ORIGINAL ARTICLE

SARS-COV-2 SPECIFIC ANTIBODY PREVALENCE AMONG DOCTORS OF EMERGENCY IN MAYO HOSPITAL, LAHORE

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ABSTRACT:

Objective: To know the frequency of doctors with IgG antibodies positive for SARS-COV-2 working in Mayo hospital emergency during the COVID-19 pandemic. To determine the frequency of doctors who developed asymptomatic COVID-19 during this pandemic while working in emergency. Association of contaminating infection and observing preventive measures.

Methods: IT was observational cross-sectional study with sample size 151. Those doctors who gave consent for study were included. Demographical Variables, designation, area of work, history of symptoms of COVID-19, use and availability of PPE were asked on a performa. Blood samples were drawn for analysis by a local laboratory to assess levels of IgG antibody titer. Collected data was analyzed using SPSS 20.

Results: The mean Age of 151 included participants was 27.94 ± 4.25. Of these, 96 (63.6%) were male and 55 (36.4%) were female. Mean IgG level was 2.09 ± 5.23. Seropostivity for COVID -19 IgG antibody among doctors working at Emergency of Mayo hospital was observed in 39.7 % (60).. 91 (60.3%) were screened negative. 63 (41.7%) doctors showed symptoms of COVID-19 of them 47 were screened positive and 16 were non reactive in antibody titer. Among 88 (58.3%) asymptomatic participants 13 (14.7%) were seropositive whereas 75 (83.3%) neither showed symptoms nor showed reactive antibody titer.

Conclusion: There was a high seroprevalance of antibodies against SARS-CoV -2 in doctors working at Mayo hospital, Lahore. Most of the symptomatic patients were seropositive.

Key Words: SARS CoV-2, IgG antibodies, Seroprevalance

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INTRODUCTION:

Novel Corona Virus which is officially known as severe acute respiratory syndrome coronavirus 2 (SARS –COV 2) was first reported during last December in China. WHO named the disease caused by it as Coronavirus diseases 2019 (COVID-19) and declared it as pandemic on March 11th, 2020 after an alarming increase in its spread globally. (1,2,3). Clinical Presentation varies greatly from having mild flu-like symptoms to severe pneumonia leading to acute respiratory distress syndrome (ARDS). (4,5).

Most of the affected individuals are asymptomatic and continues to spread the virus for many weeks. (6,7,8) It is transmitted mainly from person to person. (9,10).

Health Care Providers (HCP) is a high risk population of contaminating COVID 19 since they are more exposed than the general population and can become a source of spreading the virus to the patients and fellows. (11,12) In order to avoid its spread to other doctors, paramedics and patients, strict standard hygiene measurements need to be followed.(13). Several policies, including a reduction in working hours, weekly shift and regular screening, have been devised to control its spread and improve patient care. (14).

After exposure to SARS - CoV- 2, B-Cell response of the host body produces immunoglobulin G (IgG) antibodies against the virus within a duration of 14 days (10-18 days) for its neutralization.(15,16). This not only grants immunity to the patient but also indicates the previous infection. (17). The question in regard to immunity after seroconversion, antibody levels, its duration and its possible relationship to protection from re-infection still remains debatable and need to be elucidated.(17,18).

Since SARS-CoV-2 infection is asymptomatic many a times, actual burden of the disease is much higher than the numbers being reported. Seroprevalence study can provide us with the proportion of recently infected individuals especially in high risk groups like doctors. We aim to study the presence of antibodies against SARS –CoV- 2 among the doctors working at the emergency of a large tertiary care hospital and preventive measures taken by them.

METHODS:

IT was observational cross-sectional study with sample size 151. at Department of Emergency, Mayo hospital, Lahore. Sample techniques were Non-probability, consecutive sampling.

INCLUSION CRITERIA: All doctors including consultants, postgraduate Residents, house officers, medical officers who worked in emergency department during the pandemic will be included in the study after informed consent

EXCLUSION CRITERIA: Those doctors who didn't give consent to participate in this study.

DATA COLLECTION: After the approval of the ethical review committee, all doctors who worked in emergency during COVID 19 pandemic were included in the study after informed consent. Age, gender and designation of doctor was noted on a pre-designed Performa. IgG Antibody testing was done from a local laboratory through ELISA after withdrawing a sample of 3ml. 1.4 was considered cut off value below which participants was considered negative and any value equal to or greater than 1.4 was labeled as seropositive. Further they were asked regarding the symptoms of COVID-19 infection and regarding any PCR for COVID done for confirmation of infection. Information regarding duty place, availability and use of PPE was asked.

DATA ANALYSIS: Data was analysed using the SPSS version 20.0.

RESULTS:

Table 1: Frequencies and Associations of the Variables.

Variables		Seropositive	Seronegative	p-Value
Gender	Total	60 (39.7%)	91(60.3%)	
	Male	41(68.3%)	55 (60.4%)	
	Female	19 (31.7%)	36 (39.6%)	0.324
Age (Years)	21-28 (105) (69.5%)	39 (65.0%)	66 (72.5%)	
	29-36 (42) (27.8%)	20 (33.3%)	22 (24.2%)	
	37-44 (1) (0.7%)	1 (17%)	0 (0%)	
	45-52 (3) (2%)	0 (0%)	3 (3.3%)	0.81
	PGR (92) (60.9%)	40(66.7%)	52 (57.1%)	
Designation	Medical Officer (24) (15.9%)	7 (11.7 %)	17 (18.7%)	
	House Officer (23) (15.2%)	10 (16.7%)	13 (14.3%)	
	Consultant (12) (7.9%)	3 (5.0%)	9 (9.9%)	0.410
	CRR (69) (45.7%)	30 (50. 0%)	39 (42.9%)	
Duty Area	NCR (58) (38.4%)	23 (38.3%)	35 (38.5%)	
	Triage (24) (15.9%)	7 (11.7%)	17 (18.7%)	0.467
Use of Surgical Mask	Yes (121) (80.1%)	44 (73.3%)	77 (84.6%)	
	No (30) (19.9%)	16 (26.7%)	14 (15.4%)	0.089
Use of N95	Yes (128) (84.8%)	52 (86.7%)	76 (83.5%)	
	No (23) (15.2%)	8 (13.3%)	15 (16.5%)	0.598
Use of eye Glasses	Yes (100) (66.2%)	42 (70.0%)	58 (63.7%)	
	No (51) (33.8%)	18 (30.0%)	33(36.3%)	0.426
Use of Gloves	Yes (77) (51%)	27 (45.0%)	50(54.9%)	
	No (74) (49%)	33(55.0%)	41(45.1%)	0.232

Variables			Seropositive	Seronegative	p-Value
Use of Eye Shield	Yes (61)	(40.4%)	20 (33.3%)	41 (45.1%)	
	No (90)	(59.6%)	40 (66.7%)	50 (54.9%)	0.151
TYVEK Suit use	Yes (80)	(53%)	31 (51.7%)	49 (53.8%)	
	No (71)	(47%)	29 (48.3%)	42 (46.2%)	0.793
Symptoms	Yes (63)	(41.7%)	47 (78.3%)	16 (17.6%)	
	No (88)	(58.3%)	13 (21.7%)	75 (82.4%)	0.000
Reverse Transcriptase	Detected (29) (19.2%)		28 (46.7%)	1 (1.%1)	
Polymerase Chain	Not detected (16) (10.6%)		5 (8.3%)	11 (12.1%)	0.000
Reaction (rT PCR)	Not Done (106) (70.2)		27 (45.0%)	79 (86.8%)	

The mean Age of 151 included participants was 27.94 +_ 4.25. Of these, 96 (63.6%) were male and 55 (36.4%) were female. The Mean IgG level was 2.09 +_ 5.23. The maximum antibody titer was 56.90 which was observed in a postgraduate resident. Seropostivity for COVID -19 IgG antibody among doctors working at Emergency of Mayo hospital was observed in 39.7 % (60). Of them 41 were male and 19 were females. 91 (60.3%) were screened negative. 63 (41.7%) doctors showed symptoms of COVID-19 like fever, cough, loss of taste and shortness of breath etc, of them 47 were screened positive and 16 were non reactive in antibody titer. Among 88 (58.3%) asymptomatic participants 13 (14.7%) were seropositive whereas 75 (83.3%) neither showed symptoms nor showed reactive antibody titer. Only 45 of the symptomatic participants got their PCR done and it came out to be positive for 29 cases. 70.2 % (106) participants were not tested by PCR for COVID-19.

92 (60.9 %) included participants were postgraduate residents (PGR), 24, 23 and 12 were medical officers, house officers and consultants respectively. Personal Protective equipment (PPE) were provided to all the doctors (100%).The area of work for 69 (45.7%) doctors was corona resuscitation room, for 24 (15.9%) was triage area and was non corona room for 58 (38.4%).The designation and working area was not associated with IgG antibody reactivity. (P-value greater than 0.05). The frequencies of the studied variables and their association with Seroprevalance using Chi-square is given below in the table.

DISCUSSION:
Seroconversion is a helpful tool indicating past infection and immunity against SARS- CoV-2. Antibodies Appear at a median of 14 days of exposure and remain for almost a period of four weeks. The diagnosed pool of symptomatic COVID-19 by PCR patients and mortality due it does give an idea of progression of disease and its outcome but it does not give real estimation of disease burden. Many of the asymptomatic patients remain undiagnosed and unreported. Seroprevalance can provide an actual disease burden in the population. To the best of our knowledge, this is the first ever reported study on seroconversion among the doctors working in Emergency department in Pakistan.

About 39.7% doctors working in emergency were screened positive. This is a very higher percentage indicating level of exposure and preventive measures taken by the doctors. Although PPE were provided to all the doctors, lack of training for their use and lack of knowledge or carelessness could be the reason for this higher percentage. Doctors are a high risk population and the actual seroprevalence will be lower than this number in whole population of the area. Still, it is far away from attaining herd immunity (67%) which can provide protection to the whole community.(19) 14.7% were asymptomatic carriers which were screened positive and had attained immunity. 9.3% and 11.6% are some of the seroprevalences reported among the healthcare workers from Spain.(20,21). 78.3% of symptomatic patients had antibodies against SARS-CoV-2. The chances of being seropositive were strongly associated with symptoms of COVID-19 (p –value <0.05). Working in COVID-19 area was not associated with seropositivity indicating probable better care and vigilance.

A survey of five weeks at Geneva showed an increasing percentages in seropositivity among the population during April and May. (22) A larger study of China including almost 17000 people proved a seroprevalence of 3.8%. It was observed that percentage of antibody titer was greater in high risk groups than general population. (23). Two other community based surveys at California and Santa Clara showed seroprevalence of antibodies against SARS-CoV-2 to be 4.6% and 2.8% respectively.(24,25). All these studies has shown a much reduced percentages than in our study. This puts a lot of questions on our practices which need to be sorted.

We aimed to screen a high risk group among population. This survey gives an idea of disease burden and actual occurrence of the disease can be better

understood using different models. This estimation of affected population is necessary to make valid and useful policies .Timely made strategies are crucial for disease control. This survey is also helpful in describing demographic characteristics of affected people and rate of transmissions. These not only gives an inside of hidden carriers but also gives potential candidates for plasma donors who have sufficient level of antibodies to donate plasma thus help saving many precious lives.

Our study has few limitations. Firstly, it involved a single cohort which represented a small portion of the population. Thus for a population based survey, a much larger sample size involving different cohorts is required. Secondly, Time frame from start of symptoms, history of time of first exposure and time at which blood sample for antibody titer was taken is not well studied. Thirdly we collected data for a period of one month which is a short duration and cannot depict true picture with changing trends in pandemic. So conducting such surveys at a larger scale with longer time duration and larger population involving more details in history are the need of the hour.

CONCLUSION:
There was a high seroprevalence of antibodies against SARS-CoV -2 in doctors working at Mayo hospital, Lahore. Most of the symptomatic patients were seropositive. This demands more comprehensive studies on the topic with larger sample size and regular screening of the doctors and paramedics working in hospitals.

ETHICAL APPROVAL:
The study was approved by the Ethical Review Committee of [1]King Edward Medical University/ Mayo Hospital Lahore, Pakistan. Vide IRB Reference No. 589 /RC/KEMU Dated: August 15, 2020.

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AUTHORS' CONTRIBUTION:

TM: Supervised the project, manuscript writing, final review
HMSJ: manuscript writing, data collection, interdepartmental communication and correspondence
MA: Result and statistical analysis
SJ: Data collection, discussion writing
SUS: Data collection, statistical analysis
TS: Final review