

ORIGINAL RESEARCH

COVID 19 infection in Health care workers working in COVID and non COVID facility: A Retrospective cohort study

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ABSTRACT

Objective: We plan to study the prevalence of COVID infection in the health care workers working both in COVID and non-COVID facility and also identify source of infection, the demographic pattern, difference in infection rate in health care workers working in COVID facility and non-COVID facility, compliance to use of PPE and following social distancing norms. **Material Method:** The RT PCR Positive health care workers were interviewed telephonically with informed consent for presence of symptoms, source of infection, method of donning and doffing of PPE while working in COVID and Non COVID facility, social distancing norms followed or not followed. **Result:** 117 staffs got tested. 40 found positive by RT PCR. The infection rate was more amongst staff working in non-COVID facility (65%) in comparison to COVID facility (22.5%). Infection rate among nursing staff was the highest (40%), followed by Doctors (35%), technicians and attendants. Male were more affected than females. 25 staffs reported not wearing appropriate PPE, 16 staffs reported breaching social distancing protocol. **Conclusion:** Though all health care workers are equally trained during COVID pandemic, there is somehow low adherence to infection prevention practices among the health care workers working in non-COVID facility, thereby increasing the risk to infection. Non COVID facility staffs need to be specifically targeted for training and implementation of infection prevention practices.

Keywords: COVID 19, personal protective equipments, social distancing

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INTRODUCTION

COVID -19' infection as publically known is a SARS-CoV 2 virus infection that has created havoc all over the world in last 2 years. It has disrupted the lives of millions of people, affecting their livelihood, their mental and physical health. Worst affected amongst were the frontline healthcare workers. With increasing workload, the healthcare workers were at a very high risk of acquiring infection and contributing to further spread. An estimate suggests frontline healthcare workers could account to 10 – 20% of all diagnoses ^[1]. Emerging data has

strongly suggested disproportionate impact of COVID 19 infection in among community of Asian, Black and minority ethnic background ^[2].

Since its identification, SARS CoV2 has spread rapidly across the globe. It was characterized as a pandemic by the World Health Organization (WHO) on the 11th of March, 2020. As of now by April 2022, 489 million cases and over 6 million deaths have been reported globally and in India, 43 lacs confirmed cases and 5 lacs 16 thousand deaths have been reported ^[3].

We started with the work of establishing a COVID facility in the month of May 2020. As the number of cases identified in local area during month of May was negligible, we had sufficient time to establish a good facility and ensure training to all health care workers. Being the only tertiary care centre in the city, it was converted to Designated COVID hospital under government direction. Initially started with 8 beds it was rapidly expanded to cater services to 180 patients at a time. Thus the hospital had a fully functional COVID and Non COVID facility during the peak phase of Pandemic. The COVID facility had a separate entry and exit facility, a lift for patient transfer, Quarantine facility for staffs working in COVID areas.

COVID facility consisted of a triage and separate wards and ICUs for suspect and positive COVID cases. The remaining half of the hospital continued to admit non COVID cases.

We plan to study the prevalence of COVID infection in both the health care workers working in COVID and NON COVID facility as all the health care workers working in both the facilities were provided with frequent training about infection prevention measures, use of appropriate PPE, self monitoring of symptoms. We also plan to study compliance of health care workers to all COVID related policies and infection prevention practices measures established in hospital during COVID pandemic.

MATERIAL AND METHOD

This study was conducted at a tertiary health care institute. All health care workers including staff from supportive departments were provided with training of basic infection control practices during pandemic, correct method of donning and doffing of PPE, correct method of sample collection and transportation, signs and symptoms of COVID for self assessment, Hydroxychloroquine prophylaxis. COVID core team with the help of administration ensured adequate supply of personal protective equipments in both COVID and non COVID facility. Health care workers working in COVID facility were provided with Quarantine facility. They had to stay in the facility for 14 days that included their 1 week duty and 1 week off. During that period they had to self monitor for development of any symptoms suggestive of COVID. Routine infection prevention practices measures that included social distancing; frequent hand hygiene, covering their face constantly with facemask and avoiding gatherings in the quarantine facility had to be followed. Health care workers developing symptoms during the stay of 14 days were abstained from working. . They were tested by RT PCR for COVID 19. Staffs turning positive stayed in the COVID facility for 14 days. They were discharged after RT PCR negative report. Health care workers working in non COVID facility were instructed to follow same infection prevention practices measures as in COVID facility. Following any accidental exposure to any unsuspected cases, they were advised to visit fever OPD, undergo risk assessment.

The RT PCR Positive healthcare workers were interviewed telephonically with informed consent for when they developed their first symptoms, what was the source of infection, was there any breach in donning and doffing protocol while working in COVID and Non COVID facility, whether social distancing norms were breached. Health care workers who were negative for RTPCR were excluded from study.

This study was approved by Institutional Ethics committee of Bharati vidyapeeth(Deemed to be university) Medical College.

RESULTS

117 Health care staffs got investigated for RT PCR in the month of July. Out of this 40 staffs turned positive. The most common reason for getting investigated was accidental exposure to positive cases, though only symptomatic cases and cases with high risk exposure underwent RT PCR testing. The infection rate was more amongst staff working in non COVID facility in comparison to COVID facility (Table 1). Infection rate among nursing staff was the highest (40%), followed by Doctors (35%), technicians and attendants (Table 2). Male were more affected than females.

Table 1: Infection rate in COVID and Non COVID facility

	Positive Staffs(40)	Infection Rate
COVID facility	09	22.5%
Non covid facility		65%
MICU	04	10%
SICU	-	-
PICU	-	-
NICU	-	-
CVTS ICU	03	7.5%
CCU	-	-
Dialysis	01	2.5%
Casualty	05	12.5%
Wards	06	15%
Operation theatre	04	10%
Radiology	02	5%
PG hostel	01	2.5%
Community transmission	05	12.5%

Table 2: Infection rate according to Professional categories

Total (40)	Affected staff	Infection rate
Doctors	14	35%
Nursing staff	16	40%
Technician	06	15%
Attendants	02	5%
Others	02	5%

Table 3: Demographic pattern in COVID infected HCW

Total male staff affected – 24

Total female staff affected - 16

Nursing staff (16)	Male (05)	Female (11)
Age 20 – 40	05	11
Age 41 – 60	-	-

Doctors (14)	Male(11)	Female (03)
Age 20 – 40	10	03
Age 41 – 60	01	-

MPW (02)	Male (02)	Female
Age 20 – 40	01	-
Age 41 – 60	01	-

Technicians and others (08)	Male (06)	Female (02)
Age 20 – 40	05	02
Age 41 – 60	01	-

Table 3: Type of exposure

Positive Staffs (40)	Appropriate PPE not used	Social distancing norms not followed	Training not attended	Late diagnosis of COVID infection in patient (13)	Aerosol Generating Procedure
Doctors	09	07	-	05	03
Nursing staff	14	07	01	07	03
Attendants	02	02	-	02	-
Total	25	16	01	14	06

Table 4: Most common reason for testing

Indications	No of staffs tested
Random screening	01
Contact tracing	27
Accidental exposure to suspect case	26
Breach in PPE while handling positive patient	08
Symptomatic	49
Exposure to family member or roommate with confirmed infection	06

DISCUSSION

Corona viruses are enveloped positive sense RNA viruses, related to Beta corona virus by genomic sequencing and phylogenetic analysis. The closest RNA sequence similarity is with Bat corona virus, proving that Bats are primary source. Whether the transmission is direct from the bat or through some other mechanism is yet to confirm ^[4]. The host receptor for SARS CoV2 cell entry is ACE (Angiotensin converting enzyme) – 2. SARS CoV2 binds to ACE2 through receptor binding domain of its spike protein ^[5].

Like other viruses, SARS CoV2 has evolved over the time. Certain variants like Omicron (B 1.1.52 lineage) and Delta variant have captured lot of attention worldwide because of their rapid emergence, spread and clinical implications. Clinical data suggest Omicron variant to be associated with less disease severity. Alpha variant has been associated with greater disease severity. Beta and Gamma variant though identified from various countries did not become a globally dominant variant.

Delta virus was first detected in India in December 2020. It was the most prevalent variant all over the world till the emergence of omicron. Compare to alpha, Delta virus was more transmissible and caused severe diseases and hospitalization ^[6,7,8,9].

Person to person transmission via respiratory droplets is the primary means of transmission of SARS CoV2. Infection is also known to spread through contaminated hands and surfaces. Hospitals treating these patients have become hub for COVID infection both for general community and health care workers. Health care workers have been the worst affected

community during the pandemic. They have been observed to be at greater risk of infection in comparison to general community^[1]. Various risk factors like prolong and frequent exposure to positive and suspect cases^[10], work pressure leading to mental and physical fatigue eventually compromising infection control practices have contributed in the infection.

In the 1st 2 months of the pandemic, we tested 117 health care workers for COVID 19 test by Real time PCR, 34% of which tested positive. Of them only 22% belonged to COVID facility, 65% from Non covid facility and 12.5 % acquired infection through community transmission.

Despite frequent trainings conducted by COVID core team, ample supply of PPE and hand hygiene equipment, we observed rising cases of COVID 19 cases in health care workers. The number was more in non-COVID facility than COVID facility staffs. Telephonic conversation revealed the reason for infection. Majority staff in Non COVID facility either did not wear any PPE or wore it incorrectly. Total 25 staffs acquired infection due to no or inappropriate use of PPE. Similar findings were observed in study done by JameelaAlajmi et al^[11]. The presumed low chances of infection among health care workers of non-COVID facility lead to low adherence to infection control practices thereby contributing its occurrence. Many of them did not bother to wear N95 mask or wore it loosely during aerosol generating procedures. Among 40 staffs, 16 acquired infection due to breach in social distancing protocols. They reported sitting together during lunch hours. Following identification of these sources, PG canteens were closed. Gatherings in the hostels were discouraged. Nursing staffs were prohibited from sitting together for lunch.

Among 3 Doctors, 1 resident of anesthesia acquired infection during intubation in operation theatre. The source patient was negative for COVID 19 rapid test. The repeat sampling by RT PCR gave positive result. 2 surgery resident acquired infection during handling of patient with negative rapid test. They were found not wearing any mask during patient care. 3 nursing staffs acquired infection during performing suctioning in intubated patient. 2 staffs belonged to Non COVID Intensive care unit and 1 to COVID ICU. Nurses were among the maximally affected (40%) health care workers followed by Doctors and others.

Infection rate among male staff was more than female. 24 (60 %) males whereas 16 (40%) female staff acquired infection. These findings are exact opposite to observations done by Long H Nguen et al whereby increased Body Mass Index, smoking habits and frequent use of NSAIDS(Non steroidal anti-inflammatory drug) in UK and USA lead to more infection rate in female health care workers. Data from Netherland study^[12] also shows female predominance in COVID infection. Pranab Chatterji et.al^[10] had observations similar to our study where 58% affected health care workers were male.

Majority affected health care workers in present study were in the age group of 20 -40 yrs (90%) including Doctors, Nurses, attendants technicians and others. Affected median age was 49 yrs in study conducted in Netherland by Reina S Sikkema et.al^[12].

CONCLUSION

Though all health care workers are equally trained during COVID pandemic, there is some how low adherence to infection control practices among the health care workers working in non COVID facility, thereby increasing the risk to infection. The health care workers should be made aware of patients who could be a source of infection in absence of evident symptoms. Every patient should be considered a potential source of pathogen during a pandemic and standard and enhanced precaution should be uniformly applied during all phases of patient care.

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