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Original Research Article

A retrospective analysis of COVID-19 infection among healthcare workers of south east Assam, India

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ABSTRACT

Background: Health care workers (HCWs) are the frontline warriors, more prone to contracting coronavirus disease 2019 (COVID-19). They also have tremendous possibility of serving as transmission vectors to others. In India there is paucity of data on COVID-19 infection among HCWs. Therefore, it is important to evaluate the infection risk, clinical features, and source of infection, transmission and outcome in HCWs to safeguard them and to check further community spread.
Methods: The aim of the study was to investigate the presence of COVID-19 infection among HCWs and to understand the risk factors for infection. Demographic and clinical data of HCWs declared SARS-COV-2 real time RT-PCR positive by VRDL, SMCH, Silchar during June 2020 to July 2021 was obtained from ICMR portal.
Results: On data analysis it was found that during the study period a rate of 3.95% (316 out of 7997 cases) infection was among HCWs. Their mean age was 36 years. With maximum cases among male staffs (57.9%), and most common age group was young generation of 17-29 years. The peak acquisition of infection was in July 2020 during ATSP surveillance with 45.5% of infected HCWs. Of the infected HCWs majority were asymptomatic (74%) Although hospitalization rate was high i.e. 82.9% but severity was low with no mortality. Co-morbidity among infected cases was low 23.4%, usually in the aged group of ≥45 years. Doctors/PGTs and Nurses were the highly affected group.
Conclusions: Safeguarding the HCWs from infection is the critical need for empowering the healthcare system and overcoming any pandemic in future as well.

Keywords: HCWs, COVID-19, SARS-COV-2, Respiratory infection

INTRODUCTION

The pandemic of novel corona virus disease 2019 (COVID-19) caused by Severe acute respiratory syndrome coronavirus-2 (SARS-COV-2) was first reported from Wuhan, China in December 2019. The virus was noted to be highly transmissible and spreads efficiently through respiratory droplets and contact routes.[1] Due to high transmission capacity it has spread to over 200 countries imparting a significant burden

globally with overwhelmed hospitals and collapsed healthcare system. Owing to its rapid spread across the world, WHO confirmed COVID-19 as a pandemic in March 2020. Globally, as of 5 November 2021, there have been 248,467,363 confirmed cases of COVID-19, including 5,027,183 deaths, as per WHO.[2]

India is one among top three severely hit countries, with its first case of COVID-19 identified on January 30, 2020 and subsequently the number of cases drastically rose.[3] Assam reported its first COVID-19 case on 31st March 2020 from south east Assam in a traveler who returned from COVID hotspot in Delhi. Since then the testing was upsurged in the entire state.

With such extreme burden of COVID-19 pandemic and increasing number of infected cases, health care workers have been highly prone to contracting the disease due to their occupational exposure. The most evident reasons behind the COVID-19 acquisition among HCWs is the exposure to infected patients, unintentional exposure to asymptomatic person, improper use of personal protective equipment (PPE), fatigue and stress due to long working hours in this pandemic. HCWs are most vulnerable group and are the backbone of entire health care system, it is important to ensure their safety not only for their own well-being but also to safeguard the other patients/family members from acquiring infection.

The panic and unprepared circumstances formed during the pandemic have impaired the efforts to systematically study the prevalence of SARS-COV-2 among HCW. Several studies have been reported regarding COVID-19 in India, still very few studies have highlighted the presence of SARS-COV-2 among HCWs.[4,5] Therefore, this retrospective study was conducted to analyse the data and determine the incidence, demographic and clinical features, mode of transmission, and outcomes of COVID-19 among HCWs of south east Assam.

METHODS

This retrospective study of SARS-COV-2 infected HCWs was conducted at VRDL, Silchar Medical College and Hospital, Silchar from June 2020 to July 2021 (during the first wave from June – December 2020 and second wave from January to July 2021) of COVID-19 pandemic. SMCH is a tertiary referral hospital which caters the patients of entire south-east Assam, being situated in a very strategic geographic location, it also renders its services to the ailing community of the neighboring states like Mizoram, North Tripura, West Manipur and South Meghalaya.

Sample selection

During pandemic, SMCH was designated as referral facility for the treatment of patients with COVID-19. Viral Research Diagnostic Laboratory (VRDL) of SMCH is the only government laboratory conducting the COVID-19 real time reverse transcriptase PCR test in the entire region of south east Assam. Under such circumstances, hospital had no control over patient selection and all the suspected patients/samples underwent COVID-19 testing at VRDL. Data of all the HCWs who have undergone real-time RTPCR testing under Assam targeted surveillance program (ATSP) or due to symptoms/contact history with positive patients were included in this retrospective analysis.

Sample size and processing

In the present study during the abovementioned period, a total of 236305 patients were referred to SMCH for COVID-19 real time RTPCR testing. For each patient nasopharyngeal/oropharyngeal swab samples were collected in viral transport media (VTM) by the technician using all the personal protective equipments. Samples were then stored in cold chain and immediately transported to the testing facility along with their specimen referral form (SRF). Samples were then processed for RNA extraction using QIAamp viral RNA extraction kit (QIAgen, Germany). Laboratory confirmation of SARS-COV-2 was carried out by real time RTPCR as per the manufacturer's protocol. Data of each patient and their sample reports were uploaded on the ICMR COVID-19 portal as well as also maintained in VRDL record file.

Of 236305 patients data, we have retrieved the data of our target group which comprised of 316 infected HCWs of public and private hospitals of south-east Assam. All these HCWs have undergone laboratory confirmation of SARS-CoV-2 real-time RTPCR testing atleast once under Assam targeted surveillance program or due to symptoms/contact history with positive patients.

Study procedure

In this retrospective study data of 316 COVID-19 infected HCWs, who were declared positive as per our inclusion criteria from June 2020 to July 2021 by VRDL, SMCH was collected and analyzed. Data related to the demographic, occupation, symptoms, co-morbidities, exposure history or use of inadequate PPE was recorded from ICMR COVID-19 portal as well as from database of VRDL and was further analyzed.

Exclusion criteria

All those HCWs who were infected due to close contact with a positive family member/friends or were suspected to have acquired the infection during travel were excluded from our study.

Ethical approval

The study was approved by Institutional Ethics Committee of SMCH. Case history and identity of all the HCWs was kept confidential during the study.

RESULTS

Our study documented that during the study period 236305 patients underwent SARS-COV-2 RT-PCR testing, and 7997 were positive. Of the positive cases, 316 (3.95%) were HCWs which includes 264/5606 (4.7%) during the first wave (June to December 2020) and 52/2391 (2.13%) during the second wave i.e. from January to July 2021.

Table 1: Demographic profile of study cases.

Demographic features		Frequency (n=316)	%
Age wise distribution (years)	17-29	136	43
	30-39	69	21.8
	40-49	53	16.7
	50-59	39	12.3
	60-65	19	6
Gender	Male	183	57.9
	Female	133	42
Clinical Features	Symptomatic	82	25.9
	Asymptomatic	234	74
	Mortality	0	0
Co-morbidity	Yes	74	23.4
	No	242	76.6
Re-infection	Yes	06	1.9
	No	310	98.1
Admission	Hospitalization	262	82.9
	Home isolation	54	17

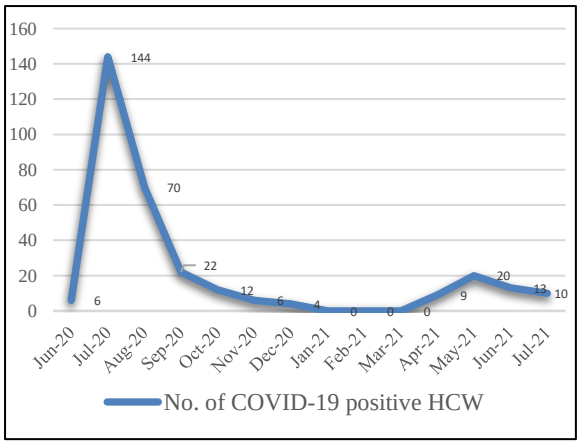

Figure 1: Monthly epidemic curve of COVID-19 cases among HCWs tested at VRDL, SMCH.

Figure 1 shows the monthly epidemiological curve of COVID-19 cases among HCWs tested at VRDL, SMCH. The mean age was 36 years. Table 1 presents the demographic profile of study cases. Overall 183 (57.9%) male and 133 (42%) female staffs were infected. The peak acquisition of infection was in July 2020 during the first wave with 144 (45.5%) infected HCWs. Among the infected patients the age ranged from 19-65 years with work experience from 1 month to 42 years and most common age group infected was 17-29 years. Based on our data the highest infection rate 136 /316 (43%) was among 17-29 years of age group, followed by 69/316 (21.8%) in 30-39 years, 53/316 (16.7%) in age group 40-49 years, 39/316 (12.3%) in 50-59 years and 19/316 (6%) in 60-65 years.

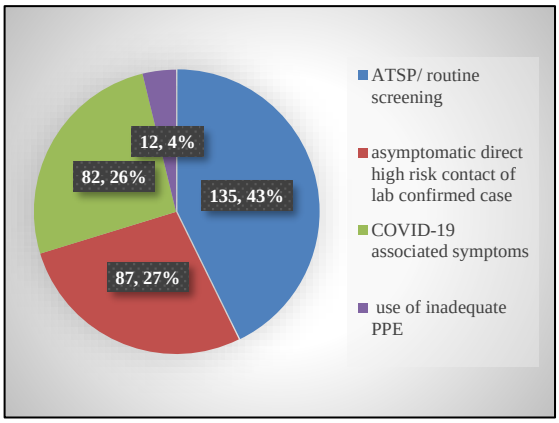

Figure 2: Reasons for testing among different groups of HCWs.

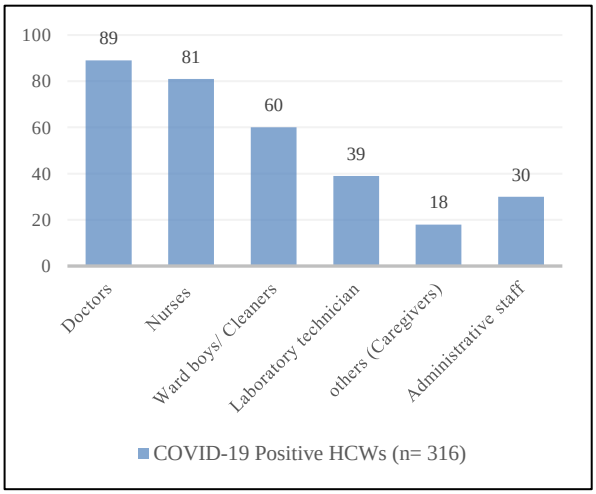

Figure 3: Infection among HCWs in relation to their job category.

It was found that 234/316 (74.0%) were asymptomatic while 82/316 (25.9%) were symptomatic. Fever, cough, headache, body ache, loss of smell and taste and slight chest pain being the most common symptoms reported. Out of 316 patients, 242 (76.6%) had no underlying disease while 74 (23.4%) had one or more co-morbidities which mainly includes (hypertension and diabetes in majority cases while others were cardiovascular disease, malignancy, cerebrovascular, pulmonary, kidney and liver disease and rheumatic diseases). As per our data re-infection was reported among 6/316 (1.9%) of infected patients.

A total of 262/316 (82.9%) HCWs were hospitalized, of which majority 220/316 of the hospitalization was under mandatory regulations laid down by government or due

to improper quarantine facility at home or were with general cough and fever but went hospitalization under the fear of getting into worse condition as disease progresses, while 42/316 (13.2%) were hospitalized due to fever, breathlessness and other moderate to severe complications. 54/316 (17%) were in quarantine facility or home quarantine, of which few had slight symptoms (such as headache, vomiting, fever) in initial phase but it subsided in 2-3 days. No mortality was reported.

The most common reason for testing among positive cases was target surveillance 135 (42.7%), asymptomatic direct high risk contact of lab confirmed case 87 (27.5%), COVID-19 associated symptoms in 82 (25.9%) while 12 (3.8%) reported use of inadequate PPE during their duty or not following proper hand hygiene and social distancing (Figure 2).

Figure 3 depicts the infection among HCWs in relation to their job category. Among all the infected HCWs, 89/316 (28.1%) were doctors/PG Students of SMCH, 81 (25.6%) were nursing staff, 60 were ward boys, cleaners or caretakers, 39 were technicians, 18 were other staffs in direct contact with positive patients / samples, while 30 were other administrative staff or data entry operators who frequently came in contact with patients or are working in such facility.

DISCUSSION

The present study provides the insight into the infection status of HCWs in south east Assam. Out of total 3.95% COVID-19 infection among HCWs. The percentage was high during the first peak (4.7%) as compared to second peak (2.13%) which could be due to vaccination of most HCWs from January 2021, thus lowering the infection rate. Similar to our findings, others studies have also documented COVID-19 infection in a small subset of people after one or both the doses of vaccination.[6,7] The Indian Council of Medical Research also released preliminary data, which showed that only 0.02-0.04 per cent vaccinated individuals were found infected after vaccination.[8] The mean age of infected HCWs was 36 years which is similar to the study reported among HCWs of Oman.[9]

Majority of HCWs acquired infection during July-August 2020 (67.7%), when the targeted surveillance program of Assam (ATSP) was launched by government, under this all HCWS or other occupational risk personnel were tested by RTPCR at least once. Initially most of the people usually refrained themselves from getting tested even if they presented with seasonal symptoms like fever, cough but under ATSP all were tested. This suggests that HCWs would have acquired infection either from workplace or from community unknowingly and acted as potential source of infection to others.[10,11]

A total of 27.5% and 25.9% infections were either due to direct contact with lab confirmed cases or due to symptoms which they suspected to have acquired during duty in hospital. Inadequate use of PPE was reported by 3.8% mainly in the initial days of pandemic but later it improved. Thus suggesting that the infection control practices and COVID-19 protocol was sincerely followed by the HCWs, which is also evident from the 1.9% rate of reinfection reported in our study.[5] Both doctors and nursing staffs, the two main pillars of health care system were almost equally affected with rate of 28.1% and 25.6% among HCWs, the main reason behind this could be their close contact with patients.

Our study also reported that a considerable number of HCWs were asymptomatic (74%) thus posing the risk of spread among other fellow colleagues/family members and to other COVID negative patients attending hospital for other causes. Other studies have also reported a high rate 78% of asymptomatic COVID-19 infected patients.[12]

Although almost 83% of the infected HCW of present study were hospitalized but it is worth mentioning that only 42/316 (13.2%) were hospitalized due to complications, of which only few suffered critically. No deaths were documented. Similar to our findings, a study from south west Iran reported no mortality as well, another report from Wuhan, China also reported low mortality (0.9%).[13,14] This could be because the majority of patients were of younger age group i.e. below 40 years and had no underlying disease (76.6%), thus making it challenging for the virus to compete with the immune system. Also the requisite hospitalization of all positive HCWs could have led to better treatment and prompt recovery, which would have prohibited the severity. This also suggests that engaging the younger group in COVID-19 associated duties might help in the better and uneventful recovery in case of getting occupational exposure.

Limitations

The data in the present study is based on reports produced by VRDL, SMCH, while data from other private laboratories and RAT positive cases are not included in present study/analysis.

CONCLUSION

Although we might have reached the end of this pandemic but its impact on HCWs both physically and mentally could not be overlooked. Hence, it is imperative to ensure the safety of HCWs in present as well as future pandemic situations.

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