OBSERVATIONAL STUDY

Study of Demographic Profile, Comorbidities, Role of Hydroxychloroquine Prophylaxis and Outcomes of COVID-19 Positive Healthcare Workers at a Tertiary Care Center in Southern Rajasthan

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ABSTRACT

Background: In December 2019, a new respiratory tract infecting agent emerged in Wuhan city of China, known as the coronavirus. There are limited studies regarding coronavirus disease 2019 (COVID-19) in healthcare workers (HCWs). Therefore, the present study was aimed to determine the demographic profile, comorbidities, hydroxychloroquine as prophylaxis and outcomes of reverse transcription polymerase chain reaction (RT-PCR) confirmed COVID-19 HCWs. **Material and methods:** This study was an observational retrospective study carried out over a period of 10 months from 15th March, 2020 to 15th January, 2021 in 350 RT-PCR confirmed COVID-19 HCWs who were in home isolation or admitted in dedicated COVID hospital. **Results:** We observed that majority of HCWs were in the age group 20-39 years (66.58%), were males (69.14%) and from urban areas (72.86%). Only few had comorbidities (3.42%), took hydroxychloroquine as prophylaxis (5.71%) and mortality was 0.57%. About 46.29% of the HCWs were doctors and 28.40% of the doctors were from Medicine. **Conclusion:** From the present study, we conclude that HCWs affected by COVID-19 are mainly young adult male physicians from urban areas, without significant comorbidities. The outcome in COVID-19 positive HCWs is favorable due to better awareness, prompt diagnosis and treatment. The results of this study will be useful in knowing the most vulnerable section of HCWs.

Keywords: COVID-19, healthcare workers, hydroxychloroquine

In December 2019, a new respiratory tract infecting agent emerged in Wuhan city of China, known as the coronavirus. It was later named coronavirus disease 2019 (COVID-19). Full-genome sequencing and phylogenetic analysis indicated that 2019-nCoV is a form of beta-coronavirus which include human severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) viruses.[1] The World Health Organization (WHO) declared COVID-19 as a pandemic on 11th March, 2020, and from India, the first case was reported on 30th January, 2020 from Kerala. Transmission of the coronavirus is usually via respiratory droplets in closed environments and through close contact between people and touching contaminated surfaces, with incubation period of 2-14 days and a reproductive number noted in early studies as 2.2.[2] COVID-19 has various clinical presentations that range from asymptomatic to mild symptoms such as fever, myalgia, sore throat, cough and cold to severe symptoms like acute respiratory distress syndrome, myocarditis, acute renal failure and multi-organ failure.[3-5]

According to WHO, healthcare workers (HCWs) are defined as all people engaged in actions whose primary intent is to enhance health.[6] In this pandemic, to manage COVID-19, many people came together and worked as HCWs.

In our study, HCWs included consultants and postgraduates from clinical as well as nonclinical departments, interns, undergraduate students, nursing staff, nursing students, paramedical staff and lab

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technicians. HCWs have exposure to COVID-19 patients directly or indirectly or to the infectious materials. Secondary transmission from HCWs is a possibility among patients, family members and the community.

Therefore, the present study was aimed to determine the demographic profile (age, sex, residence), comorbidities, role of hydroxychloroquine as prophylaxis and outcomes of reverse transcription polymerase chain reaction (RT-PCR) confirmed COVID-19 HCWs who were in home isolation or admitted in dedicated COVID hospital, a tertiary care institute attached to RNT Medical College, Udaipur, Rajasthan over a period of 10 months (15th March, 2020 to 15th January, 2021).

AIMS AND OBJECTIVES

- To study the demographic profile (age, sex, residence) of COVID-19 positive HCWs.
- To study the comorbidities in COVID-19 affected HCWs.
- To study the role of hydroxychloroquine as prophylaxis in COVID-19 affected HCWs.
- To study the outcomes of COVID-19 positive HCWs.

MATERIAL AND METHODS

This study was an observational retrospective study which was carried out over a period of 10 months from 15th March, 2020 to 15th January, 2021 in 350 RT-PCR confirmed COVID-19 HCWs who underwent home isolation or were admitted in dedicated COVID hospital, a tertiary care center attached to RNT Medical College, Udaipur, Rajasthan. We have analyzed the demographic profile, associated comorbidities, role of hydroxychloroquine drug as prophylaxis and outcomes of these HCWs.

Inclusion Criteria

All RT-PCR confirmed COVID-19 positive HCWs who were in home isolation or admitted in wards and intensive care unit (ICU) of our dedicated COVID hospital, irrespective of age and gender were included. HCWs included consultants and postgraduates from clinical as well as nonclinical departments, interns, undergraduate students, nursing staff, nursing students, paramedical staff and lab technicians.

Exclusion Criteria

HCWs who did not give written consent for the study.

Methodology

HCWs who were suspected to be COVID-19 positive on the basis of their clinical history, contact history and travel history as per the Indian Council of Medical Research (ICMR) guidelines, underwent RT-PCR testing for COVID-19 and those who came out positive were admitted in COVID Dedicated Hospital (wards and ICU) or underwent home isolation and were enrolled in our study after written consent. The following parameters were used for our study:

- Demographic profile – which includes age-wise, sex-wise and area-wise distribution.
- Comorbidities – which include diabetes mellitus, hypertension, ischemic heart disease, chronic respiratory illness, malignancies and hypo-thyroidism.
- Number of HCWs taking hydroxychloroquine prophylaxis – which includes collecting information from the HCWs whether he or she had completed or was taking hydroxychloroquine as prophylaxis.
- Outcome was recorded in the form of recovery or deaths.
- Amongst the HCWs, we classified them into doctors, nursing staff, paramedical staff and lab technicians. We further divided the doctors department-wise to see the distribution of affected doctors in each and every department. This will further give us a better picture of the departments at risk of getting affected by COVID-19.

OBSERVATION AND RESULTS

Table 1 shows the demographic profile in the COVID-19 positive HCWs. Among the age groups, maximum HCWs were in the 20-39 years group (66.58%) followed by 40-59 years age group (30.00%). Regarding gender, males were predominantly affected (69.14%). The disease predominantly involved the urban population (72.86%).

Table 2 shows the association of comorbidities with COVID-19 positive HCWs. Out of 350 HCWs, 12 had comorbidities (3.42%). Among comorbidities, diabetes mellitus was observed in maximum HCWs (1.42%), followed by hypertension (0.57%), chronic respiratory illness (0.57%), ischemic heart disease (0.28%), malignancy (0.28%) and hypothyroidism (0.28%).

Table 3 shows that out of the 350 HCWs affected, 20 took hydroxychloroquine prophylaxis (5.71%).

Table 4 shows the outcome of COVID-19 positive HCWs. Out of 350 HCWs, 348 got discharged (99.42%).

Table 1. Demographic Profile

Characteristics	HCWs (n = 350)	Percentage (%)
Age		
0-19 y	5	1.42
20-39 y	233	66.58
40-59 y	105	30.00
>60 y	7	2.00
Sex		
Male	242	69.14
Female	108	30.86
Residence		
Urban	255	72.86
Rural	95	27.14

Table 2. Comorbidities in COVID-19 Positive HCWs

Comorbidities	HCWs (n = 350)	Percentage (%)
Diabetes mellitus	5	1.42
Hypertension	2	0.57
Chronic respiratory illness	2	0.57
Ischemic heart disease	1	0.28
Malignancy	1	0.28
Hypothyroidism	1	0.28

Table 3. Number of HCWs Taking Hydroxychloroquine Drug as Prophylaxis

Hydroxychloroquine prophylaxis	HCWs (n = 350)	Percentage (%)
Yes	20	5.71
No	330	94.29

Table 4. Outcome of HCWs

Outcome	HCWs (n = 350)	Percentage (%)
Discharged	348	99.43
Death	2	0.57

Table 5 shows the distribution of COVID-19 positive HCWs. Out of 350 HCWs, maximum affected were doctors (46.29%) followed by nursing staff (37.14%), lab technicians (10.86%) and paramedical staff (5.71%). The table also shows the department-wise distribution of doctors. Among 162 doctors, maximum were from Medicine (28.40%) followed by Orthopedics (10.50%), Anesthesia (8.64%), Internship (8.64%), Pediatrics (7.40%), Surgery (6.80%), Obs and Gyne (6.17%), Radiodiagnosis (4.32%), Biochemistry (2.47%), ENT (2.47%) and others.

Table 5. Distribution of COVID-19 Positive HCWs According to their Field

Subtypes	HCWs (n = 350)	Percentage (%)
Doctors	162	46.29
Medicine	46	28.40
Orthopedics	17	10.50
Anesthesia	14	8.64
Internship	14	8.64
Pediatrics	12	7.40
Surgery	11	6.80
Obs and Gyne	10	6.17
Radiodiagnosis	7	4.32
Biochemistry	4	2.47
ENT	4	2.47
Pathology	3	1.85
Anatomy	3	1.85
Microbiology	3	1.85
Physiology	3	1.85
PSM	3	1.85
Psychiatry	2	1.23
Ophthalmology	2	1.23
Radiotherapy	1	0.61
Dermatology	1	0.61
FMT	1	0.61
Dentist	1	0.61
Nursing staff	130	37.14
Paramedical staff	20	5.71
Lab technicians	38	10.86

DISCUSSION

The present study was an observational retrospective study which was done over a period of 10 months (15th March, 2020 to 15th January, 2021) on 350 RT-PCR confirmed COVID-19 HCWs who underwent home isolation or were admitted in a dedicated COVID hospital attached to RNT Medical College, Udaipur, Rajasthan. These HCWs were analyzed in respect to demographic profile, comorbidities, role of hydroxychloroquine drug as prophylaxis and outcomes.

In the present study, we observed that COVID-19 affects all age groups. Out of 350 HCWs, maximum were from 20 to 39 years group (66.58%) followed by 40-59 years (30.00%), whereas the disease was less commonly

seen in >60 years (2.00%) and 0-19 years (1.42%) age groups. Lai et al and Sikkema et al also observed similar results and calculated median age of COVID-19 positive HCWs as 36.57 and 49 years,[8] respectively. The possible explanation of higher COVID-19 positivity in the age group 20-59 years (96.58%) may be due to the fact that this age group of HCWs may be actively involved in management of this pandemic. Regarding gender, males were predominantly involved (69.14%). This may be because the majority of HCWs at our center are males and in the Indian society, males are more habituated in smoking, drinking alcohol, outdoor activities and tendency of removal of face masks frequently. The study done by Mahajan et al[9] found similar results (57%). This study also shows that the disease has a predominantly urban preponderance (72.86%). The possible explanation might be that the study was conducted at a tertiary care center, which in itself is in urban area.

In the present study, comorbidities were seen in 3.42% HCWs. Among comorbidities, diabetes mellitus was observed in maximum HCWs (1.42%), followed by hypertension (0.57%), chronic respiratory illness (0.57%), ischemic heart disease (0.28%), malignancy (0.28%) and hypothyroidism (0.28%). In contrast to our study, Mahajan et al[9] reported 19% comorbidities in COVID-19 positive HCWs. This significant difference in comorbidities may be due to the fact that the maximum HCWs in our study were in younger age groups. They also observed that hypertension and diabetes mellitus were the most common comorbidities, which resembles the present study.

The present study shows that only 5.71% of HCWs took hydroxychloroquine drug as prophylaxis as it was advocated to have a role in the early phase of the pandemic. But, the drug did not seem much efficacious, hence, HCWs stopped taking it as prophylaxis in the later half. Therefore, majority of the HCWs did not take hydroxychloroquine as prophylaxis. Jha et al[10] also stated that hydroxychloroquine did not have a role in prophylaxis. Multiple systematic reviews[11] also concluded that there is no pertinent data to support the use of hydroxychloroquine drug outside that of research, and there is lack of clinical data to actually support its efficacy.

Among the 350 COVID-19 positive HCWs, deaths occurred in only 2 HCWs (0.57%). Mahajan et a[l9] and Lai et al[7] reported similar results in their studies (1%, 0.9%). This can be explained by several reasons. In our study, most of the HCWs were young adults which accounts for better immunity. Early symptoms were more easily noticed by HCWs which led to early diagnosis, treatment and better outcome. Also, the proper use of personal protective equipment (PPE) kits and face masks by them may be responsible for decreasing the severity of infection and death.

In the present study, out of 350 COVID-19 affected HCWs, maximum were doctors (46.29%) followed by nursing staff (37.14%), lab technicians (10.86%) and paramedical staff (5.71%). The study by Mahajan et al[9] showed involvement of 29% doctors, 26% nursing staff and 46% healthcare assistants and other staff. The result of the present study is contradictory to the above mentioned study. In the present study among HCWs, doctors were maximally affected (46.29%). This may be explained by the fact that doctors were the frontline warriors and were actively involved in the management of COVID-19 positive cases.

Amongst the 162 doctors affected, maximum were from Medicine department (28.40%), followed by Orthopedics (10.50%), Anesthesia (8.64%) and Internship (8.64%). The possible explanation of this higher involvement (28.40%) of doctors from Medicine department may be due to the fact that these doctors were actively and directly engaged in patient care in COVID-19 positive wards, ICU as well in severe acute respiratory illness (SARI) wards. In this pandemic, there were a lot of patients presenting with bilateral atypical pneumonias but their COVID-19 RT-PCR was repeatedly negative and they were admitted in various general medical wards, where improper use of PPE and exposure of these Medicine residents to highly suspected clinical COVID-19 patients might be one of the cause of higher involvement of doctors of this department. Orthopedicians are often involved due to operating on emergency cases of trauma without knowing the COVID-19 status of the patient. The surgeries are for longer hours and thus, increase the chances of exposure of the doctors. Anesthetists are involved in aerosol generating procedures like mechanical ventilation and noninvasive ventilation, which can lead to their increased chances of exposure. Also, Interns are primarily affected because at our center, they are doing the job of sampling of COVID-19 suspect and positive cases, which leads to increased risk for them.

CONCLUSION

From the present study, we conclude that HCWs affected by COVID-19 are mainly young adult males from urban areas, without significant comorbidities. The outcome in COVID-19 positive HCWs is favorable

due to better immunity, awareness, prompt diagnosis and treatment. We recommend that all HCWs as well as their family members and close contacts should be regularly tested for COVID-19 as they are the most precious resource for every country. Special attention needs to be paid to protect HCWs from cross infection from other HCWs. HCWs are at higher risk of being exposed to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and could potentially have a role in hospital transmission. Among HCWs, doctors are most prone to develop the infection, especially the ones from departments of Medicine, Orthopedics, Anesthesia and Interns.

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