DOI: https://doi.org/10.53350/pjmhs221661024

ORIGINAL ARTICLE

Analysis to Calculate Mortality and Adverse Outcomes Among Health Workers and General Population with Covid-19

RAISA NAZ[1], RUBINA ANJUM[2], SYED ABDUL RAUF SHAH[3], AMANAT ALI[4], IMRAN MEHBOOB BAIG[5], ABDUL AZEEM[6]
[1]*Associate Professor, Physiology Department, Ayub Medical College Abbottabad*
[2]*Consultant, Department of Family Medicine, Agha Khan University Hospital, Karachi*
[3]*Professor of Maxillofacial surgery, Department of Dentistry / Oral & Maxillofacial, Quetta*
[4]*Associate Professor of Pharmacology, HBS Medical and Dental College, Islamabad*
[5]*Assistant Professor, Department of Physiology, Shahida Islam Medical College Lodhran, Punjab*
[6]*Assistant Professor, Department of Pharmacology, Watim Medical and Dental College, Rawat, Rawalpindi*
Corresponding author: Raisa Naz, Email: raisakhan660@gmail.com

ABSTRACT

Objective: The primary objective of this research is to evaluate the mortality rates from coronavirus infection among healthcare workers against those in the general population.
Study Design: Comparative/Retrospective study
Place and Duration: Medical Unit Ward and Emergency Department, Ayub Medical College Abbottabad, July, 2021 to Dec, 2021.
Methods: 190 coronavirus-infected patients of both sexes participated. 20-65-year-old patients were enrolled. All cases gave written consent for age, sex, BMI, socioeconomic status, and domicile. Patients were symptomatic and asymptomatic. Group A had 95 cases of general population and in group B 95 were health workers. In coronavirus ward patients were observed for recovery. Outcomes were ICU hospitalization, need of ventilation, and mortality rates were compared. We analyzed data with SPSS 20.0.
Results: We found that majority of the patients among both groups were asymptomatic 55 (57.9%) in group A and 59 (62.1%) in group B. Most common comorbidities were HTN, DM and IHD. Use of preventive measures in group A 35 (36.8%) was lower as compared to group B 70 (73.75) with p value <0.003. We found that number of ICU admission 17 (17.9%), ventilation requirement 20 (21.05%) and mortality 13 (13.9%) in group A was significantly higher with p value 0.005 as compared to group B 5 (5.3%), 6 (6.3%) and 3 (3.2%).
Conclusion: In this study, we found that the incidence of mortality, admissions to the intensive care unit, and the use of invasive ventilation were all much greater in the general population than they were in the health care professional group.
Keywords: Ventilation, General Population, COVID-19, Mortality, ICU, Health workers

INTRODUCTION

Presently, the new coronavirus illness of 2019 (COVID-19) poses an unprecedented risk to world health. Nepal, a country in South Asia, is not immune to the pandemic's devastating impacts, which have been felt across the country's economy and healthcare system. After the first incidence of COVID-19 was discovered in a Nepalese traveller returning from China in the last week of January [1], the Nepalese government promptly began its reaction. Despite the statewide lockdown that began on March 24, 2020 and lasted for over 10 weeks [2], 13,248 cases and 29 fatalities were documented in the country as of June 29, 2021.

However, the mental health impact of a pandemic is often overlooked despite the high expense of the repercussions [3]. Preliminary data suggests that health care professionals directly involved in the diagnosis, treatment, and management of patients with COVID-19 may be at risk for acquiring mental health problems [4,5]. During the 2003 SARS pandemic, health care professionals had similar negative psychological effects, as described in prior investigations [6,7]. Health workers may feel stressed out due to factors such as an increase in the number of confirmed cases and deaths, an increase in the amount of work required of them, a lack of adequate personal protective equipment (PPE), media attention, the absence of a specific treatment, the need to remain in quarantine, and a general lack of workplace support [5-7].

Since then, covid-19 vaccinations have been shown to be safe and effective in healthy volunteers[8,9] and have been rolled out to the adult population of the UK, starting with the most elderly groups (aged 90 years) and those people most at risk. However, a residual risk of serious covid-19 outcomes (in particular, hospital admission or death) remains after vaccination, despite these positive results. Exposure, acquiring a breakthrough infection following exposure, and developing a severe illness all contribute to the probability of a poor outcome in vaccinated populations. Relevant risk factors are unknown, however, because clinical trials have not included many people in whom vaccine response might be suboptimal (e.g., the elderly, people with complex comorbidities (e.g., in receipt of solid organ transplants or immunosuppressive treatment for autoimmune disorders), or patients with cancer receiving chemotherapy and/or radiotherapy). [10].

Healthcare workers (HCWs) throughout the world are facing an unparalleled physical and emotional struggle because of the COVID-19 epidemic.The risk of exposure to COVID-19 is greater for HCWs than for the general population [11] due to their work with patients at the front lines of care.[12,13] However, because they tend to be healthier overall, they should do better than the general population when compared to hospitalization and death rates. HCWs that are infected pose a threat to their loved ones, coworkers, and patients in the hospitl .[15] Poor sleep quality, stress, post-traumatic stress symptoms, anxiety, and depression are only some of the mental health problems that might appear due to exposure, danger of transferring infection to others, long working hours, and perceived shame from family and society.

The design of extra infection control measures to safeguard HCWs requires a quantification of such risk. Furthermore, the results may provide an indirect evaluation of the safety measures already in place within the hospital system. Estimating the prevalence of COVID-19 infection and associated consequences among HCWs, relative to the general population, was the goal of the current research.

MATERIAL AND METHODS

This comparative/retrospective study was conducted at Medical Unit Ward and Emergency Department, Ayub Medical College Abbottabad from July, 2021 to Dec, 2021 and comprised of 190 patients of coronavirus disease. All participants provided written informed consent before their demographic data (such as age, sex, BMI, socioeconomic status, and place of residence) were collected. Patients who did not provide written consent or were less than 20 years old were not included in this research.

The patients' ages varied from 20 to 65. Patients who were showing symptoms as well as those who were showing none were included. The symptoms of those who had close, unprotected contact with a person who tested positive for COVID-19 led to their testing. The RT-PCR tests were performed in accordance with the

protocol established by the WHO. Before beginning the investigation, we utilized a library of definitions to train our data abstractors and ensure that all data and variables were properly understood. Healthcare professionals including physicians, nurses, technicians, and other support employees who interact directly with patients. Oxygen desaturation, or hypoxemia, was defined as a percentage below 94%, while tachypnea was defined as a respiratory rate of greater than 24 breaths per minute. Those with a temperature over 38 degrees Celsius were diagnosed with fever, while those with a lymphocyte count under 1000 per millilitre were diagnosed with lymphocytopenia. About 95 of the 190 patients in group A were members of the general public and the other 95 were healthcare professionals. Patients infected with coronavirus were hospitalized and monitored for signs of improvement. Mortality, length of stay in the intensive care unit (ICU), and the need for mechanical ventilation were only some of the outcomes measured and compared between the two groups. All data was analyzed using SPSS version 20.0.

RESULTS

Among 190 cases, majority of the patients were males 53 (55.8%) in group A and 52 (52.6%) in group B.(figure 1)

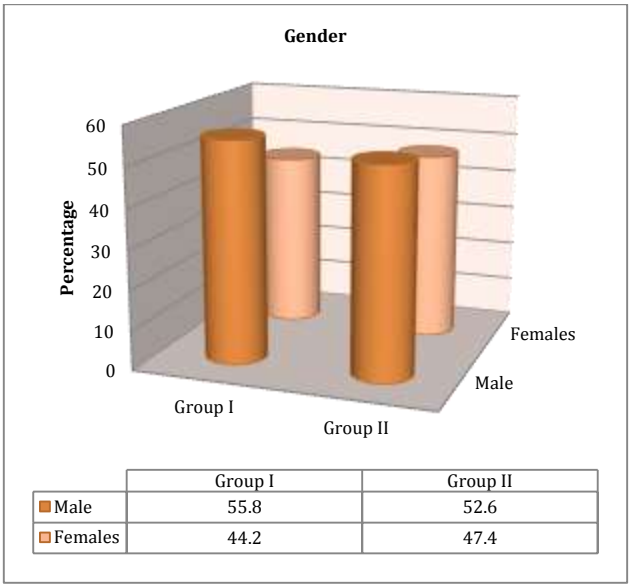

Figure-1: Gender distribution among both groups

Among all cases, 75 (39.5%) had age 20-30 years, 60 (31.6%) had had age between 31-40 years and 55 (28.9%) had age <40 years. 70 (73.7%) had BMI <25kg/m^2 in group and in group B 55 (57.9%) had BMI <25kg/m^2. We found that majority of the cases among both groups had poor socio economic status and were from urban areas.(table 1)

Table-1: Included patients with detailed demographics

Variables	Group A	Group B
Age (years)		
20-30	40 (42.1%)	35 (36.8%)
31-40	20 (21.5%)	40 (42.1%)
>40	35 (36.8%)	20 (21.05%)
BMI		
<25kg/m^2	70 (73.7%)	55 (57.9%)
>25kg/m^2	25 (26.3%)	40 (42.1%)
Socio-Economic Status		
Poor	60 (63.2%)	65 (68.4%)
Middle/Upper	35 (36.8%)	30 (31.6%)
Residency		
Urban	57 (60%)	61 (64.2%)
Rural	38 (40%)	34 (35.8%)

We found that majority of the patients among both groups were asymptomatic 55 (57.9%) in group A and 59 (62.1%) in group B. Most common comorbidities were HTN, DM and IHD.(table 2)

Table 2: Comparison of symptomatic and comorbidities

Variables	Group A	Group B
Type of Disease		
Symptomatic	40 (42.1%)	36 (37.9%)
Asymptomatic	55 (57.9%)	59 (62.1%)
Other diseases		
HTN	35 (36.8%)	30 (31.6%)
DM	30 (31.6%)	40 (42.1%)
IHD	30 (31.6%)	25 (26.3%)

We found that 70 (73.7%) cases were vaccinated in group B and in group A 43 (45.3%) patients were vaccinated.(table 3)

Table-3: Comparison of vaccination status among both groups

Variables	Group A	Group B
Vaccination Status		
Yes	43 (45.3%)	70 (73.7%)
No	52 (54.7%)	25 (26.3%)

Use of preventive measures in group A 35 (36.8%) was lower as compared to group B 70 (73.7%) with p value <0.003.(figure 2)

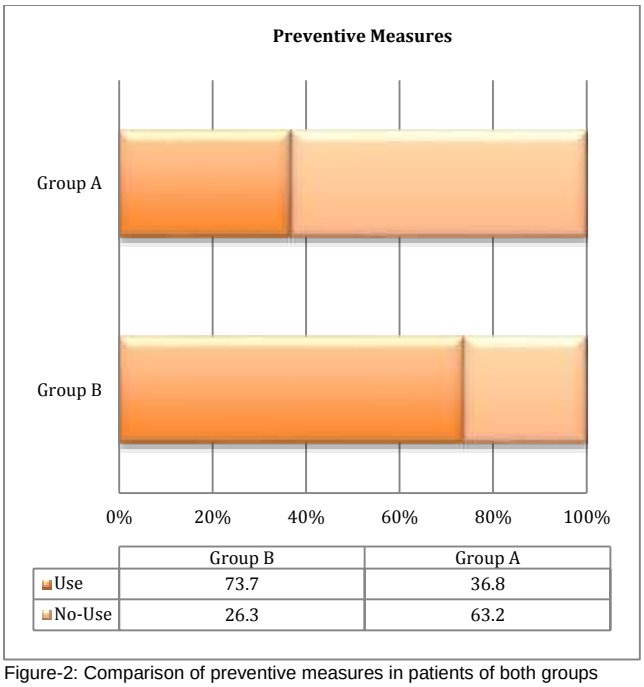

Figure-2: Comparison of preventive measures in patients of both groups

We found that number of ICU admission 17 (17.9%), ventilation requirement 20 (21.05%) and mortality 13 (13.9%) in group A was significantly higher with p value 0.005 as compared to group B 5 (5.3%), 6 (6.3%) and 3 (3.2%).(table 4)

Table 4: Adverse outcomes among both groups

Variables	Group A	Group B
Adverse Outcomes		
Mortality	13 (13.9%)	3 (3.2%)
ICU Admission	17 (17.9%),	5 (5.3%),
Ventilation Need	20 (21.05%)	6 (6.3%)

We found that hospital stay in group A was significantly higher than that of the patients of group B.(figure 3)

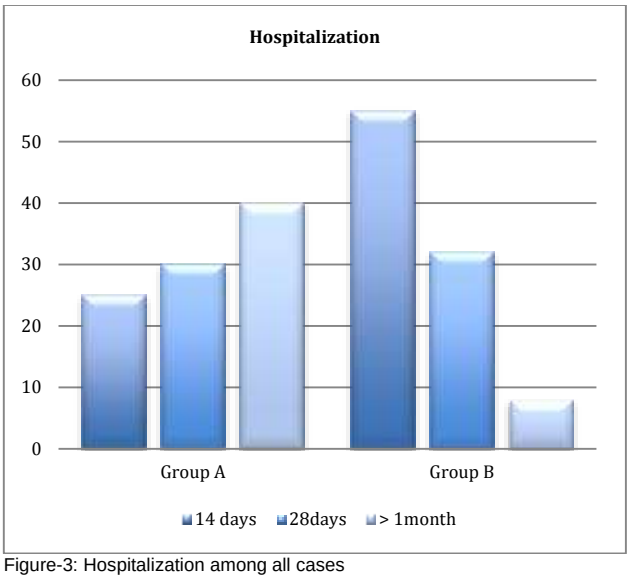

Figure-3: Hospitalization among all cases

DISCUSSION

The liability of preventing and treating COVID-19 fell squarely on the shoulders of the health care systems across the world. Concerns about HCWs' health and safety, as well as the unknown number of HCW deaths attributable to COVID-19, are growing as the pandemic approaches its third year. The total number of COVID-19-related deaths, and especially those among HCWs, is difficult to accurately record from all nations (even those with well-functioning death registration systems). [16]There are a number of contributing elements, including: Since countries differ in their ability to test and track infections in and deaths of HCWs, some only report fatalities for which a COVID-19 test has established that a patient was infected with SARS-CoV-2; this means that untested people may not be included in death numbers. Therefore, in this scenario, using an estimate based on a population might reduce the sensitivity to detection bias. Problems include the lack of uniformity in COVID-19 testing, case management capacity, and age reporting methods, as well as the inability to generalize from limited data. [17]

Present study comprised of 190 individuals. Among 190 cases, majority of the patients were males 53 (55.8%) in group A and 52 (52.6%) in group B. These results were comparable to the study conducted in past.[18] Among all cases, 75 (39.5%) had age 20-30 years, 60 (31.6%) had had age between 31-40 years and 55 (28.9%) had age <40 years. 70 (73.7%) had BMI <25kg/m^2 in group and in group B 55 (57.9%) had BMI <25kg/m^2. We found that majority of the cases among both groups had poor socio economic status and were from urban areas. These demographics showed resemblance to the previous some researches in which majority of the patients were aged between 31-40 years and had poor socio-economic status.[19,20]

In current study most of the patients were asymptomatic. The COVID-19 research in Nepal ran into problems with public perception. All of the health workers' psychological results were severely impacted by stigma. Health care providers, who are at a higher risk of infection owing to their work environment, may be distracted by stigmatization. Similar results were shown in Italy [21], where health care professionals who were stigmatized during COVID-19 were found to have asymptomatic coronavirus and less symptoms than those seen in the United States, including burnout, exhaustion, and psychological distress. Boosting the morale of downtrodden medical staff who worry about contracting and spreading disease is, thus, essential. Identifying the causes and factors that contribute to stigmatisation among healthcare professionals is crucial for designing an appropriate response, which may involve intensive treatments [22]. Health worker stigma reduction should thus be incorporated into public health information on COVID-19.

In current study, we found that number of ICU admission 17 (17.9%), ventilation requirement 20 (21.05%) and mortality 13 (13.9%) in general populataion was significantly higher with p value 0.005 as compared to health care workers 5 (5.3%), 6 (6.3%) and 3 (3.2%). This may be due to the fast systemic spread of SARS-CoV-2 as well as the high frequency of comorbidities and compromised immune systems in the elderly population (Mahmoud et al., 2021).[23] (Vinayachandran and Balasubramanian, 2020). [24] In previous study mortality rate among general population was higher as compared to HCW's because of weak immune system.[25]

Inadequate safety measures were shown to significantly increase the risk of mental health problems such as anxiety and depression in this study's sample of healthcare professionals. Failure to take reasonable safety precautions, such as using personal protective equipment, can result in unsafe working conditions, a heightened risk of infection, and a worse quality of life for employees. Due to the fact that many people infected with COVID-19 show no symptoms [26], health care professionals may experience increased psychological anguish and a decline in mental health if they do not feel adequately protected. This study's finding that three out of four health professionals reported taking insufficient precautions at work because to the risk of contracting COVID-19 is indicative of the susceptibility of health workers in Nepal. Research from throughout the world [27,28] highlights the need of providing psychological support and personal protective equipment to healthcare professionals in order to reduce the prevalence of negative mental health consequences.

Many studies have shown that age, sex, and preexisting conditions all have a role in how severely COVID-19 affects general population[29], and there is some indication that other characteristics, such as ethnicity, are also independent risk factors. There is substantial bias introduced by the varying distributions of risk groups within and between communities, and this is not taken into account by attempts to capture a single measure of mortality in a population [30].

CONCLUSION

In this study, we found that the incidence of mortality, admissions to the intensive care unit, and the use of invasive ventilation were all much greater in the general population than they were in the health care professional group.

REFERENCES

1 Bastola A, Sah R, Rodriguez-Morales AJ, Lal BK, Jha R, Ojha HC, Shrestha B, Chu DKW, Poon LLM, Costello A, et al. The first 2019 novel coronavirus case in Nepal. Lancet Infect Dis. 2020;20(3):279–80
2 Shrestha R, Shrestha S, Khanal P, Bhuvan KC. Nepal's first case of COVID-19 and public health response. J Travel Med. 2020
3 Naser AY, Dahmash EZ, Al-Rousan R, Alwafi H, Alrawashdeh HM, Ghoul I, Abidine A, Bokhary MA, HT AL-H, Ali D. Mental health status of the general population, healthcare professionals, and university students during 2019 coronavirus disease outbreak in Jordan: a cross-sectional study. medRxiv. 2020;10(8):e01730.
4 Rajkumar RP. COVID-19 and mental health: a review of the existing literature. Asian J Psychiatr. 2020;52(20):102066..
5 Spoorthy MS. Mental health problems faced by healthcare workers due to the COVID-19 pandemic-a review. Asian J Psychiatr. 2020;51:102119.
6 Bai Y, Lin C-C, Lin C-Y, Chen J-Y, Chue C-M, Chou P. Survey of stress reactions among health care workers involved with the SARS outbreak. Psychiatr Serv. 2004;55(9):1055–7.
7 Nickell LA, Crighton EJ, Tracy CS, Al-Enazy H, Bolaji Y, Hanjrah S, Hussain A, Makhlouf S, Upshur RE. Psychosocial effects of SARS on hospital staff: survey of a large tertiary care institution. Cmaj. 2004;170(5):793–8
8 Voysey M, Clemens SAC, Madhi SA, et al., Oxford COVID Vaccine Trial Group. Safety and efficacy of the ChAdOx1 nCoV-19 vaccine (AZD1222) against SARS-CoV-2: an interim analysis of four

randomised controlled trials in Brazil, South Africa, and the UK. Lancet2021;397:99-111.pmid:33306989

9 Baden LR, El Sahly HM, Essink B, et al., COVE Study Group. Efficacy and Safety of the mRNA-1273 SARS-CoV-2 Vaccine. N Engl J Med2021;384:403-16. doi:10.1056/NEJMoa2035389. pmid:33378609

10 Lim SH, Campbell N, Johnson M, et al. Antibody responses after SARS-CoV-2 vaccination in patients with lymphoma. Lancet Haematol2021;8:e542-4. doi:10.1016/S2352-3026(21)00199-X. pmid:34224667

11 Shaukat N, Ali DM, Razzak J. Physical and mental health impacts of COVID-19 on healthcare workers: a scoping review. Int J Emerg Med. 2020;13(1):40

12 Ali S, Noreen S, Farooq I, Bugshan A, Vohra F. Risk Assessment of Healthcare Workers at the Frontline against COVID-19. Pak J Med Sci. 2020;36(COVID19-S4):S99–S103

13 Wei JT, Liu ZD, Fan ZW, Zhao L, Cao WC. Epidemiology of and Risk Factors for COVID-19 Infection among Health Care Workers: A Multi-Centre Comparative Study. Int J Environ Res Public Health. 2020;17(19)

14 Misra-Hebert AD, Jehi L, Ji X, Nowacki AS, Gordon S, Terpeluk P, et al. Impact of the COVID-19 Pandemic on Healthcare Workers' Risk of Infection and Outcomes in a Large, Integrated Health System. J Gen Intern Med. 2020

15 Shah ASV, Wood R, Gribben C, Caldwell D, Bishop J, Weir A, et al. Risk of hospital admission with coronavirus disease 2019 in healthcare workers and their households: nationwide linkage cohort study. BMJ. 2020;371:m3582.

16 Centers for Disease Control and Prevention. Interim Clinical Guidance for Management of Patients with Confirmed 2019 Novel Coronavirus (2019-nCoV) Infection, Updated February 12, 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html (Accessed on February 14, 2020).

17 van den Borst B, Peters JB, Brink M, et al. Comprehensive Health Assessment 3 Months After Recovery From Acute Coronavirus Disease 2019 (COVID-19). Clin Infect Dis 2021; 73:e1089.

18 Khanal, P., Devkota, N., Dahal, M. et al. Mental health impacts among health workers during COVID-19 in a low resource setting: a cross-sectional survey from Nepal. Global Health 16, 89 (2020).

19 Chutiyami M, Bello UM, Salihu D, Ndwiga D, Kolo MA, Maharaj R, Naidoo K, Devar L, Pratitha P, Kannan P. COVID-19 pandemic-related mortality, infection, symptoms, complications, comorbidities, and other aspects of physical health among healthcare workers globally: An umbrella review. Int J Nurs Stud. 2022 May;129:104211

20 Alshamrani MM, El-Saed A, Al Zunitan M, Almulhem R, Almohrij S. Risk of COVID-19 morbidity and mortality among healthcare workers working in a Large Tertiary Care Hospital. Int J Infect Dis. 2021 Aug;109:238-243.

21 Ramaci T, Barattucci M, Ledda C, Rapisarda V. Social stigma during COVID-19 and its impact on HCWs outcomes. Sustainability. 2020;12(9):3834.

22 Stangl AL, Earnshaw VA, Logie CH, van Brakel W, Simbayi LC, Barré I, Dovidio JF. The health stigma and discrimination framework: a global, crosscutting framework to inform research, intervention development, and policy on health-related stigmas. BMC Med. 2019;17(1):31.

23 Mahmoud M., Carmisciano L., Tagliafico L., Muzyka M., Rosa G., Signori A. Patterns of comorbidity and in-hospital mortality in older patients with COVID-19 Infection. Front. Med. 2021;8

24 Vinayachandran D., Balasubramanian S. Salivary diagnostics in COVID-19: future research implications. J. Dent. Sci. 2020;15(3):364.

25 Park S-C, Park YC. Mental health care measures in response to the 2019 novel coronavirus outbreak in Korea. Psychiatry Investig. 2020;17(2):85.

26 Day M. Covid-19: four fifths of cases are asymptomatic, China figures indicate. United Kingdom: British Medical Journal Publishing Group; 2020.

27 Maunder RG, Lancee WJ, Rourke S, Hunter JJ, Goldbloom D, Balderson K, Petryshen P, Steinberg R, Wasylenki D, Koh D, et al. Factors associated with the psychological impact of severe acute respiratory syndrome on nurses and other hospital workers in Toronto. Psychosom Med. 2004;66(6):938–42.

28 Liu C-Y, Yang Y-Z, Zhang X-M, Xu X, Dou Q-L, Zhang W-W, Cheng AS. The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. Epidemiol Infect. 2020:1–17.

29 Jain V, Yuan J-M. Predictive symptoms and comorbidities for severe COVID-19 and intensive care unit admission: a systematic review and meta-analysis. Int J Public Health. 2020;65: 533–546.

30 Angelopoulos A, Pathak R, Varma R, Jordan MI. Identifying and Correcting Bias from Time- and Severity- Dependent Reporting Rates in the Estimation of the COVID-19 Case Fatality Rate. SSRN Electronic Journal.