosed to have COVID-19. In a study, done during May 2020 in Kerala, the prevalence of SARS-CoV-2 infection was only 0.5% among HCWs [12]. At the time of the study, total number of cases in Kerala was around 1000 only [12]. Seroprevalence of SARS-CoV-2 infection in Kerala which was 0.3% in August increased to 11.6% in December and during this period, a similar increase in COVID-19 among HCWs was noted [8].

The present study was conducted between 8th January and 19th January 2021. As on 19th January, Kerala had a cumulative case load of 8,57,380 cases with 70,259 active cases [12]. The present study showed a seropositivity of 19.1% among HCWs. A similar study done at National capital region of India conducted between January 12th and February 13th 2021 reported a seroprevalence of 46.2% among HCWs (4-pre print). In India, the seropositivity among HCWs was 2.5% during June in Kashmir, 11% in Mumbai during May and 11.94% in Kolkata during July 2020 [9,10,13]. Lower seroprevalence among HCWs in these studies reflect the stage of the pandemic in respective states during the study period. The seropositivity among HCWs in other countries was 1.6%, 3.4% and 6% in Germany, Italy and England respectively [14-16]. This low prevalence of SARS-CoV-2 IgG antibodies reflects the burden of pandemic in the study population in the particular time window.

In Kerala, COVID-19 peaked in October 2020 and the epidemic curve has plateaued ever since. Higher SARS-CoV-2 IgG seropositivity among HCWs observed in this study reflects the epidemic situation in the state in the months prior to study period and that is the reason why seropositivity among HCWs was high. Interestingly, in the seroprevalence study conducted by Government of Kerala in February 2021, seropositivity among HCWs was 10.5%.The high seropositivity among HCWs (19.1%) in GMCT compared to

the average seropositivity among HCWs (10.5%) across the state reflects the infection prevention and control challenges in a hybrid hospital which caters to both COVID and non COVID patients [8].

In this study, statistically significant difference in seropositivity was observed among female HCWs (21%) compared to that in males (14.9%). This is due to the greater representation of female nurses in high risk category subgroup who turned seropositive (30.54%). Initial studies from China had reported a sex disparity in COVID-19 epidemiology, whereas global health 50/50 research initiative has observed similar number of cases in men and women [17].

In the present study, statistically significant difference in seropositivity (20.3%) is observed in high risk category compared to that in low risk category (7.4%). This finding is consistent with a study done in Switzerland [5]. Among the subgroups of high risk category, seropositivity was higher in nurses (30.54%) followed by hospital attenders (19%), resident doctors (18.9%) and consultant doctors (6.4%). Nurses are at the highest risk of occupational exposure due to the nature of their work which results in longer duration and intensity of exposure to SARS-CoV-2. This is the reason why among HCWs in high-risk category, nurses have maximum seropositivity. Consultant doctors have minimum duration of exposure to COVID-19 patients and that explains why seropositivity among them is only 6.4%.

In this study, of the 180 subjects who were seropositive, only 24.8% had atleast one co-morbidity. This can be explained by the fact that 81.4% of study population was below 50 years of age. Moreover in our hospital, younger staff without co-morbidities was posted preferentially in high-risk areas. The practice of selectively posting those with co-morbidities in low risk areas in our institution probably helped in protecting them from getting infected.

The potential symptoms suggestive of COVID-19 in seropositive HCWs who had never tested for COVID-19 were analysed in this study. Ageusia and anosmia were the common symptoms in that group. The predictive symptomatology for COVID-19 in this study is similar to that in studies done in Sweden [18] and a multinational population-based cohort in United States (US) and United Kingdom (UK) [19]. In this study, in seropositive with past history of COVID-19 all the potential COVID-19 symptoms were present in more than 75% of subjects similar to a study done on healthcare personnel in Washington [20].

Of the 134 HCWs included in this study with history of COVID-19, 75.4% were detected to be seropositive. SARS-CoV-2 IgG was tested by Chemiluminescence Immunoassay (CLIA) method. Different methods to measure SARS-CoV-2 IgG like Enzyme-Linked Immunosorbent Assay (ELISA), CLIA and rapid lateral flow immunoassay have been found to have equivalent clinical performance for detecting IgG 14 days after onset of symptom in certain studies [21], whereas, a systematic review and meta-analysis to determine diagnostic accuracy of serological tests for COVID-19 detection have found lower sensitivity for lateral flow immunoassay when compared to ELISA and CLIA [22].

In this study, 75.4% of the subjects with history of COVID-19 were seropositive for SARS-CoV-2 IgG. Antibody decay kinetics in the present study assuming that all patients with past history of COVID-19 had developed IgG antibodies, is comparable to the rate of decay in published literature [23]. Even after six months of SARS-CoV-2 infection, 33.3% of patients had SARS-CoV-2 IgG antibody. The persistence of SARS-Cov-2 IgG in patients who were diagnosed to have COVID-19 at 5,4,3,2 and one month prior to the study period was 73%, 79.2%, 87%, 88.9% and 92.9%, respectively. Studies on antibody decay kinetics in COVID-19 had shown that majority of the patients seroreverted by three months [23,24]. Similar antibody kinetics was observed in another study performed on 271 laboratory confirmed SARS-CoV-2 infection [25]. Antibody persistence upto four months after infection has been observed in studies from Iceland and USA. Later studies done using more sensitive CLIA test kits have shown antibody persistence for more than six months of SARS-CoV-2 infection.

This study was done using VITROS Ig G KIT in which results are calculated as signal/cut-off (s/co). A serosurvey study on convalescent plasma therapy in COVID-19 at Mayo clinic using the VITROS IgG kit revealed value between 1.0-4.64 s/co as low titer, 4.62-18.45 as medium titer and above 18.45 as high titer [26]. As per this study, 40.6% of subjects who tested positive for the SARS-CoV-2 antibody had a low titer of antibody levels whereas 59.4% had medium titer of antibody levels.

Limitation(s)

Neutralising antibodies and T-cell responses which are the real correlates of immune protection from COVID-19 were not assessed. Division into high and low risk group was made based on occupational exposure only and other factors like exposure from the community were not taken into account.

CONCLUSION(S)

The seroprevalence of SARS-CoV-2 infection among HCWs in GMCT was found to be 19.1% in this study. Seropositivity was significantly higher in high risk group compared to low risk group. Antibody decay kinetics observed in this study is comparable to that in published literature. Even after six months of SARS-CoV-2 infection, 33.3% of patients had SARS-CoV-2 IgG antibody. The persistence of SARS-CoV-2 IgG in patients who were diagnosed to have COVID-19 at 5,4,3,2 and 1 month prior to the study period was 73%, 79.2%, 87%, 88.9% and 92.9%, respectively. The high seropositivity among HCWs (19.1%) in GMCT compared to the average seropositivity among HCWs (10.5%) across the state reflects the infection prevention and control challenges in a hybrid hospital which caters to both COVID-19 and non COVID-19 patients.

Declaration: The article is present in the preprint repository medRxiv (https://www.medrxiv.org/content/10.1101/2021.07.19.21260792v1).

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