

Original Article

Frequency of Infected Healthcare Workers and Factors Leading to Infection in Emergency Neurosurgical Trauma during COVID-19 Pandemic

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ABSTRACT

Objective: The aim of this study was to know the frequency of COVID-19 infection in healthcare workers and to identify the risk factors leading to infection in emergency neurosurgical trauma during COVID-19 pandemic.

Material and Methods: This descriptive cross-sectional study was conducted in the Department of Neurosurgery, Ayub Teaching Hospital. A total of 99 healthcare workers with an age range from 22 – 55 years attending or carry emergency procedures with both male and female gender were included in the study. Age, gender, sign and symptoms, safety measures and COVID PCR reports were recorded.

Results: 12 (12.1%) out of 99 healthcare workers got an infection with COVID-19. 83.3% of the infected healthcare workers were male while 16.6% were females. A maximum of the healthcare workers infected with COVID-19 was in the age range 31 – 40 (50%). Most of them were Doctors (66.6%) followed by nursing staff (25%). Low-grade fever and cough were the most common symptoms. The most important factors which affect the transmission of infection to healthcare workers were improper use of personal protective equipment (PPE), masks, gloves by healthcare professionals, and inability to maintain social distancing with the patients.

Conclusion: Among healthcare workers Doctors have the highest risk of getting an infection with COVID-19, followed by Nurses and Paramedics staff. Lack of social distancing and personnel protective equipment is associated with a high risk of infection with coronavirus disease. To protect healthcare workers from getting infections, proper personal protective equipment should be used. Early recognition of the infected patient and prompt isolation should be done to prevent or minimize the chain of transmission.

Keywords: COVID-19, Frequency, Risk factors, Healthcare workers.

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INTRODUCTION

COVID-19 outbreak was first reported in Wuhan, Hubei province, China in late December 2019 and then rapidly became an increasing health concern globally.¹ The extremely infectious disease is caused by coronavirus 2 (CoV-2), has a disastrous impact on the world population with more than 2.9 million deaths worldwide, emerging as the most substantial universal health crises after the influenza pandemic in 1918.² World health organization in January 2020 declared the disease (COVID-19) as a public health crisis of international concern.³ The disease manifest in various symptoms spanning, from asymptomatic/mild symptoms to critical illness and death.⁴ Route of transmission is via aerosolized droplets that are ejected through sneezing, coughing, and expiration.⁵ Health care workers are usually on the frontline during the COVID-19 pandemic and carry a high chance of getting an infection while taking care of patients.⁶ They are subjected to prolonged duty timings, mental stress, and tiredness.⁷ They represent a vulnerable target for infection due to their repeated exposure to highly contiguous patients and the inability of the healthcare facilities to deal with the unexpected increase in cases.⁸ They have a high risk of getting an infection during the COVID-19 Pandemic especially before transmission dynamics are entirely characterized.⁹ The incidence in healthcare workers was up to 10% of the confirmed cases reported in China and Italy, while in Spain 20.4% of the cases were among healthcare workers.³ Infection in healthcare workers can potentially exacerbate the chain of transmission in hospitals and outside healthcare facilities.¹⁰ Unprotected exposure, personnel contact, and potential droplets are the factors that keep the healthcare workers at a high risk of infection.¹¹ Nowadays, COVID-19 is the most serious threat to healthcare workers and causes the highest level of anxiety among them in many countries including Pakistan. Healthcare workers account for 3% of COVID-19 infections in

Pakistan, much lower from developed countries like Spain where COVID-19 infection in healthcare workers accounts for 20.4% of total reported cases.³ According to National Command and Operation Center (NCOC), more than 253 healthcare workers have been infected with the novel coronavirus across Pakistan till April 22, 2020. Most of them are doctors (49%), while paramedics and other staff make up for 35% and nurses 15%. The aim of this study is to know the frequency of COVID-19 infection in healthcare workers and to identify the risk factors leading to infection in emergency neurosurgical trauma during the COVID-19 pandemic.

MATERIAL AND METHODS

Study Design and study settings

This descriptive cross-sectional study was conducted in the department of neurosurgery from 20 April 2020 to 10th August 2020. Approval was taken from the hospital ethical committee. Informed consent was taken from all Healthcare workers (n=99) included in this study. An inclusion and exclusion criteria were created.

Inclusion Criteria

Healthcare workers with ages range from 22 – 55 years attending or carry emergency procedures with both male and female gender were included in the study.

Exclusion Criteria

Any healthcare worker with past history of COVID-19 was excluded from the study.

Data Collection

A total of 99 Healthcare workers were included in the study. Basic demographic information's, Designation, signs, and symptoms along with safety measures including personnel protective equipment (PPEs), face mask, gloves, etc., were

recorded on pre-designed preformed. An initial chest X-ray was done to aid in diagnosis. The nasopharyngeal swab was taken and Infection with COVID-19 was confirmed by Real-time reverse transcriptase-polymerase chain reaction (RT-PCR) according to the standard protocol established by the world health organization (WHO). The data was analyzed using IBM SPSS 25.

RESULTS

Gender Incidence

Out of 99 healthcare workers included in this study, there were 27 (27.27%) female and 72 (72.72%) male patients.

Age Distribution

The age ranged between 22 to 55 years. Most of the healthcare workers included in this study were in the age range 30 – 40 (41.4%) years (Table 1).

Table 1: Age Distribution.

Age Range	n (%)
22 – 30	22 (22.2%)
31 – 40	41 (41.4%)
41 – 50	23 (23.2%)
51 – 55	13 (13.3%)

Incidence of Infection in Healthcare Workers

The majority of them were nursing staff (31.3%) followed by doctors (24.2%) and paramedics (25.2%). 12 (12.1%) out of 99 healthcare workers got an infection with COVID-19. 83.3% of the infected healthcare workers were male while 16.6% were females. Maximum of the healthcare workers infected with COVID-19 were in the age range 31 – 40 (50%) years (Figure 1). Most of them were Doctors (66.6%) followed by Nursing staff (25%).

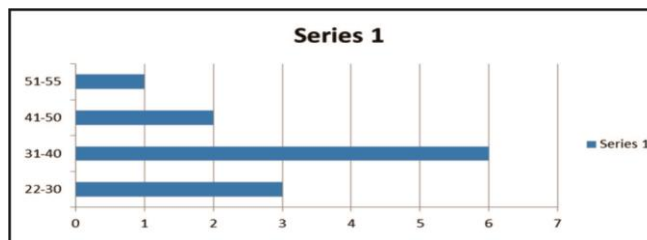


Figure 1: Age distribution of infected healthcare workers.

Clinical Manifestations

Cough and low grade-fever were the most common symptoms. 7 (58.3%) of the infected healthcare also reported shortness of breath and chest discomfort. 2 (16.6%) out of 12 infected healthcare workers reported gastroenteritis along with fever and dry cough. The mean duration between signs and symptoms to diagnosis with PCR was 5.7 days.

Risk Factors

The most important factors which affected the transmission of infection to healthcare workers was improper use of personal protective equipment (PPE), masks, gloves by healthcare professionals and inability to maintain social distancing with the patients. Asymptomatic patients and especially undiagnosed symptomatic patients greatly affected the healthcare workers.

DISCUSSION

Health care workers are usually on the frontline during a pandemic and carry a high chance of getting infections while treating patients. Healthcare professionals are usually at a high risk of acquiring infections during COVID -19 outbreaks.¹² Up-to-date little is known about COVID -19 transmission in healthcare settings. Studies from Hong Kong, Singapore, and Illinois have reported no infection in healthcare professionals exposed to infected patients with coronavirus disease.^{13,14} it might be because of that, most of the healthcare workers were wearing

precautions against contact, droplets, or airborne transmission. As a result of the spread of COVID-19, it is usually difficult to know whether a healthcare professional is infected in a hospital or in some community. This study helps which healthcare worker acquired the infection and which did not acquire infection and guides us to protect our healthcare workers on the frontline.

The frequency of infected healthcare workers in our study was 12.1% with male 8.3% and female 1.6% respectively. This high percentage of infection largely depends on the lack of precautions taken by healthcare professionals. Initially, in the hospitals, even the simple surgical mask was not available; peoples use to buy it from outside.

Still, our frequency is lower than the results which are showed by North-Eastern Italy that is 16.2% of all infected healthcare workers that could be attributed to the decrease in virulence capacity of the virus over time. But our results are much higher than the results showed in China and United States, that is 3.8% and 4.4%, respectively.¹⁵ this could be due to highly precautions and equipment available for their healthcare workers.

We identified many factors that probably lead to an increased infection rate in healthcare workers. First, there was a lack of knowledge of this new disease and a low level of safety measures combating the COVID-19 outbreaks, especially in the first few weeks of outbreaks in Pakistan. In emergency neurosurgical trauma initially, there was no simple surgical mask for healthcare workers. Peoples used to buy it from outside. Second, healthcare workers cannot maintain social distancing in resuscitation and operating upon neurosurgical patients. In addition, there could be some patients who may have atypical symptoms in the incubation period of COVID-19. Throughout these circumstances, the virus was transmitted to healthcare workers without full protective gear.

CONCLUSION

Among healthcare workers, Doctors have the highest risk of getting an infection with COVID-19, followed by Nurses and Paramedics staff. Lack of social distancing and personnel protective equipment is associated with a high risk of infection with coronavirus disease. To protect healthcare workers from getting infections, proper personal protective equipment should be used. Early recognition of the infected patient and prompt isolation should be done to prevent or minimize the chain of transmission.

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Additional Information

Disclosures: Authors report no conflict of interest.

Ethical Review Board Approval: The study was conformed to the ethical review board requirements.

Human Subjects: Consent was obtained by all patients/participants in this study.

Conflicts of Interest:

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Ehtisham Ahmad Khan Afridi	Study design and methodology.
2.	Shoaib Zardad	Paper writing, referencing, and data calculations.
3.	Shah Khalid	Data collection and calculations.
4.	Shahbaz Ali Khan	Analysis of data and interpretation of results etc.
5.	Aqsa Shehzadi	Literature review and manuscript writing.
6.	Faiza	Analysis of data and quality insurer.