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RESEARCH ARTICLE

EFFECTIVENESS OF SCREENING PROTOCOLS AND TRIAGING ON PREVALENCE OF COVID INFECTION AMONG HCW IN A MIXED COVID HOSPITAL

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ABSTRACT

The COVID-19 pandemic has put the health care worker at increased risk of getting infected by way of exposure to patients in a hospital. Some are at higher risk including those caring COVID 19 patients, and those exposed to suspected, and undiagnosed COVID patients entering the hospital. We did a pilot study in our tertiary care hospital to study the prevalence of COVID 19 infection in HCW in our hospital by conducting COVID 19 antibody tests among 149 HCW at highest risk by nature of their work areas and found very low prevalence of recent COVID 19 infection in them, including zero rates among intensivists doctors working in COVID ICU. We hypothesize that the reasons for our results are strict protocol for screening of patients and HCW entering the hospital, and well implemented SOP and protocols for PPE, infection control, distancing and continuous education to update guidelines.

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INTRODUCTION

The COVID-19 pandemic has put the healthcare worker at an increased risk of getting infected. Among them the highest risk is in hospitals which deal with COVID-19 patients and large number of healthcare workers in the world have been infected with virus in spite of the recommended screening procedures and use of various kinds of people personal protective equipment [Adams,] Many healthcare workers including doctors and nurses have died and these are not necessarily confined to COVID ICUs proving that healthcare workers are at increased risk are getting infected in all types of health Care facilities and environments. Indian data about rate of infectivity and burden of COVID disease among healthcare workers and staff is scarce though .Population estimates are however available. In one study done in India published in a newspaper article published on 22nd July 2020 showed that according to Thyro-care lab 15% of population may have COVID 19 antibodies.

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This was based on data from 60000 tests across hundred Pin-codes conducted over 20 days with marked interregional variability ranging from 47% - 0.7% [Lerner, 2020; ICMR COVID Study Group, 2020]. Results of a Delhi Serological survey showed that 22.86 percent of residents in Delhi have developed antibodies against COVID-19. Two private Labs in Mumbai found antibody positive ATI rate at 24.3% [4]. On this background we conducted a pilot study at our hospital to test for antibody positive rates among healthcare employees employed at a 350 bed tertiary care Hospital having isolated floor to care for COVID-19 patients and the rest of the hospital dedicated to care of Non-COVID patients. In the start of the epidemic, our hospital has set up stringent screening criteria both for OPD and IPD patients as well as hospital employees, on the basis of questionnaire, in COVID and Non-COVID areas with modification in infrastructure to deal with such patients and maintain optimal segregation. Stringent screening criteria was set up for all the employees entering the hospital premises. This screening consisted of a questionnaire at the entry of hospital premises followed by RFID screening, followed by retina thermal screening for high risk healthcare workers. At suspicion of having COVID symptoms on the basis of questionnaire and thermal screening all screen-positive

patients were not allowed to enter the hospital and were referred to Fever clinic established outside the hospital building for further evaluation. We conducted a study to find out the COVID-19 antibody prevalence rates among healthcare workers. Samples of 149 healthcare workers working in high risk of COVID 19 infection in the hospital were tested for COVID-19 antibodies and included all doctors of the hospital and some nurses working in high risk areas. Hence this group represented a sample of healthcare workers at the highest risk of exposure to COVID-19 positive patients over background risk of exposure to COVID-19 which happens in the general population at home. Out of these 149 patients only 14 turned out to be positive for COVID-19 antibody. This is approximately 9.4 % of the sample size tested for COVID-19 antibody. It was striking to note that the antibody positivity rate among intensivists doctors working in COVID ICU, which were 15 in number, many of whom had done multiple COVID duties was zero. (Zero out of 149).

RESULTS

Age Range	No of tests
20-29	57
30-39	72
40-49	15
50-59	4
>60	1

Designation	No of tests
Doctor	30
Nurse	63
Paramedical staff	8
Blood Bank Staff	4
Lab Staff	7
Support	37

Age Range	No of tests
20-29	57
30-39	72
40-49	15
50-59	4
>60	1

Gender	No of tests
Male	89
Female	60

No of Tests	149
Positive	14
Negative	135

Numeric result	Result message	Interpretation
COI < 1.0	Non-reactive	Negative for anti- SARS-CoV-2 antibodies
COI ≥ 1.0	Reactive	Positive for anti-SARS-CoV-2 antibodies

DISCUSSION

Only 9.4 % of the healthcare workers developed a positive antibody titer indicating recent infection among all those who had the highest risk of developing COVID-19 disease. This number in our opinion is very low as compared to the titer in many cities of India as reported by various Labs. Important to note is that our numbers are from high risk healthcare workers inside Hospital which is as low as 9.4 % which compared to reported percentage positivity in normal population in various cities is low, these prevalence rates in these cities have been reported range from 47 % to 0.7% and average around 20% in various metros. Significance of this small study and thereof, of our results may have different reasons. Definite inferences cannot be made. The reason for this result may be multiple. One reason which we think is important is maybe because of stringent screening criteria that was put up at the hospital to screen all healthcare workers every-day in the form of questionnaires, RFID, and retina thermal scans. Awareness campaigns were run among healthcare workers to educate them about the risk of infection in health care workers, high risk of transmission among healthcare workers, and steps to prevent it.

Another step taken which could have contributed to decreased prevalence of recent COVID-19 infection was setting up of Fever clinic outside the main Hospital building where all patients as well as health care staff testing positive for COVID screen were required to report, and this Fever clinic had established SOP for social distancing, isolation, PPE, and disinfection. The other reason which may have contributed to this low number is the low prevalence and incidence of acute COVID-19 infection in the general population in this region and surrounding, to which this tertiary care Hospital caters to. This seems unlikely because this region has high incidence of acute COVID-19 infections as in the last three months we have seen and treated almost more than 1200 COVID-19 patients inside the hospital. These patients were treated at our dedicated COVID-19 facility at Nayati hospital Agra and a mixed facility at Nayati hospital in Mathura. The large number of patients admitted in the last 3 months in these two hospitals and many others testing positive from the OPD tell us that it is not the low incidence of COVID-19 infection in the surrounding area that is responsible for this seemingly low incidence of COVID-19 infection in healthcare workers. The official number of COVID 19 patients in UP as reported by Govt. authorities 1,77,239 as of 21/08/2020 [https://en.wikipedia. org/wiki/ COVID-19_pandemic_in_Uttar_Pradesh]. Elecsys Anti-SARS- CoV-2 used in our study is an immunoassay for the in vitro qualitative detection of antibodies (including IgG) to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in human serum and plasma. The test is intended as an aid in the determination of the immune reaction to SARS-CoV-2. The **e**lectroche**mi**luminescence **i**mmuno**a**ssay "ECLIA" is intended for use on Cobas-E immunoassay analysers. As per the data and information supplied by the manufacturer in the package insert, relative performance data on the analyzers were shared. In a total of 5272 samples tested with the Elecsys Anti-SARS-CoV-2 assay, the resulting overall specificity in the internal study was 99.81%. The 95% lower confidence limit was 99.65%. A total of 204 samples from 69 symptomatic patients with a PCR confirmed SARS-CoV-2 infection were tested at various time points and the sensitivity ranged from 65.5 % in the first 6 days following PCR confirmation to 100% after more than 14 days after PCR confirmation [Okba, 2020].

Test principle: Sandwich principle.

Interpretation of the results: Results obtained with the Elecsys Anti-SARS-CoV-2 assay can be interpreted as follows:

The magnitude of the measured result above the cut-off is not indicative of the total amount of antibody present in the sample.

Conclusion

In conclusion, in a sample study of 149 health care workers, who were working in areas at high risk of transmission of COVID 19 infection from unidentified COVID 19 infected patients visiting this hospital to health care workers, healthcare workers in a tertiary Care Hospital catering to Mathura and the surrounding areas were tested for COVID-19 antibodies and only 9.4 % of the healthcare workers tested positive which in our opinion is very low and may have been primarily because of stringent and effective, screening, awareness, training, triaging of both patients as well as healthcare employees of the hospital. Zero antibody positive rates among intensivists working in COVID ICU since Feb 2020 till writing this paper, is striking and evidence that extensive training in PPE donning and doffing, good infrastructure, and high quality protective equipment, frequent rotation, adequate rest between shifts, few days off for recovery from mental and physical exhaustion etc. may be very important and effective to protect the health and lives of intensivists and HCW working in covid areas.

Finally we are of the opinion that in tertiary care hospitals and even smaller hospitals, health care workers having significantly higher risk of exposure to COVID-19 patients. Screening, awareness testing, stringent, and widely applied training protocols, and modification of infrastructure to achieve these goals were effective in decreasing the risk of COVID-19 infection in this group of healthcare workers who are highly exposed to this disease and worldwide data suggesting that the healthcare workers are at significantly increased risk of help and of life because of getting exposed during the duty, these strategies may be most effective in those at highest risk i.e. Intensivist doctors and nurses working in COVID ICU s and the incidence and prevalence of infection acquired by health care workers may be reduced to very low levels in these group of health care workers.

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