Mental health status of medical staff working in hospitals during COVID-19 pandemic in Pakistan: A cross-sectional study

M. Zahid[1]*, N. Tahir[1], KH. Mujtaba Quadri[2], A. Azhar[3], MM. Shabir[4], A. Wahab[5], U. Urfi[6], K. Waqar[1], D. Nadeem

[1]National University of Medical Sciences, Rawalpindi, Pakistan
[2]Consultant Nephrologist, Maroof International Hospital, Islamabad, Pakistan
*Corresponding author: Maham Zahid, Lecturer Public Health, Clinical Research Associate, National University of Medical Sciences, Pakistan. Email: zahidmaham487@gmail.com

Rest of author's affiliation at the end of the manuscript.

Abstract:

Background: *The ongoing global pandemic of novel coronavirus (COVID-19) infection has created unrest and fear among frontline healthcare workers worldwide. Objective: To investigate the mental health status of medical staff working in the COVID-19 outbreak, and to compare anxiety, insomnia, and post-traumatic distress syndrome among healthcare workers dealing directly and indirectly with confirmed COVID-19 patients.*

Methods: *The cross-sectional study was carried out in seven tertiary care hospitals as designated COVID-19 centers, between July and September 2020 with a response rate of 76.3%. The study population comprised of medical staff working in COVID-19 dedicated tertiary care hospitals managing COVID-19 patients. Mental health assessment was done by using GAD-7, ISI-7, and IES-R-22 standardized scales to evaluate depression, anxiety, insomnia, and distress among healthcare workers.*

Results: *458 healthcare workers participated in the study, 254 (55.5%) males and 204 (44.5%) females with a mean age of 31.98±7.18 years. Study participants were divided into two groups based on their interaction with confirmed cases of COVID-19. More number of healthcare workers directly dealing with COVID-19 patients (Group A) were at risk of developing anxiety (GAD score ≥10) with crude odds of 3.16 (adjusted OR=3.40, 95% CI 2.1 − 5.7, p<0.001) as compared to those indirectly or not dealing with COVID-19 patients (Group B). Similarly, Group A was more likely to suffer from insomnia (ISI score ≥15) and post-traumatic distress syndrome (IMS-R score ≥33) with crude odds of 2.88 (adjusted OR=2.14, 95% CI 1.2 − 3.8, p<0.001) and 3.36 (adjusted OR=3.2, 95% CI 2.0 − 5.3, p<0.001) respectively.*

Conclusion: *A significant number of healthcare workers were found to be suffering from mental health illnesses during the COVID-19 outbreak.*

INTRODUCTION

There have been periodic global outbreaks of newly emerging infectious diseases e.g. Ebola, Zika, Middle East Respiratory Syndrome (MERS), and Severe acute respiratory syndrome (SARS) to name a few. Most recently, the novel coronavirus (COVID-19) outbreak started in China on December 2019 and has spread across the world with 248 million confirmed cases and 5.0 million deaths worldwide until now, November 2021 (WHO, 2021).

This ongoing global pandemic of novel coronavirus (COVID-19) infection has created unrest and fear. At its peak, several thousand people were getting infected per day, thousands were dying on daily basis, hospitals were exhausted and with concerns of essential staff requiring quarantine, currently it is still negatively influencing the psychological well-being of the general population (Brooks SK, 2020). Aside from the general population, the psychological state of frontline medical staff and allied personnel is of prime importance (Alwidyan MT, 2020). The World Health Organization's Department of Mental Health emphasized the importance of psychological well-being during the COVID-19 pandemic. Generally speaking, there is a lack of data on epidemiology and prevalence of mental health data in Pakistan. (Karim S, 2004).

In Pakistan, as the number of COVID-19 infected cases continued to increase, until recently, with limited resources and increased workload on the medical staff, the stress was also enormously increasing which might subsequently lead to various mental health problems (WHO, 2020). During such an emergency, usually, there is not much time to provide proper mental health training to the health care staff to cope with panic and crisis (Xiang YT, 2020). From past outbreaks and epidemics, it has been learned that the mental well-being of medical doctors, nurses, and allied health staff is very important in controlling the disease. The psychological impact of outbreaks on the medical staff is said to be associated with the occupational role, high-risk work environments, perceived risk, social rejection/isolation, and its impact on personal life (Brooks SK, 2018). A study conducted in India by Mahindra et al reported that factors, including being a potential source of infection for relatives, putting families in danger of getting infected, being isolated, fear of improper use of protective equipment, and lack of medical insurance, to be significant triggers of mental health problems among medical staff (Mahindra R, 2020). Zhang C et al (Zhang C, 2020) conducted a study on 1563 healthcare workers to explore the prevalence of insomnia using the ISI-8 tool and reported prevalence of 36.1%. A systematic review conducted by Vizheh M et al (Vizheh M, 2020) reported a higher prevalence of anxiety (24.1% - 67.55%) and post-traumatic stress (29.8% - 62.9%) among healthcare staff working during the COVID-19 outbreak. (Krishnamoorthy Y, 2020).

The acute onset of fear and anxiety at the early stages of an epidemic settles down as the epidemic resolves, but psychological depression and post-traumatic stress symptoms appear in later stages and last longer with profound psychosocial effects (Williams N, 2014, Morin CM, 2011). Therefore, there was a need to identify healthcare workers at a higher risk of developing psychological conditions, so that targeted coping strategies could be initiated properly. The purpose of this study was to investigate the mental health status of medical staff working in the COVID-19 outbreak and to compare anxiety, insomnia, and post-traumatic distress syndrome among healthcare workers dealing directly and indirectly with confirmed COVID-19 patients. The secondary objective was to identify psychological needs based on the prevalence of mental health problems and to recommend coping strategies that can be used to approach to these problems in a more targeted and timely manner.

METHODS

The study was designed as a multi-center cross-sectional survey and seven hospitals participated in this study from June to October 2020. The proposal sought approval from the Institutional Review Board (IRB) of the National University of Medical Sciences and from IRBs of tertiary care hospitals that were included in the study. The study population comprised of staff (including doctors, nurses, pharmacists, and other allied health workers) working during the pandemic at secondary/tertiary care hospitals of Rawalpindi, Islamabad, Lahore, and Peshawar. The hospitals were 'covid care' designated and chosen based on convenience. Medical superintendents/institute heads were approached; those who showed willingness to participate and granted permission to collect the data from their respective hospitals were then considered to be included in the study. The sample size was calculated via WHO sample size calculator and the minimum required sample size was found to be 400 healthcare workers. The calculation was based on a 45% prevalence of stress among healthcare workers managing COVID-19 patients (Salari N, 2020), 95% level of significance, 80% power, and 15% rate of attrition. Data was collected from participants through a self-rated questionnaire distributed over the internet via Google survey form, and in three hospitals, hard copies were distributed among medical staff. Healthcare workers were voluntarily invited to participate in the study and those who consented to participate were then asked to fill out the study questionnaire at their convenience.

The study questionnaire was developed using well-established validated tools; comprising of six parts: a) Demographic data, b) Mental health assessment, c).

Exposure to COVID-19, d) Risk factors for exposure to COVID-19, e) Psychological need assessment, f) Self-perceived health status before COVID-19 outbreak. Demographic data included age, gender, occupation (doctor, nurse, pharmacist, allied staff), marital status (married, single), family members living with the health care provider, educational level (graduation, post-graduation), cadre (junior, intermediate, senior staff member). Mental health assessment was done by using the 7-item generalized anxiety disorder (GAD-7) (Motlagh H, 2010), the 7-item insomnia severity scale index (ISI-7) (Chong MY, 2004), and 22-item impact of event scale-revised (IES-R) (Wu P, 2009) to evaluate depression, anxiety, insomnia and distress among participants. To simplify the association of various factors with mental health problems, standardized cut-off values were applied to identify participants with mild or no mental health issues and those with moderate/severe mental health issues. For the GAD-7 questionnaire, a cut-off value of 10 was used; participants with a score of 10 or more were labeled to have clinically significant anxiety. For the ISI-7 questionnaire, a cut-off value of 15 was used; participants with a score of 15 or above were considered to have clinically significant insomnia. Similarly, for the IES-R tool, a cut-off of 33 was used, participants with a score of 33 or more were said to be suffering from post-traumatic stress disorder. Exposure to COVID-19 was assessed by asking about the department in which the healthcare workers were currently working (high-exposure department e.g. fever clinic, isolation ward, emergency dept, ICU; and low-exposure department (e.g radiology, pathology), and how they were dealing/managing the confirmed COVID-19 patients (directly dealing, indirectly dealing or not dealing). Risk factors to exposure were assessed by asking the following questions: Have you been diagnosed with COVID-19? Do you manage patients diagnosed with COVID-19? Has any of your colleagues been diagnosed with COVID-19? Have your family members or friends been diagnosed with COVID-19? Are you experiencing any symptoms of fever, flu, sore throat, or shortness of breath? Are you provided with protective measures by the hospital? (Including masks, hand sanitizers, protective suits, etc.) Do you use provided protective measures for your safety? (Yes, No) Do you feel provided measures are enough to ensure your safety? (Yes, No). The psychological need was assessed by asking if the participants had received any psychological services including psychological information material (brochures, books, etc. provided

by the hospital), psychological resources available through media, or psychological counseling/training/psychotherapy? Participants will also be asked what type of material or counseling they consider important to be provided to them. In the end, the current health status of participants was assessed for which no specific tool was used but their self-perception of health status was noted by simply asking to compare their self-perceived health status before the outbreak of COVID-19 to now (better than before, unchanged, worse now).

Data analysis was performed by using IBM SPSS (version 23.0) software. Descriptive statistics of continuous variables were reported as mean and standard deviation, while frequency and percentages were reported for categorical data. Group comparisons were made by chi-square test, independent samples t-test, and one-way ANOVA depending on the nature of variables. Post-hoc Bonferroni correction was used to limit the possibility of getting a statistically significant result when testing multiple hypotheses. Associations were derived using univariate logistic regression, expressed in terms of odds ratio and 95% confidence interval. Multivariate logistic regression was used to adjust for potential confounders including gender (male vs. female), marital status (married vs. not married), profession (doctors vs. non-doctors), type of institution (public vs. private), and duty hours (partial vs. full time), expressed as adjusted odds ratios along with 95% confidence intervals. The study's primary outcome was the mental health status of healthcare workers in terms of presence or absence of anxiety, insomnia, and post-traumatic stress syndrome, based on pre-specified standardized cut-off values. The primary comparison was to compare the mental health status of healthcare workers who were, directly and indirectly, dealing with COVID-19 patients. Secondary outcomes included the comparison of mental health status with department, working hours duration, and public/private hospitals. The secondary outcome also included correlation of anxiety, insomnia, and post-traumatic stress syndrome with each other, and a relationship was reported in terms of correlation coefficient r. Self-perceived health status was also compared with the presence of anxiety, insomnia, and post-traumatic stress syndrome as a secondary outcome. P-value of less than or equal to 0.05 was considered significant.

RESULTS

Demographics

The data was obtained from 458 healthcare workers working during the pandemic, with a response rate of 76.3%. There were 278 (60.7%) doctors, 107 (23.4%) nurses, 20 (4.4%) pharmacists and 53 (11.6%) paramedics who participated in the study, with 254 (55.5%) males and 204 (44.5%) females and mean age of 31.98±7.18 years (age range 21 – 58). Overall, there were 92 (20.1%) senior healthcare workers, 219 (47.8%) intermediate, and 147 (32.1%) junior staff who participated in the study with 291 (63.5%) and 167 (36.5%) working in government and private hospitals respectively. Study participants were divided into two groups based on their interaction with confirmed cases of COVID-19. Those who were directly dealing with confirmed patients were in Group A (n=266), while those indirectly/not dealing with confirmed cases were in Group B (n=192). Summary of demographic and clinical characteristics is given in **Table 1**.

Characteristics	Overall n (%) (n=458)	Dealing with COVID patients n (%)	
		Directly dealing (n=266)	**Indirectly / Not dealing (n=192)**
Age (mean±SD) in years	31.98±7.18	31.43±7.1	32.76±7.2
Gender			
• **Male**	254 (55.5%)	101 (38.0%)	103 (53.6%)
• **Female**	204 (44.5%)	165 (62.0%)	89 (46.4%)
Marital status			
• **Single**	231 (50.4%)	146 (54.9%)	85 (44.3%)
• **Married**	227 (49.6%)	120 (45.1%)	107 (55.7%)
Profession			
• **Doctor**	278 (60.7%)	195 (73.3%)	83 (43.2%)
• **Nurses**	107 (23.4%)	48 (18.0%)	59 (30.7%)
• **Pharmacists**	20 (4.4%)	2 (0.8%)	18 (9.4%)
• **Paramedics**	53 (11.6%)	21 (7.9%)	32 (16.7%)
Position			
• **Senior Officer**	92 (20.1%)	43 (16.2%)	49 (25.5%)
• **Intermediate**	219 (47.8%)	125 (47.0%)	94 (49.0%)
• **Junior Staff**	147 (32.1%)	98 (36.8%)	49 (25.5%)
Type of institute			
• **Public**	291 (63.5%)	194 (72.9%)	97 (50.5%)
• **Private**	167 (36.5%)	72 (27.1%)	95 (49.5%)
Living status			
• **Alone**	73 (15.9%)	43 (16.2%)	30 (15.6%)
• **Shared accommodation**	73 (15.9%)	42 (15.8%)	31 (16.1%)
• **With family**	312 (68.1%)	181 (68.0%)	131 (68.2%)
Duty hours			
• **<4 hours**	81 (17.7%)	24 (9.0%)	57 (29.7%)
• **4-8 hours**	209 (45.6%)	117 (44.0%)	92 (47.9%)
• **>8 hours**	168 (36.7%)	125 (47.0%)	43 (22.4%)
Hx of COVID-19			
• **Tested positive**	120 (26.2%)	85 (32.0%)	35 (18.2%)
• **Negative**	338 (73.8%)	181 (68.0%)	157 (81.8%)
Colleagues diagnosed with COVID	412 (90.0%)	244 (91.7%)	168 (87.5%)
Colleagues died due to COVID	115 (25.1%)	62 (23.3%)	53 (27.6%)
Want to quit their job	71 (15.5%)	48 (18.0%)	23 (12.0%)
Self-perceived health after COVID			
• **Worsen**	129 (28.1%)	94 (35.3%)	35 (18.2%)
• **Remained same**	286 (62.4%)	150 (56.4%)	136 (70.8%)
• **Improved**	43 (9.4%)	22 (8.3%)	21 (10.9%)

Table 1. Summary of demographic/clinical characteristics of study group and comparison with respect to contact with confirmed COVID patients
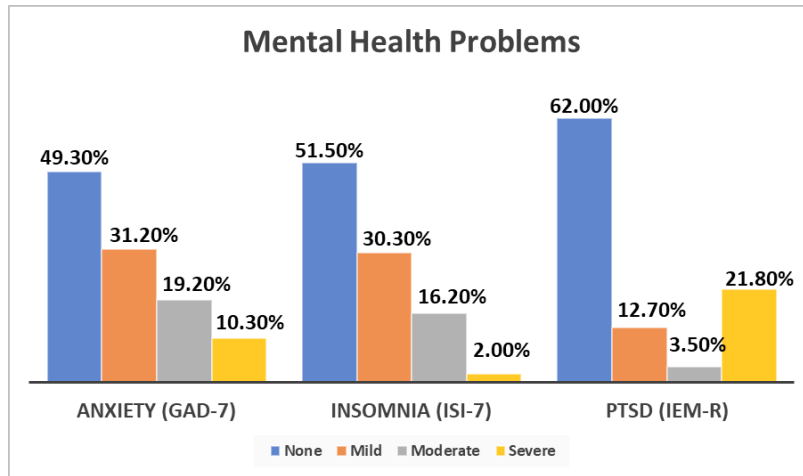
Figure 1. Comparison and distribution of mental health problems including anxiety, insomnia and post-traumatic stress disorder (PTSD) among the healthcare workers working in hospitals during pandemic (n=458).

Mental health status

According to the Generalized Anxiety Disorder (GAD-7) questionnaire, overall, 47 (10.3%) healthcare workers were found to be suffering from severe anxiety, while 88 (19.2%) and 143 (31.2%) had moderate and mild anxiety respectively as shown in **Figure 1**. According to Insomnia Scale Index (ISI-7) questionnaire, 139 (30.3%) had subthreshold insomnia, 74 (16.2%) had insomnia of moderate severity, whereas 9 (2.0%) had severe clinical insomnia. According to the Impact of Even-Scale (IES-R) questionnaire, 100 (21.8%) participants experienced severe symptoms of post-traumatic stress disorder, while 16 (3.5%) and 58

(12.7%) had moderate and mild symptoms. It was found that a greater number of healthcare workers directly dealing with COVID-19 patients (Group A) were at risk of developing anxiety (GAD score ≥10) with crude odds of 3.16 (adjusted OR=3.40, 95% CI 2.1 – 5.7, p<0.001) as compared to those indirectly or not dealing with COVID-19 patients as given in **Table 2**. Similarly, Group A was more likely to suffer from insomnia (ISI score ≥15) and post-traumatic distress syndrome (IMS-R score ≥33) with crude odds of 2.88 (adjusted OR=2.14, 95% CI 1.2 – 3.8, p<0.001) and 3.36 (adjusted OR=3.2, 95% CI 2.0 – 5.3, p<0.001) respectively.

Mental health problems		Dealing with COVID patients		p
		Directly dealing (n=266)	**Indirectly / Not dealing (n=192)**	
Anxiety	**GAD score ≥10**	103 (38.7%)	32 (16.7%)	
	Crude OR (95% CI)	3.16 (2.0 – 4.9)		<0.001
	Adjusted OR (95% CI)	3.40 (2.1 – 5.7)		<0.001
Insomnia	**ISI score ≥15**	64 (24.1%)	19 (9.9%)	
	Crude OR (95% CI)	2.88 (1.7 – 5.0)		<0.001
	Adjusted OR (95% CI)	2.14 (1.2 – 3.8)		<0.001
PTSD	**IMS-R score ≥33**	90 (33.8%)	26 (13.5%)	
	Crude OR (95% CI)	3.36 (2.0 – 5.3)		<0.001
	Adjusted OR (95% CI)	3.20 (2.0 – 5.3)		<0.001

Table 2. Risk of anxiety, insomnia and post-traumatic distress syndrome in healthcare workers directly and indirectly/not dealing with COVID-19 patients

Risk exposure

Healthcare workers directly dealing with COVID-19 patients were found to be working overtime (>8 hours shift) as compared to those not directly dealing with COVID-19 patients (47.0% vs 22.4%, p<0.001) and reported to be unhappy about working overtime during pandemic (p=0.008). Participants belonging to Group A tended to worry that they might have been infected with COVID upon experiencing respiratory symptoms as compared to Group B (79.3% vs 67.2%, p=0.003). A significantly greater number of healthcare workers in Group A reported having tested positive for COVID as compared to Group B (32.0% vs 18.2%, p=0.001). A significantly higher number of healthcare workers directly dealing with COVID-19 patients reported having felt weak and self-contradictory, between their responsibility and life safety while working during the pandemic as compared to those indirectly/not dealing with such patients (62.8% vs 52.6%, p=0.029). Regarding the use of protective measures on-duty, no difference was observed in the use of PPE including masks, gloves, gowns, sanitizers, etc. while working, between the two groups, and the PPE material was reported to be provided by their hospitals. A significantly greater number of healthcare workers in Group A declared that the protective measures provided by the hospitals were not enough to ensure their safety, as compared to Group B (39.1% vs 25.0%, p=0.002).

Other risk factors associated with mental health problems

Upon multivariate subgroup analysis, multiple comparisons were made to explore secondary risk factors that might be associated with the development of anxiety, insomnia, and post-traumatic stress syndrome. Bonferroni correction of alpha value was done to control for false-positive results. The majority of the healthcare staff working in fever clinics/corona isolation wards were found to be suffering from anxiety (OR=4.47, 95% CI 2.6-7.5, p<0.001), insomnia (OR=4.16, 95% CI 2.1-7.9, p<0.001), and PTSD (OR=5.38, 95% CI 3.0-9.6, p<0.001). Similarly, work duration of more than 8 hours per day was significantly associated with the development of mental health problems including anxiety, insomnia, and PTSD as compared to those working less than 8 hours per day (OR=3.1, 95% CI 1.6-5.8, p=0.001; OR=6.6, 95% CI 2.2-19.1, p<0.001; OR=5.1, 95% CI 2.3-11.2, p<0.001 respectively).

Self-perceived health

Participants were asked to compare their self-perceived health status before the outbreak to the present time and identify it as unchanged, improved, or worse than before. It was stated by 129 (28.2%) participants that they had experienced worsening of their health during the outbreak. Among healthcare workers directly dealing with COVID-19 patients, 35.3% reported worsening of health status during the pandemic, while the same was reported by 18.2% of healthcare workers indirectly/not dealing with confirmed cases (p<0.001).

Correlation between anxiety, insomnia, and PTSD

A strong positive correlation was found between anxiety, insomnia, and PTSD scores as shown in correlation matrix **Figure 2**. Anxiety and insomnia scores had a correlation coefficient of r=0.732 (p<0.001), anxiety and PTSD scores had a correlation coefficient of r=0.751 (p<0.001) while insomnia and PTSD scores have a correlation coefficient of r=0.767 (p<0.001).
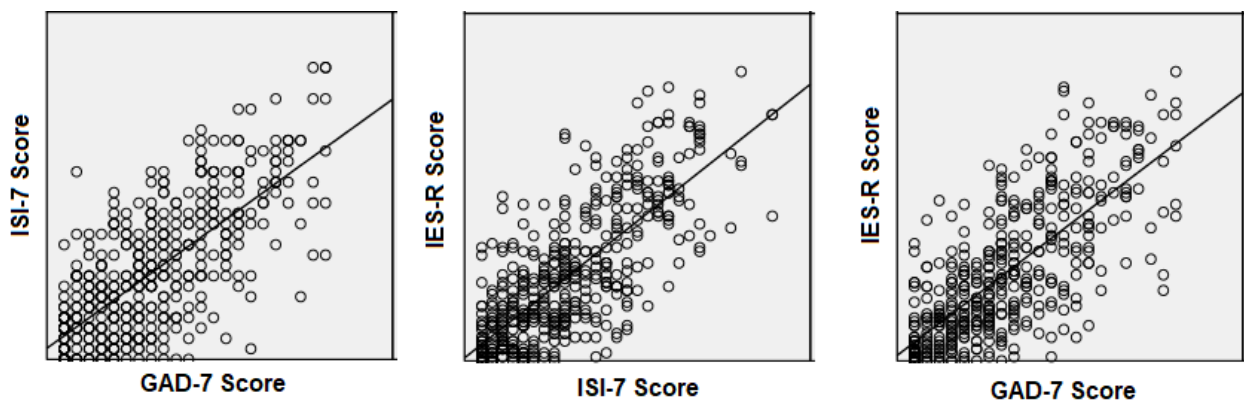
Figure 2. Correlation matrix of Generalized Anxiety (GAD-7) score, Insomnia Scale Index

DISCUSSION

The high prevalence of anxiety, insomnia and post-traumatic stress disorder in this study can be explained by the fact that most of the healthcare staff were worried about infecting their families, the uncertainty of treatment, hospitalization with no loved ones around, death in hospitals, severe nature of the disease and body disposal without routine religious ceremony.

Positive status of participants, their friends, and colleagues for Covid-19, prolonged duty hours, and death of friends and colleagues due to covid infection were important risk factors for mental health problems in frontline healthcare staff directly involved in the management of COVID-19 patients. Single healthcare workers were found to have higher PTSD and insomnia scores as compared to married ones, due that living alone and lesser communication with close relatives may lead to more depressive symptoms and greater mental health issues. Despite all these factors, most of the healthcare staff believed the current high-risk job to be their social and moral responsibility. A few decided to quit their jobs due to post-traumatic stress disorder.

However, the prevalence of mental disorders in this study is lesser as compared to a study conducted at the start of the coronavirus outbreak in China (Lai J, 2020). This can be explained by the fact that the current study was conducted just after the first wave in Pakistan, when COVID-19 transmission rate, morbidity, and mortality was lower compared to other countries. Moreover, the majority of the healthcare staff lived with family, compared to a lesser number of people living alone. So, communication and moral support from the relatives and friends' health care staff was available.

Here we recommend some strategies that might help the healthcare staff to cope with mental health problems. Supportive measures including appreciation from family members, colleagues, hospitals providing a peer support system, psychological support via online sessions, can be beneficial in such a scenario. Government can provide financial support to the health care provider and their families (Shanafelt T, 2020). Motivational strategies including encouraging and recognizing the hard work of doctors/nurses, identifying mental health problems, and providing psychological therapy to affected ones are of primary importance. Additionally, distributing the workload, shortening of working hours, providing support for childcare needs at home, providing residence facilities at hospital to doctors and nurses working in isolation wards, protecting health and safety of staff by providing ample protective equipment and robust infection control policies are other key recommended imperatives. (Patel RS, 2018). Training/Educational strategies including, providing educational material on mental health, providing self-awareness, mindfulness, and stress management training can also be effective in coping with mental health problems (Liu S, 2020). A multidisciplinary support team of psychologists, psychiatrists, and social workers should be present at each hospital to pay special attention to high-risk medical staff working as front-liners (Hall H, 2020).

The potential limitations of the study includes selection bias due to convenience sampling, bias could also have been introduced by non-responders, online self-administrated questionnaires, and no direct interviews from the participants and administration. The baseline mental health status of the study population was not known, and no follow-up was done in this study so the results might not reflect the long-term psychological disorders in the health care workers. Nevertheless, the study provides a snapshot and insight into the prevalent mental health status amongst healthcare workers during the first covid wave in Pakistan. The response rate was high when questionnaires in hardcopy were provided to some hospitals by the main person. The generalizability is high as a representative sample from two provinces comprising of multiple private/public hospitals of Pakistan was included in our study.

CONCLUSION

This study has revealed a high occurrence of anxiety, insomnia, and posttraumatic stress disorder among frontline healthcare workers managing COVID-19 patients in Pakistan. The situation was quite alarming, indicating a dire need to intervene and protect the mental health of the frontline healthcare workforce.

Author Affiliations

1 National University of Medical Sciences, Rawalpindi, Pakistan
2 Consultant Nephrologist, Maroof International Hospital, Islamabad, Pakistan
3 Consultant Internist/Nephrologist, Hayat Shaheed Teaching Hospital, Peshawar, Pakistan
4 Resident Infectious Diseases, Pak Emirates Military Hospital, National University of Medical Sciences, Rawalpindi, Pakistan
5 Consultant Psychiatrist, Shifa International Hospital, Islamabad, Pakistan
6 Consultant Medicine, Ali Medical Center, Islamabad, Pakistan

Conflict of interest

The authors declare that there is no conflict of interest.

REFERENCES

Alwidyan, M. T., Trainor, J. E., & Bissell, R. A. (2020). Responding to natural disasters vs. disease outbreaks: Do emergency medical service providers have different views?. International journal of disaster risk reduction, 44, 101440.

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. The lancet, 395(10227), 912-920.

Brooks, S. K., Dunn, R., Amlôt, R., Rubin, G. J., & Greenberg, N. (2018). A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. Journal of occupational and environmental medicine, 60(3), 248-257.

Chong, M. Y., Wang, W. C., Hsieh, W. C., Lee, C. Y., Chiu, N. M., Yeh, W. C., ... & Chen, C. L. (2004). Psychological impact of severe acute respiratory syndrome on health workers in a tertiary hospital. The British journal of psychiatry, 185(2), 127-133.

Hall H. The effect of the COVID-19 pandemic on healthcare workers' mental health. Journal of the American Academy of PAs. 2020 Jul 1;33(7):45-8.

Karim, S., Saeed, K., Rana, M. H., Mubbashar, M. H., & Jenkins, R. (2004). Pakistan mental health country profile. International Review of Psychiatry, 16(1-2), 83-92.

Kang, L., Li, Y., Hu, S., Chen, M., Yang, C., Yang, B. X., ... & Liu, Z. (2020). The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. The Lancet Psychiatry.

Krishnamoorthy, Y., Nagarajan, R., Saya, G. K., & Menon, V. (2020). Prevalence of psychological morbidities among general population, healthcare workers and COVID-19 patients amidst the COVID-19 pandemic: A systematic review and meta-analysis. Psychiatry research, 293, 113382.

Lai, J., Ma, S., Wang, Y., Cai, Z., Hu, J., Wei, N., ... & Hu, S. (2020). Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA network open, 3(3), e203976-e203976.

Liu S, Yang L, Zhang C, Xiang YT, Liu Z, Hu S, Zhang B. Online mental health services in China during the COVID-19 outbreak. The Lancet Psychiatry. 2020 Apr 1;7(4):e17-8.

Mohindra, R., Ravaki, R., Suri, V., Bhalla, A., & Singh, S. M. (2020). Issues relevant to mental health promotion in frontline health care providers managing quarantined/isolated COVID19 patients. Asian J Psychiatr, 51(3), 102084.

Morin, C. M., Belleville, G., Bélanger, L., & Ivers, H. (2011). The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. Sleep, 34(5), 601-608.

Motlagh, H. (2010). Impact of event scale-revised. J Physiother, 56(3), 203. http://svc019.wic048p.server-web.com/ajp/vol_56/3/Clinimetrics.pdf

Patel, R. S., Bachu, R., Adikey, A., Malik, M., & Shah, M. (2018). Factors related to physician burnout and its consequences: a review. Behavioral sciences, 8(11), 98.

Salari, N., Khazaie, H., Hosseinian-Far, A., Khaledi-Paveh, B., Kazeminia, M., Mohammadi, M., ... & Eskandari, S. (2020). The prevalence of stress, anxiety and depression within front-line healthcare workers caring for COVID-19 patients: a systematic review and meta-regression. Human resources for health, 18(1), 1-14.

Shanafelt, T., Ripp, J., & Trockel, M. (2020). Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. Jama, 323(21), 2133-2134.

Vizheh, M., Qorbani, M., Arzaghi, S. M., Muhidin, S., Javanmard, Z., & Esmaeili, M. (2020). The mental health of healthcare workers in the COVID-19 pandemic: A systematic review. Journal of Diabetes & Metabolic Disorders, 1-12.

Williams, N. (2014). The GAD-7 questionnaire. Occupational medicine, 64(3), 224-224. https://doi.org/10.1093/occmed/kqt161

World Health Organization. (5th November 2021). WHO Coronavirus (COVID-19) Dashboard. Geneva. https://covid19.who.int/

World Health Organization. (18 March 2020). Mental health and psychosocial considerations during the COVID-19 outbreak. Department of Mental Health. Geneva. https://www.who.int/docs/default-source/coronaviruse/mental-health-considerations.pdf?sfvrsn=6d3578af_10.

Wu, P., Fang, Y., Guan, Z., Fan, B., Kong, J., Yao, Z., ... & Hoven, C. W. (2009). The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. The Canadian Journal of Psychiatry, 54(5), 302-311.

Xiang, Y. T., Yang, Y., Li, W., Zhang, L., Zhang, Q., Cheung, T., & Ng, C. H. (2020). Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. The lancet psychiatry, 7(3), 228-229.

Xing, J., Sun, N., Xu, J., Geng, S., & Li, Y. (2020). Study of the mental health status of medical personnel dealing with new coronavirus pneumonia. PloS one, 15(5), e0233145.

Zhang, C., Yang, L., Liu, S., Ma, S., Wang, Y., Cai, Z., ... & Zhang, B. (2020). Survey of insomnia and related social psychological factors among medical staff involved in the 2019 novel coronavirus disease outbreak. Frontiers in psychiatry, 11, 306.

Zortea, T. C., Brenna, C. T., Joyce, M., McClelland, H., Tippett, M., Tran, M. M., ... & Platt, S. (2020). The impact of infectious disease-related public health emergencies on suicide, suicidal behavior, and suicidal thoughts. Crisis.