



## A STUDY ON EPIDEMIOLOGY AND EVALUATION OF OUTCOMES IN COVID-19 POSITIVE HEALTHCARE WORKERS AT TERTIARY CARE HOSPITAL IN SOUTHERN RAJASTHAN

### Community Medicine

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### ABSTRACT

**Introduction:** In December 2019, an outbreak of pneumonia of unknown causes occurred in China later declared as pandemic by WHO and named as COVID 19. HCWs became the firstline workers and in the due time, a lot of HCWs were affected and many died. **Objectives:** To study the epidemiology and evaluate the outcome in COVID 19 positive HCWs. **Materials and Methods:** A retrospective study was conducted to all HCWs of MBGH and attached hospitals of RNT Medical College, Udaipur who were positive for RT-PCR during 1st April, 2020 to 31st March 2021. Data was collected from personal interview and record room. Positive HCWs were interviewed for various symptoms, risk factors and other covid related informations. All relevant data was filled into a pre-designed proforma and outcomes were studied. Data was analysed for percentages, mean, SD, Chi-square test and others as relevant. **Results:** The study identified a significant association between age group and COVID-19 symptoms like fever, cough, malaise, breathlessness, distaste, and anosmia. Additionally, there was a significant association between weakness with body aches (post-COVID complication) and gender, with males being more affected. **Conclusions:** The high risk of HCWs contracting COVID 19 infection can be attributed to the repeated occupational exposures, long duration of working hours, stress and fatigue. Testing at regular interval among HCWs can be helpful in timely diagnosis of infective diseases such as COVID 19 and will be helpful in containing the transmission of infective disease.

### KEYWORDS

COVID 19, Healthcare Workers, Frontline Workers

### INTRODUCTION

Coronaviruses are enveloped, positive-sense, single-stranded RNA viruses belonging to the family Coronaviridae known to produce mild respiratory diseases in humans.<sup>1</sup> In December 2019, an Outbreak of pneumonia of unknown causes occurred in Wuhan of China. The WHO named the resultant disease COVID-19 and declared it a pandemic.<sup>2</sup>

As the pandemic progressed, the Healthcare system collapsed all over the world and put healthcare workers on the frontline. Among the 49,370 COVID-19 cases reported to CDC between February 12 to April 9, 2020, from all states in the United States, 9282 (19%) are HCWs. In China, more than 3300 healthcare workers (HCWs) have been affected and many have died.<sup>3</sup>

The exact mode of transmission is unknown, but, like other respiratory viruses, droplet-borne infection, either directly or indirectly, through fomites is probably the predominant mode of transmission. Evidence of airborne transmission of the virus is yet to be established.<sup>4</sup> As per studies, the basic reproduction number (R0) is within the range of 2.0 to 3.0 and the mean or median incubation period ranges from 5-6 days.<sup>5</sup>

COVID-19 has a spectrum of severity ranging from asymptomatic to critical with mortality. In a report from the Chinese Center for Disease Control and Prevention, 81% of cases were mild, 14% were severe, and 5% were critical.<sup>6</sup> Fever is a common symptom, present in 44% of patients at admission and 88% developing fever after admission. Dry cough is reported in 65-70% of patients. Anosmia or hyposmia and loss of taste are reported in 85% and 88% of patients from Europe, respectively. Anorexia, myalgia, and dyspnea are also frequent complaints. Gastrointestinal symptoms such as diarrhoea, abdominal pain, and vomiting/nausea occur in 17.6% of patients. The clinical course varies, with the median time from the first symptom to dyspnea, hospitalisation, and ARDS being 5, 7, and 8 days, respectively. ICU admission is required for patients who develop ARDS, arrhythmia, or shock, with older patients with co-morbidities being more likely to require ICU care.<sup>7</sup>

### MATERIALS AND METHODS

It was a retrospective study that conducted to all HCWs of MBGH and attached hospitals of RNT Medical College, Udaipur who were positive for RT-PCR during 1st April, 2020 to 31st March 2021. HCWs

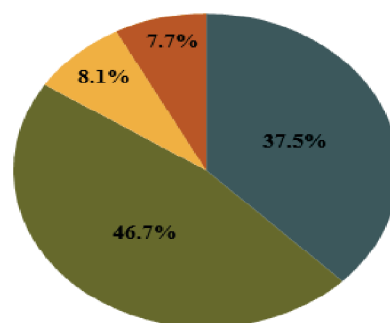
were not giving consent and HCWs transferred to other places, not included in our study. Data was collected by personal interview and record room.

Positive HCWs were interviewed for COVID-19-related constitutional symptoms, respiratory symptoms, gastrointestinal symptoms and other manifestations like anxiety, insomnia etc. Risk factors like age, DM, HTN, Obesity, bronchial asthma, smoking, and COPD were also evaluated. All relevant epidemiological data were collected and entered into a pre-designed proforma. The outcomes of HCWs were also studied. Data so collected was analysed for percentages, mean, SD, Chi-square test and others as relevant.

### RESULTS

Total 272 covid-19 positive HCWs enrolled in our study. Out of the 272 HCWs, 46.7% were aged between 30-40 years and 37.5% were aged between 20-30 years (Graph 1). The majority of the HCWs were female (52.2%) and 58.5% HCWs were doctors, while 24.6% were nursing officers.

**Graph 1: Percent Distribution of COVID 19 Positive HCWs According to Age**



■ 21-30 years ■ 31-40 years ■ 41-50 years ■ 51 years & above

The study found that 55.2% of the HCWs contracted COVID-19 while working in COVID-19-related settings, such as ICU, OPD or wards followed by 32.2% in non-COVID-19-related settings. The most common symptoms experienced were fever (87.5%), cough (62.9%),

malaise (54%) and distaste (38.2%). 76.8% of HCWs had contact history with COVID-19 positive patients or family members, while only 18.4% had a travel history.

The study found that 13.6% of HCWs were hospitalized and 10 HCWs needed oxygen during hospitalization. Among hospitalized HCWs, more than 50% stayed for 1-7 days, while 16.2% stayed for more than 14 days. There were no HCWs mortality during the study period but 15.8% of subjects had post-COVID psychiatric illnesses such as depression, stress and anxiety, while 76.1% had physical complaints mainly weakness and body aches.

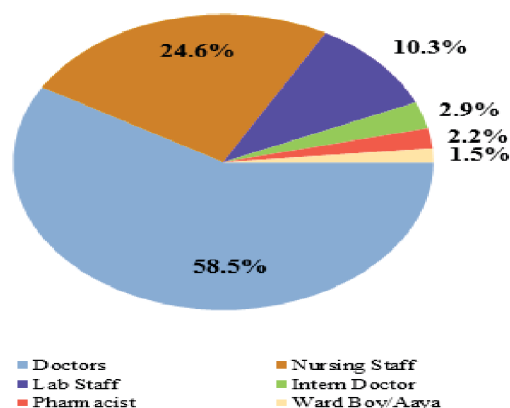
The study identified a significant association between age group and COVID-19 symptoms like fever, cough, malaise, breathlessness, distaste and anosmia. Additionally, there was a significant association between weakness with body aches (post-COVID complication) and gender, with males being more affected. The study also found that only 21% of HCWs were not using masks and 9.6% were not maintaining social distancing.

## DISCUSSION

In our study, majority of HCWs 127(46.7%) were in the age group 30-40 years while 37.5% in 20-30 years, 8.1% in 41-50 years and rest 7.7% were above the age of 50 years. Out of these, the majority 142 (52.2%) were females and 130(47.8%) were males. Similar to our study, the study of Kushwaha et al<sup>8</sup> suggests higher chances of infection among females with lower age and males with higher age.

Among HCWs, 58.5% were doctors, 24.6% were nursing staff, and 6.6% were lab technicians, remaining were other lab staffs, intern doctors, pharmacist and ward boys/aaya (Graph-2).

**Graph 2 - Occupational Status of COVID 19 Positive HCWs**



On the contrary, the results of Shahriarirad R et al<sup>9</sup> and Mirahmadizadeh A et al<sup>10</sup> states that the highest infection rate was among nurses (51.3%). However, the highest CIR was among physicians (3.2%).

In our study 209 (76.8%) had contact history 50 (18.4%) had history of travel, while 222 (81.6%) had not travelling history while 43 (15.8%) patients experience Post COVID Psychiatric Disorder. (Table 1)

**Table 1: Contact History, Travel History & Post COVID Psychiatric Disorder in COVID 19 Positive HCWs**

|     | Contact History | Travelling History | Post COVID Psychiatric Disorder |
|-----|-----------------|--------------------|---------------------------------|
| Yes | 209 (76.8%)     | 50 (18.4%)         | 43 (15.8%)                      |
| No  | 63 (23.2%)      | 222 (81.6%)        | 229 (84.2%)                     |

Duong et al<sup>11</sup> states that a detailed travel history with the chronology of symptoms paired with the patient's medical risk factors and exposures along with some basic knowledge of infectious respiratory illnesses will help facilitate clinical decision making.

In our study, 250 (91.9%) patients had no any comorbidity, while 22 (8.1%) patients had, which includes Diabetes 4%, HTN 1.5%, Asthma 1.5%, DM with HTN 0.7% and renal disease 0.4% (Table 2).

**Table 2: Co-morbidity Conditions of COVID 19 Positive HCWs**

| Co-morbid Condition        | No. of HCWs | (%)  |
|----------------------------|-------------|------|
| Asthma                     | 4           | 1.5  |
| Diabetes                   | 11          | 4.0  |
| Hypertension               | 4           | 1.5  |
| Diabetes with Hypertension | 2           | 0.7  |
| Renal Disorder             | 1           | 0.4  |
| No Co-morbidities          | 250         | 91.9 |
| Total                      | 272         | 100  |

Similarly, the most commonly reported comorbidity in study of Ratshikhopha E et al<sup>13</sup> was hypertension (36.3%), followed by diabetes (23.3%) and obesity (16.7%). Hypertension (aOR 1.3; 95% CI 1.0–1.6), diabetes (aOR 1.6; 95% CI 1.3–2.0) and HIV (aOR 1.6; 95% CI 1.2–2.1) were significantly associated with disease severity.

There was significant association of age and presence of fever, cough, malaise, breathlessness, distaste and anosmia. Majority patients of 30-40 year age group had symptoms, followed by patients of 20-30 year age group, followed by 40-50 year ages group. Symptoms are least seen in 40-50 year age group (Table 3).

**Table 3: Correlation of Age with Symptoms in Covid-19 positive HCWs**

| Age Group   | Fever       | P Value | Cough      | P Value | Malaise    | P Value | Breathlessness | P Value | Distaste   | P Value | Anosmia    | P Value |
|-------------|-------------|---------|------------|---------|------------|---------|----------------|---------|------------|---------|------------|---------|
| 21-30 years | 92 (38.7%)  | 0.039   | 51 (29.8%) | 0.03    | 40 (27.2%) | 0.001   | (23.3%)        | 0.008   | 31 (29.8%) | <0.001  | 15 (26.8%) | <0.001  |
| 31-40 years | 114 (47.9%) |         | 93 (54.4%) |         | 82 (55.8%) |         | 12 (40.0%)     |         | 45 (43.3%) |         | 23 (41.1%) |         |
| 41-50 years | 17 (7.1%)   |         | 13 (7.6%)  |         | 12 (8.2%)  |         | (16.7%)        |         | 13 (12.5%) |         | 12 (21.4%) |         |
| >50 years   | 15 (6.3%)   |         | 14 (8.2%)  |         | 13 (8.8%)  |         | (20.0%)        |         | 15 (14.4%) |         | (10.7%)    |         |
| Total       | 238 (100%)  |         | 171 (100%) |         | 147 (100%) |         | 30 (100%)      |         | 104 (100%) |         | 56 (100%)  |         |

Study by Magnavita Net al<sup>14</sup> fever occurred in approximately one in four cases and only one in three HCWs manifested breathlessness. On the contrary, anosmia and dysgeusia were particularly strongly associated with test positivity.

There was significant association of fever, breathlessness, distaste and anosmia with gender. While cough and malaise had no significant association with gender. Fever, cough and distaste was higher in males. While malaise was almost equal in both sex. Breathlessness was more in females. Study done by Kim Ret al<sup>14</sup> have reported similar findings where HCWs affected with COVID-19 were younger compared to the general population and were more common among female HCWs.

## CONCLUSION AND RECOMMENDATIONS

The increased risk of HCWs contracting COVID-19 can be attributed to repeated occupational exposure, long working hours, stress, and fatigue. Nurses were found to be the most affected group among COVID-19 positive HCWs. Routine screening of both symptomatic and asymptomatic hospital staff is essential for early diagnosis to prevent transmission of COVID-19 infection. Effective contact tracing of positive HCWs aids in the early identification of contacts and timely quarantine. Testing should be extended to family members and close contacts, and interval testing of HCWs is recommended for timely detection of infection to limit in-hospital transmission. Strict infection control policies at all times should be followed, especially during a critical need like the COVID-19 pandemic.

The findings of this study could be useful for policymakers in the efforts to contain the transmission of infectious diseases.

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