Psychosocial Impact of COVID-19 on Healthcare Workers at a Tertiary Care Cardiac Center of Karachi Pakistan

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Objectives: Aim of this study was to determine the depression, stress, and anxiety level among healthcare workers working at a tertiary care cardiac center of Karachi Pakistan during COVID-19 pandemic. Methods: This survey was conducted at the National Institute of Cardiovascular Disease (NICVD), Karachi, Pakistan. Participants of the study were fulltime employees of hospital. Data were collected using an online questionnaire and Depression, Anxiety and Stress - 21 (DASS-21) scale was used. Results: A total of 224 healthcare workers were included, 46 (20.5%) participants were screened for moderate to severe depression, 20.1% (45) for moderate to severe anxiety, and 14.7% (33) for moderate to severe stress. Conclusion: A significant levels of depression, anxiety, and stress were noted with the major concerns of workplace exposure, increased risk of infection, and transmission to their families and friends. Keywords: anxiety, COVID-19, depression, healthcare workers, pandemic, psychosocial, stress

World is facing Coronavirus disease (COVID-19) pandemic since December 2019 when the first case of COVID-19 was reported in Wuhan, China.1 Soon after the rapid spread of disease to the other parts of the world, the World Health Organization (WHO) had to declare COVID-19 as global pandemic.3 According to worldometer, as of August 7, 2020, the COVID-19 outbreak affected 213 countries around the world, including Pakistan, with 19,363,217 cases and death toll of 719,633 with the death rate of 5%.4 The first confirmed case of COVID-19 in Pakistan was reported on February 26, 2020, according to the COVID-19 health advisory platform by Ministry of National Health Services Pakistan, as of today (August 7, 2020) the total confirm cases in Pakistan are 282,645 with the death toll of 6052 (2.1%).6 COVID-19 pandemic has caused an unprecedented scenario not only for the masses but also for the healthcare workers around the globe. Following the footsteps of Chines response to the COVID-19 outbreak, social distancing measures such as national level lockdowns and restricted mobility of the masses are implemented by the government of all the affected nations in order to limit the human to human transmission and spread of the infection.7 However, world is yet to experience the looming financial, political, and socio-psychological impacts of the pandemic.8 This pandemic is expected to be even direr in low- and middle-income countries, such as Pakistan, with struggling economies and poor health care infrastructures.9 These critical situations have most affected the frontline healthcare workers who are vulnerable to get infected due to close proximity and direct contact with the suspected patients. Moreover, disrupted lifestyle, prolonged working hours, discomfort of the prolonged donning of the personal protective equipment (PPE), continuous fear of exposure, commute to workplaces during lockdown, and isolation/quarantine and limited interaction with friends and families has significant morale and psychosocial impact on the healthcare workers.10 Anxiety and depression among healthcare professionals is a common feature of epidemics, such as SARS and H1N1 epidemics and now COVID-19.11-15 A high incidence of stress and anxiety disorders have been reported among healthcare professionals working in a tertiary care hospital dealing COVID-19 patients.13 Although, our center is a cardiac care center and not designated center for the management of COVID-19 patients, but cardiac emergency room was operational for cardiac emergency admission during the COVID-19 pandemic and an isolated ward was admitting COVID-19 patients with underlying cardiac diseases. Therefore, aim of this study was to determine the depression, stress, and anxiety level among frontline healthcare workers during COVID-19 pandemic at a tertiary care cardiac center of Karachi Pakistan.

METHODS
This study was conducted at the National Institute of Cardiovascular Disease (NICVD), Karachi, Pakistan, the largest tertiary care cardiac center of the country, from July 1, 2020 to July 20, 2020. Participants of the study were fulltime employees of hospital including consultants, physicians, nursing staff, allied health care professionals, technicians, administrators, and clerical staff who were actively performing their duties during COVID-19 pandemic and were directly or indirectly exposed to the suspected COVID-19 patients with underlying cardiovascular diseases and their attendants. Employees of either sex between 18 and 65 years of age without any pre-existing psychiatric illness were included in this study.

Data were collected using an online questionnaire formed on Google Forms which consisted of two sections, demographic and depression, anxiety, and stress assessment section. Demographic section comprises of age (years), sex, marital status, occupation, education, area/department of work, comorbid conditions, whether participant self and any of his family members tested positive for COVID-19, exposure to the COVID-19 suspected patients during work hours, and general reasons of concern during COVID-19 pandemic. Depression, anxiety, and stress were assessed using the 21 items Depression, Anxiety and Stress - 21 (DASS-21) scale by the Psychology Foundation of Australia.

Considering the varying degree of education level of the participants the Urdu (national language of Pakistan) version of the questionnaire available from the DASS website (http://www2.psych.unsw.edu.au/dass/Urdu/Aslam.htm) was used in this study. DASS-21 is a shorter version of basic 42-items questionnaire which comprises of seven item each for depression, anxiety, and stress.
TABLE 1. Demographic Profile, Pre-existing Comorbid Conditions, and COVID-19 Exposure of the Participants

| Characteristics                      | Total (N) |
|--------------------------------------|-----------|
| Total (N)                            | 224       |
| Gender                               |           |
| Male                                 | 78.9% (170) |
| Female                               | 21.1% (47)  |
| Age, yrs                             |           |
| ≤35                                  | 79% (177) |
| >35                                  | 21% (47)  |
| Marital status                       |           |
| Single                               | 37.9% (85) |
| Married                              | 62.1% (139) |
| Education                            |           |
| Under graduate                       | 10.7% (24) |
| Graduation                           | 41.1% (92) |
| Masters                              | 22.3% (50) |
| Post-graduation                      | 25.9% (58) |
| Occupation                           |           |
| Allied healthcare professionals      | 79.5% (178) |
| Nursing staff                        | 15.2% (34) |
| Other                                | 5.4% (12)  |
| Comorbid conditions                  |           |
| Diabetes mellitus                    | 4.5% (10) |
| Hypertension                         | 6.7% (15) |
| Asthma/COPD                          | 5.4% (12) |
| Ischemic heart disease               | 1.8% (4)  |
| Smoking                              | 11.2% (25) |
| Hypothyroidism                       | 1.3% (3)  |
| COVID-19 exposure                    |           |
| Any family member tested positive for COVID-19 | 25.4% (57) |
| Exposed to COVID-19 suspected patients at work | 87.9% (197) |
| Participant is tested positive for COVID-19 | 14.3% (32) |

COVID-19, Coronavirus disease; COPD, chronic obstructive pulmonary disease.

TABLE 2. Depression, Anxiety, and Stress Levels Stratified by the COVID-19 Status of the Participant

| DASS-21                      | Total | Negative | Positive | P-Value |
|------------------------------|-------|----------|----------|---------|
| Total (N)                    | 224   | 192      | 32       | –       |
| Depression                   |       |          |          |         |
| Depression score             |       |          |          |         |
| Normal (0–9)                 | 62.9% (152) | 6 [2–11] | 7 [2–15] | 0.333 |
| Mild (10–13)                 | 11.6% (26) | 12.5% (24) | 6.3% (2) | 0.148 |
| Moderate (14–20)             | 13.8% (31) | 13% (25) | 18.8% (6) |         |
| Severe (21–27)               | 4.9% (11) | 3.6% (7) | 12.5% (4) |         |
| Extremely severe (28+)       | 1.8% (4) | 2.1% (4) | 0% (0) |         |
| Anxiety                      |       |          |          |         |
| Anxiety score                |       |          |          |         |
| Normal (0–7)                 | 72.3% (162) | 74.5% (143) | 59.4% (19) | 0.004* |
| Mild (8–9)                   | 7.6% (17) | 7.3% (14) | 9.4% (3) |         |
| Moderate (10–14)             | 12.5% (28) | 12% (23) | 15.6% (5) |         |
| Severe (15–19)               | 3.6% (8) | 4.2% (8) | 0% (0) |         |
| Extremely severe (20+)       | 4% (9) | 2.1% (4) | 15.6% (5) |         |
| Stress                       |       |          |          |         |
| Stress score                 |       |          |          |         |
| Normal (0–14)                | 73.7% (165) | 76% (146) | 59.4% (19) | 0.001* |
| Mild (15–18)                 | 11.6% (26) | 12.5% (24) | 6.3% (2) |         |
| Moderate (19–25)             | 9.8% (22) | 6.3% (12) | 31.3% (10) |         |
| Severe (26–33)               | 4.5% (10) | 4.7% (9) | 3.1% (1) |         |
| Extremely Severe (34+)       | 0.4% (1) | 0.5% (1) | 0% (0) |         |

COVID-19, Coronavirus disease; DASS-21, Depression, Anxiety and Stress - 21 (DASS-21) scale.
*Significant at 5%.

RESULTS

A total of 224 hospital workers were included in this survey, 75.9% (170) of them were male participants and majority of the participants were under the age of 35 years (79%) and married (62.1%). Only 10.7% (24) were under graduates and 79.5% (178) of the participants were allied healthcare professionals. A majority of the participants (87.9%) were directly or indirectly exposed to the COVID-19 suspected patients at workplace, 25.4% (57) of the participants had at least one family member tested positive for COVID-19, and 14.3% (32) of the participants were tested positive for COVID-19 and recovered. Demographic profile, pre-existing comorbid conditions, and COVID-19 exposure are presented in Table 1. The DASS-21 has good internal consistency for all three domains with the Cronbach’s coefficient of 0.834 for depression, 0.761 for anxiety, and 0.850 for stress scale. The median depression score was 6 [IQR: 2 to 12] with 6.7% (15) fall under the severe depression categorized and 25.4% (57) with mild to moderate depression. The anxiety score was 4 [IQR: 0 to 8] with 7.6% (17) had severe and 20.1% (45) with mild to moderate anxiety. Similarly, stress score was 10 [IQR: 4 to 16] with 4.9% (11) and 21.4% (48) of the participants with severe and mild to moderate stress. Anxiety and stress levels were found to be comparatively higher among participants who were tested score and severity was categorized based on the cut-off scores values recommended in the manual for the DASS.

Collected data were analyzed using IBM SPSS Statistics for Windows, Version 21.0. (IBM Corp., Armonk, NY). Normality of the distribution of age (years), depression, anxiety, and stress scores were assessed by applying Shapiro–Wilk test and P-value of the test were <0.05 hence median and interquartile range (IQR) were computed and Mann–Whitney U test was applied to compare the scores by various groups and subgroups of participants. Categorical variables were expressed as frequency (%) and Chi-square tests were applied to assess the association of depression, anxiety, and stress level by various groups and subgroups of participants. The level of significance was set at less than or equal to 0.05 throughout the analysis.

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TABLE 3. Odds of Participants been Screened Positive for Severe Depression, Anxiety, and Stress Score With Demographic Characteristics and Pre-existing Comorbid Conditions

| Characteristics                  | Severe Depression |                            | Severe Anxiety |                            | Severe Stress |                            |
|----------------------------------|-------------------|-----------------------------|----------------|-----------------------------|--------------|-----------------------------|
|                                  | OR [95% CI]       | P-Value                     | OR [95% CI]    | P-Value                     | OR [95% CI]  | P-Value                     |
| Male                             | 0.9 [0.3–2.8]     | 0.811                       | 0.7 [0.2–2.2]  | 0.596                       | 0.8 [0.2–3.3] | 0.801                       |
| Age > 35 years                   | 4 [0.5–30.8]      | 0.190                       | 0.9 [0.3–27]   | 0.789                       | 2.8 [0.3–22.1]| 0.340                       |
| Married                          | 0.5 [0.2–1.5]     | 0.210                       | 0.7 [0.2–1.8]  | 0.423                       | 0.7 [0.2–2.4] | 0.600                       |
| Masters/post-graduation          | 0.7 [0.2–2]       | 0.512                       | 0.6 [0.2–1.6]  | 0.273                       | 0.6 [0.2–2.1] | 0.424                       |
| Allied health care professional  | 1 [0.3–3.8]       | 0.958                       | 1.2 [0.3–4.5]  | 0.759                       | 2.7 [0.3–21.5]| 0.354                       |
| Family member tested positive for COVID-19 | 1.5 [0.5–4.6]   | 0.470                       | 1.2 [0.4–3.7]  | 0.697                       | 1.1 [0.3–4.3] | 0.887                       |
| Participant is tested positive for COVID-19 | 2.4 [0.7–7.9]   | 0.167                       | 2.8 [0.9–8.5]  | 0.074                       | 0.6 [0.1–4.7] | 0.618                       |
| Diabetic                         | 1.6 [0.2–13.4]    | 0.672                       | 1.4 [0.2–11.5] | 0.769                       | – –          | – –                         |
| Hypertensive                     | 2.3 [0.5–11.4]    | 0.300                       | 3.5 [0.9–13.8] | 0.076                       | – –          | – –                         |
| Asthma/COPD                      | 3.1 [0.6–15.4]    | 0.175                       | 2.6 [0.5–13.1] | 0.239                       | 1.8 [0.2–15.7]| 0.578                       |
| Ischemic heart disease           | 4.9 [0.5–50.3]    | 0.180                       | 4.2 [0.4–43.2] | 0.222                       | – –          | – –                         |
| Smoking                          | 3.3 [1–11.1]      | 0.060                       | 1.8 [0.5–6.8]  | 0.383                       | 3.3 [0.8–13.2]| 0.098                       |

Cl, confidence interval; COVID-19, Coronavirus disease; COPD, chronic obstructive pulmonary disease; DASS-21, Depression, Anxiety and Stress - 21 (DASS-21) scale; OR, odds ratio.

Significant at 5%.

Positive for COVID-19. Depression, anxiety, and stress levels stratified by the COVID-19 status of the participant are presented in Table 2.

Odds of participants been screened positive for severe depression, anxiety, and stress with demographic characteristics and pre-existing comorbid conditions are presented in Table 3. Anxiety score was significantly higher among healthcare workers who were directly or indirectly exposed to COVID-19 suspected patients at work (4 [2–8] vs 2 [0–4]; P < 0.001). However, odds of participants been screened positive for depression, anxiety, and stress was not found to be associated with either demographic characteristics or pre-existing comorbid conditions.

When asked for reasons of concern during COVID-19 pandemic, 41.1% (92) of the participants showed their concerns regarding safety of their families, 40.6% (91) were concerned about getting infected and workplace exposure, 9.4% (21) were due to disrupted professional and personal life, and 6.3% (14) raised their concern regarding lack of safety equipment. Other concerns mentioned by the healthcare workers were regarding general public not following SOPs (3.1%), economic instability (2.2%), lack of treatment options and vaccinations (2.2%), uncertain situation (2.2%), and misconception and negative image of doctors in community (1.3%).

DISCUSSION

Psychosocial response of the healthcare workers during pandemics like COVID-19 is multifold, various factors come to play including the highly contagious nature of infection itself, workplace exposure and continuous risk of getting infected and transmitting to family and loved ones, uncertainty and lack of control over the diseases progression due to lack of treatment options and vaccinations, prolonged working hours and disrupted professional and personal life, extreme precautions and fatigue due to PPE, lack of clear communication of directives, and lack of social support due to isolation and social distancing. Similar to what has been observed, during this pandemic workplace exposure and fear of getting infected and transmitting to the family and friends were the major concerns among the participants of this study. A significant number of participants were screened for moderate to severe stress (14.7%), depression (20.5%), and anxiety (20.1%).

Moderate to severe stress, anxiety, and depression among the healthcare professionals working in the COVID-19 isolation ward of the various designated hospitals of Pakistan is reported to be 90.1%, 85.7%, and 72.3% which were much higher than the levels reported in our study. The differences in results can be partly explained by the fact that our center is not a primarily designated hospital for the COVID-19 patients, it only caters COVID-19 patients with underlying cardiac diseases. Hence, the burden of COVID-19 patients as well as associated level of risk is low for our center as compared with the hospitals designated for the COVID-19 patients. Another study from the Wuhan China, the origin of diseases, also reported depression, anxiety, insomnia, and distress in 50.4%, 44.6%, 34%, and 71.5% respectively among the healthcare professions dealing in COVID-19 patients. 16

Every epidemic draw a unique response from the healthcare system, psychological impact of pandemic is much higher for the healthcare workers who had firsthand experience of the extent of the disease, from its sign and symptoms to the isolation to the recovery phases. Healthcare workers who were diagnosed positive for the COVID-19 had higher moderate to severe depression (31.3% vs 18.8%), anxiety (31.3% vs 18.2%), and stress (34.4% vs 11.5%). Although, global communities have appraised the efforts of healthcare workers during these critical situations and shown empathy and compassion. But it is also important to understand the underlying sources of fear and anxiety among the healthcare workers that can potentially weaken self-confidence to reassure the public and ability to stay calm when it is most needed.

CONCLUSION

A significant levels of depression, anxiety, and stress were noted among the healthcare worker performing their duties during COVID-19 pandemic. The major concerns were workplace exposure, increased risk of infection, and transmission to their families and friends. Under these extraordinarily difficult circumstances, it is responsibility of the organizations and leadership to recognize the concerns with efforts to support, facilitate, and protect healthcare workers and their families.

REFERENCES

1. CP N. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) in China. Zhonghua Liu Xing Bing Xue Za Zhi. 2020;41:145–151.
2. Surveillance V. The epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19)—China. 2020. China CDC Wkly. 2020;2:113–122.
3. Organization WH. WHO Announces COVID-19 Outbreak a Pandemic. World Health Organization [Internet]; 2020.
4. Worldometer. Reported Cases and Deaths by Country, Territory, or Conveyance; 2020. Available at: https://www.worldometers.info/coronavirus/. Accessed August 7, 2020.
5. Imtiaz Ali SAS, Siddiqui N. Pakistan confirms first two cases of coronavirus, govt says ‘no need to panic’ DAWN; 2020. Available at: https://www.dawn.com/news/1536792. Accessed August 7, 2020.

6. Pakistan MoNHS. Government of Pakistan, COVID-19 dashboard; 2020. Available at: http://covid.gov.pk/stats/pakistan. Accessed August 7, 2020.

7. Block P, Hoffman M, Raabe JJ, et al. Social network-based distancing strategies to flatten the COVID-19 curve in a post-lockdown world. Nat Hum Behav. 2020;4:588–596.

8. Bonaccorsi G, Pierri F, Cinelli M, et al. Economic and social consequences of human mobility restrictions under COVID-19. Proc Natl Acad Sci U S A. 2020;117:15530–15535.

9. Rong C-L, Brasher C, Chikumba E, McDougall R, Mellin-Olsen J, Enright A. The COVID-19 pandemic: effects on low- and middle-income countries. Anesth Analg. 2020;131:86–92.

10. Goh SS, Chia MY. Anxiety and morale in front-line healthcare workers during the Coronavirus Disease 2019 (COVID-19) outbreak at the National Screening Centre in Singapore. Ann Acad Med Singap. 2020;49:259–262.

11. Abrams Z. Psychologist leads innovative approach to tackle psychological toll of COVID-19: American Psychological Association; 2020. Available at: https://www.apa.org/news/apa/202003/psychologist-covid-19. Accessed August 7, 2020.

12. Brooks SK, Dunn R, Amlôt R, Rubin GJ, Greenberg N. A systematic, thematic review of social and occupational factors associated with psychological outcomes in healthcare employees during an infectious disease outbreak. J Occup Environ Med. 2018;60:248–257.

13. Huang J, Han M, Luo T, Ren A, Zhou X. Mental health survey of 230 medical staff in a tertiary infectious disease hospital for COVID-19. Zhonghua Lao Dong Wei Sheng Zhi Ye Bing Za Zhi. 2020;38:192–195.

14. Aoyagi Y, Beck CR, Dingwall R, Nguyen-Van-Tam JS. Healthcare workers’ willingness to work during an influenza pandemic: a systematic review and meta-analysis. Influenza Other Respir Viruses. 2015;9:120–130.

15. Chan-Yeung M. Severe acute respiratory syndrome (SARS) and healthcare workers. Int J Occup Environ Health. 2004;10:421–427.

16. Lai J, Ma S, Wang Y, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw Open. 2020;3:e203976.

17. Chen Q, Liang M, Li Y, et al. Mental health care for medical staff in China during the COVID-19 outbreak. Lancet Psychiatry. 2020;7:e15–e16.

18. Sandesh R, Shahid W, Dev K, et al. Impact of COVID-19 on the mental health of healthcare professionals in Pakistan. Cureus. 2020;12:e8974.

19. Chan AO, Huak CY. Psychological impact of the 2003 severe acute respiratory syndrome outbreak on health care workers in a medium size regional general hospital in Singapore. Occup Med (Lond). 2004;54:190–196.

20. Adams JG, Walls RM. Supporting the health care workforce during the COVID-19 global epidemic. JAMA. 2020;323:1439–1440.

21. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. JAMA. 2020;323:2133–2134.