Research Article

The Toll it Takes: Mental Health Burden and Associated Factors During COVID-19 Outbreak among Healthcare Workers in Lahore, Pakistan

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Abstract

Objective: To assess psychological impact of COVID-19 pandemic among healthcare workers (HCWs) in a University Teaching Hospital, the main referral center for COVID-19 in Lahore Pakistan, by quantifying symptoms of acute stress disorder, depression, anxiety, insomnia and to explore their potential risk factors.

Study Design: Descriptive Analytical study.

Place and Duration of the Study: King Edward Medical University from March 30th-April 15th 2020.

Methods: Following Institutional Review Board approval and informed consent, Demographic form, Patient Health Questionnaire, Generalized Anxiety Disorder scale, Insomnia Severity Index, and the stress reactions questionnaire were used for data collection. Descriptive statistics were computed. Binary logistic regression was done to determine potential risk factors for mental health outcomes.

Results: Three hundred and thirty-seven healthcare workers participated with 79% physicians and 20% were nurses and paramedical staff. The prevalence of anxiety, depressive symptoms, acute stress disorder and insomnia was 36.2%, 30%, 27.9% &1.5% respectively. Women, frontline HCWs and junior staff had more anxiety, depression and insomnia symptoms with physicians reporting more acute stress symptoms compared to nurses. Binary logistic regression showed that being a junior staff member and a frontline worker appeared to be an independent risk factors for depression and anxiety (but not insomnia).

Conclusion: High psychological distress among healthcare workers during COVID-19 reported in Pakistan. Failure to provide adequate psychosocial support can significantly impair their functioning and compromise patient care.

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Introduction

World Health Organization (WHO) declared COVID-19, a Public Health Emergency of International Concern (PHEIC) on 30th January 2020 and later as "Pandemic" on March 11th 2020.[1]

COVID-19 has placed extraordinary demands upon healthcare systems worldwide, including Pakistan. According to data released by Ministry of Health, Government of Pakistan(GoP), as of April 29th, 2020 more than 444 Healthcare Professionals, including doctors, nurses and paramedical staffs have also

contracted the illness in the line of duty with 8 reported deaths.[2]

The COVID-19 pandemic has caused not only extraordinary public health concerns but is also likely to place Healthcare workers (HCWs) under extreme stress. Literature suggests that HCWs are very vulnerable to emotional distress while caring for sick and distressed patients including having to make difficult decisions.[3,4,5] HCWs on COVID-19 Pandemic forefront face compounding stressors: Increasing number of cases, high risk of infection, fear of infecting family members, limited supplies of Personal protective equipment (PPE), frustration, long working hours, exhaustion, isolation, dealing with patients with negative emotions, media coverage of other HCWs becoming ill and scarcity of lifesaving resource can all contribute to mental burden.[6,7] Some of them are also likely to suffer "moral injury" due to the unprecedented nature of challenges being faced during this pandemic like allocation of meagre resources to equally needy patients, looking after their own health needs alongside patients' needs etc.[8] Studies report that staff with Moral injuries, often experience negative thoughts, which can increase risk of developing mental health difficulties.[9] This has also been supported by Lai et al in their study of 1830 Healthcare workers in china in 2020, published in JAMA, reporting high rates of depression, anxiety, insomnia and post-traumatic stress disorder. Women, Nurses, HCWs in Wuhan, and frontline health care workers reported higher Psychological burden.[7] High rates of Psychiatric problems are also being reported in other recent studies, mostly from China.[10,11] Although based on literature, we had reason to speculate that psychological health of HCWs during COVID-19 in Pakistan may also be affected, but evidence-based evaluation was scarce in our setting.

The aim of current study was to assess psychological impact of COVID-19 outbreak among HCWs in a University setting Teaching Hospital, one of the first and main centers managing patients with COVID-19 in Lahore Pakistan, by measuring symptoms of acute stress disorder, depression, anxiety, insomnia and assessing possible risk factors associated with them. This Mental Health burden assessment can serve as baseline and important evidence for developing comprehensive psychosocial response and measures to promote mental health and wellbeing of HCWs.

Methods

Our study is a descriptive analytical study, done in King Edward Medical University/Mayo Hospital Lahore from March 30th-April 15th 2020. Approval from the Institutional Ethics Review Board was received prior to start of the study. This Institutional web based study (to avoid transmission of the COVID-19 through droplet or contact) was anonymous, voluntary and informed consent and confidentiality of information was assured. Information to access confidential psychological support was also provided during the study. The minimum target sample size calculated was 196 using 95% confidence level, 7% absolute precision with an expected percentage of HCWs with depression as 50% based on a recent study during COVID-19 outbreak in China.[7]

All participants reported their demographic data and completed a stress reaction questionnaire alongside three standardized questionnaires assessing depression, anxiety and insomnia. Demographic data included age, gender, marital status, place of residence, designation etc. Respondents who answered questions in the affirmative about their direct involvement in providing care to patients with diagnosed or suspected COVID-19 patients were defined as frontline workers, while others were considered as second line workers. Stress Reactions Questionnaire, is composed of acute stress disorder criteria according to DSM-IV and associated emotional and behavioral changes.[6] Depression was measured by using The Patient Health Questionnaire (PHQ-9), which is considered a valid and reliable tool to screen depression in Pakistan.[12,13] It has nine items reporting the frequency of depressive symptoms in last two weeks on a 4-point Likert-scale ranging from 0 (not at all) to 3 (nearly everyday). It showed good reliability (Cronbach's alpha=0.86). Range of PHQ-9 score is from 0-27 and interpretation of scores is; normal (0-4), mild (5-9), moderate (10-14), and severe (15-27) depression. PHQ-9-total score of 10 points or greater was considered as the presence of depressive symptoms.

The 7-item Generalized Anxiety Disorder (GAD-7) scale (range 0-21) assessed participants's anxiety symptoms.[14] Cronbach's alpha was 0.87. Interpretation of GAD-7 scores is as follows; normal (0-4),

mild (5-9), moderate (10-14), and severe (15-21) anxiety; with more severe functional impairments noted with increase in scores. In our study, GAD-7 scores greater than 7 points indicated anxiety symptoms.[7]

Insomnia was assessed by using The Insomnia Severity Index.15 ISI scoring interpretation is: (ISI score range, 0-28), normal (0-7), subthreshold insomnia (8-14), moderate (15-21), and severe (22-28) insomnia. The cutoff score for detecting symptoms of insomnia was 15 in our study. The ISI had good reliability (Cronbach's alpha=0.9).

Data analysis was performed using SPSS 20.0. Descriptive analysis was done to assess demographic characteristics of the respondents. Data for scales scores is presented as medians with interquartile ranges (IQRs), as it was not normally distributed. Data for each level for symptoms of depression, anxiety, insomnia, and stress are mentioned as numbers and percentages. For comparing the severity of each symptom between groups, nonparametric Mann-Whitney U test was used. Binary logistic regression was performed to determine possible risk factors for symptoms of psychiatric outcomes and results are reported as odds ratios (ORs) and 95% CIs. All tests were two tailed and the statistical significance was set at $\alpha = .05$.

Results

Three hundred and thirty-seven respondents with mean age of 30.4 + 6.7 and 53% being females, completed the questionnaire. Of the 337 respondents, 276 (79%) were physicians and 67 (19.9%) were nurses and paramedical staff. Majority of participants 253 (75%) were junior staff members (Interns, Residents, Medical Officers, Junior nurses), Frontline workers comprised 33.5% (113) of the respondents while 224(66.5%) were second line healthcare workers.

Figure 1 summarizes the concerns, stress related symptoms and related behaviors identified by healthcare professionals following COVID-19 outbreak. Most common responses were being afraid to go home because of fear of infecting family (72.1%) and fear of getting infected with Corona Virus (66.8%) and investing majority of free time reading or watching Corona related information (36.8%).

257(76.3%) noticed staff around them, not complying with Infection control procedures. Reasons identified included unavailability of equipment required (257, 91.5%), psychological response such as denying risk or simple rebellion (78, 27.8%), inadequate communication (72, 25.6%) and technical difficulties (69, 24.6%).

The prevalence of GAD, depressive symptoms, acute stress disorder and Insomnia and were 36.2%, 30%,

Figure 1: Stress Related Symptoms & Behaviours Identified by HCWs during COVID-19
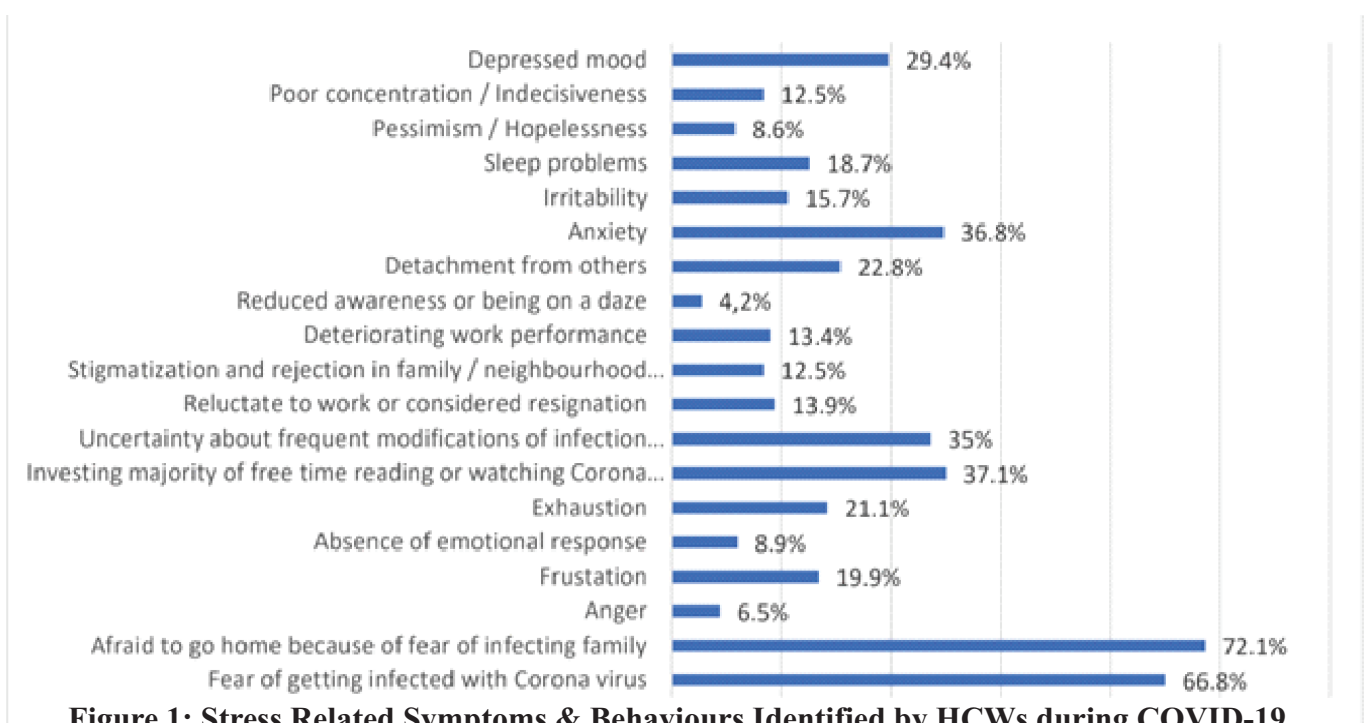
27.9% &1.5% respectively. The median (IQR) scores on the PHQ-9 (depression), the GAD-7 (anxiety) and the ISI (insomnia), for all respondents were 4.0 (2.0-10.0), 5.0 (1.0-9.0), and 3.0(0-7.0), respectively. Participants, who were female, working on frontline, and junior staff members had higher scores in anxiety symptoms compared with men, second-line health care workers, and senior staff. (Table 1)

Compared with senior staff, junior staff had higher scores on depression and insomnia (p = .001). Frontline healthcare workers also had higher scores on depression symptoms (p= .008). No differences in designation or gender for scores of depression, anxiety and insomnia was noted. (Table 1).

Table 1: *Scores of Depression, Anxiety, Insomnia & Acute Stress Questionnaire in Total Cohort and Subgroups*

Scale	Total Score Median (IQR)	Occupation Median (IQR)			Gender Median (IQR)			Working Position Median (IQR)			Seniority Median (IQR)		
		Physicians	Nurses & Paramedical staff	p. value	Men	Women	p. value	Frontline	Second line	p. value	Senior staff	Junior Staff	p. value
PHQ-9 Depression symptoms	4.0 (2.0-10.0)	5.0 (2.0-10.0)	4.0 (1.0-11.0)	.580	4.0 (2.0-10.0)	5.0 (2.0-11.0)	.154	6.0 (2.0-12.0)	4.0 (2.0-9.0)	.008*	3.0 (1.0-7.0)	4.0 (2.0-10.0)	.001*
GAD-7, anxiety symptoms	5.0 (1.0-9.0)	4.0 (1.0-9.0)	6.0 (1.0-11.0)	.270	4.0 (1.0-9.0)	5.0 (2.0-9.0)	.05*	6.0 (2.0-9.0)	4.0 (1.0-8.0)	,035*	3.0 (0.0-7.0)	5.0 (2.0-9.0)	.001*
ISI, Insomnia symptoms	3.0 (0-7.0)	4.0 (1.0-7.0)	1.0 (0-6.0)	.374	3.0 (0-8.0)	3.0 (1.0-6.0)	.538	3.0 (0-8.0)	3.0 (0-7.0)	.365	1.0 (0-6.0)	4.0 (1.0-7.0)	.001*

Abbreviations: PHQ-9, The 9-item Patient Health Questionnaire: GAD-7, 7-item Generalized Anxiety Disorder: ISI, 7-item Insomnia Severity Index: IQR, Interquartile Range.
* p value statistically significant.

Table 2: *Severity Categories of Depression, Anxiety, Insomnia, and stress Measurement in total Cohort and Subgroups*

Severity Category	Total No (%)	Occupation No (%)			Gender No (%)			Working Position No (%)			Seniority No (%)		
		Physicians	Nurses & Paramedical staff	p. value	Men	Women	p. value	Frontline	Second line	p. value	Senior staff	Junior Staff	p. value
PHQ-9 Depression symptoms													
Normal	170(50.0)	133(49)	38(52.2)	.894	81(50.9)	87(48.9)	.686	47(41.6)	123(54.9)	.010*	53(63.1)	117(46.2)	.014*
Mild	75(22.3)	60(22.5)	14(20.9)		56(35.2)	52(29.2)		24(21.2)	51(22.8)		19(22.6)	56(22.1)	
Moderate	65(19.3)	54(20.2)	11(16.4)		19(11.9)	28(15.7)		38(29.2)	32(14.3)		9(10.7)	56(22.1)	
Severe	27(8.0)	20(7.5)	7(10.4)		3(1.9)	11(6.2)		9(8.0)	18(8.0)		3(3.6)	24(9.5)	
GAD-7, anxiety symptoms													
Normal	168(49.9)	133(49.8)	35(52.2)	.150	81(50.9)	87(48.9)	,133	50(4.2)	118(52.7)	.185	56(66.7)	112(44.3)	.005*
Mild	108(32)	60(22.5)	14(20.9)		56(35.2)	52(29.2)		36(31.9)	72(32.1)		19(22.6)	89(35.2)	
Moderate	47(13.9)	54(20.2)	11(16.4)		19(11.9)	28(15.7)		22(19.5)	25(11.2)		7(8.3)	40(15.8)	
Severe	14(4.2)	20(7.5)	7(10.4)		3(1.9)	11(6.2)		5(4.4)	9(4.0)		2(2.4)	12(4.7)	
ISI, Insomnia symptoms													
Absence	257(77.4)	204(77.0)	50(78.1)		119(74.8)	138(79.8)		82(73.1)	175(79.2)		69(83.1)	188(75.5)	
Subthreshold	70(21.1)	56(21.1)	4(21.9)	.713	37(23.3)	33(19.1)	.537	26(23.4)	44(19.9)	.319	13(15.7)	57(22.9)	.354
Moderate	5(1.5)	5(1.5)	0(0)		3(1.9)	2(1.2)		3(2.7)	2(0.9)		1(1.2)	4(1.6)	
Severe	0(0)	0(0)	0(0)		0(0)	0(0)		0(0)	0(0)		0(0)	0(0)	
Acute Stress Questionnaire													
Met Criteria for Acute Stress Disorder	101(30.0)	91(34.1)	10(14.9)	.005*	50(31.4)	51(28.7)	.330	38(33.6)	63(28.1)	.298	20(23.8)	81(32.0)	.155

Abbreviations: PHQ-9, The 9-item Patient Health Questionnaire: GAD-7, 7-item Generalized Anxiety Disorder: ISI, 7-item Insomnia Severity Index
* P value statistically significant.

Regarding severity of measurements and related factors, front line workers experienced more severe symptom of depression: [e.g Moderate Depression among frontline workers vs second-line workers: 38 [29.2%] vs 32 [14.3%]; p = .014] but not on other variables. Compared with senior staff working in hospital, junior staff were more likely to have severe symptoms of depression (24[9.5%]vs 3 [3.6%]; p = .014), anxiety (12[4.7%] vs 2 [2.4%]; p = .005), but not insomnia. Physicians had significantly higher prevalence of Acute stress disorder compared to nurses and paramedical staff (91[34%] vs 10[14.9]; p=.005). (Table 2)

Binary logistic regression analysis revealed that, being a junior staff member was linked with symptoms of depression and anxiety. Working in the frontline was also noted to be an independent risk factor for depression and anxiety (depression: OR, 2.41; 95% CI, 1.45-4.01;p = .001) (Table 3).

Discussion

In studies done following previous outbreaks of similar illnesses such as the outbreak of SARS-CoV (2002-2004) and MERS CoV in 2012, the incidence of psychological symptoms such as anxiety, insomnia, emotional distress, fears of being infected and/or infecting their families was raised.[7,16] HCWs caring for patients during the Ebola virus outbreak of 2014 also reported some psychological symptoms although not as intense as those following CoV related illness.[17] A very recent study from China on the psychological effects of COVID-19 illness on HCWs indicated high risk of multiple mental health symptoms including anxiety, depression, insomnia and psychological distress.[7]

The majority of our respondents (79%) were physicians with most of the rest being nurses and a few paramedical staff. 75% of respondents were junior staff members. The most common concerns of these HCWs were being afraid to go home for fear of infecting their families with COVID-19 illness and fear of getting infected themselves. Women, frontline health care workers and junior staff reported experiencing more anxiety, depression and insomnia symptoms with physicians reporting more acute stress symptoms compared to nurses and paramedical staff. Being a junior staff member was associated with more severe symptoms of depression and anxiety (but not insomnia) and being a frontline worker treating COVID-19 patients also was found to be an independent risk factor for depression. The results of our study are in line with recent studies of psychological symptoms in the medical workforce treating COVID-19 patients starting with Wuhan, China, where the virus originated and similar to prior findings of the psychological impact of CoV illness including SARS CoV and MERS CoV.[7,11] As with those studies, our

Table 3: *Risk Factors for Mental Health Outcomes Identified by Binary Logistic Regression Analysis*

Variable	No of cases/ total respondents in category(%)	Adjusted OR (95%CI)	p. Value
PHQ-9 Depression symptoms			
Gender			
Women	54/178(30.3)	1[Reference]	.153
Men	40/159(25.2)	.68(.4-1.15)	
Designation			
Nurses/ Paramedical staff	18/67(26.9)	1[Reference]	.714
Doctors	76/267(28.5)	1.12(.59-2.13)	
Seniority			
Senior Staff	12/84(14.3)	1[Reference]	.001**
Junior Staff	82/253(32.4)	3.02(1.53-5.98)	
Working Position			
Second line	50/224(22.3)	1[Reference]	.001**
Frontline	44/113(38.9)	2.41(1.45-4.01)	
GAD-7, Anxiety symptoms			
Gender			
Women	70/178(20.8)	1[Reference]	.359
Men	52/159(15.4)	0.79(,48-1.29)	
Designation			
Nurses/ Paramedical staff	32/67(47.8)	1[Reference]	.070
Doctors	90/267(33.7)	0.59(.34-1.04)	
Seniority			
Senior Staff	21/84(25.0)	1[Reference]	.005**
Junior Staff	101/253(39.9)	2.28(1.28-4.06)	
Working Position			
Second line	69/224(30.8)	1[Reference]	.001**
Frontline	53/113(46.9)	2.21(1.36-3.58)	
ISI, Insomnia symptoms			
Gender			
Women	2/178(1.2)	1[Reference]	.92
Men	3/159(1.9)	1.08(.17-6.68)	
Seniority			
Senior Staff	1/84(1,1)	1[Reference]	0.84
Junior Staff	4/253(1.6)	1.24(.13-11.54)	
Working Position			
Second line	2/224(0.8)	1[Reference]	.27
Frontline	3/113(2.6)	2.76(.45-16.99)	

Abbreviations: PHQ-9, The 9-item Patient Health Questionnaire: GAD-7, 7-item Generalized Anxiety Disorder: ISI, 7-item Insomnia Severity Index.OR, Odds Ratio; CI, Confidence Interval. ** p value statistically significant

study found more physicians and frontline workers exhibiting psychological sequelae of caring for COVID-19 patients. This is natural given that not only are frontline medical workers more exposed to the risk of COVID-19 infection themselves, they also have to deal with the sickest patients including those at greatest risk of dying from the illness. In areas where the case fatality ratio from COVID-19 has been high, for example in Lombardy, Italy, it would be expected that psychological stress on medical workers would be more extreme and would result in greater distress.[18]

In a pattern that has been repeated all over the world including in the United States, ever increasing numbers of suspected and confirmed cases begins to overwhelm existing medical resources and personnel leading to exhaustion and burnout especially in frontline medical workers. Lack of medical supplies including specific drugs, Personal Protective Equipment (PPE), negative media coverage and a feeling of being inadequately supported leads to increasing psychological distress.[7] In our study as well, lack of appropriate protective equipment and inadequate training and communication on how to utilize the scarce equipment available was a major factor in medical staff not complying with infection control procedures thus placing them at high risk for getting infected themselves. There is also the matter of HCWs being called upon to make decisions regarding rationing of scarce resources which also leads to distress including 'moral injury' potentially predisposing HCWs to later development of post-traumatic stress disorder.[8,19] While confirmed COVID-19 cases in our region are still relatively low, the government of Pakistan has warned that this can change rapidly in the next few weeks leading to the same problems seen previously in other regions and countries affected by COVID-19.[2]

The study has various limitations. Our study was limited to one hospital in Lahore, Pakistan. The government of Punjab province has designated other hospitals in the province as regional referral centers for COVID-19 cases and further studies should extend our findings to those centers as well. Most of the respondents (79%) were physicians while only 19.9% were nurses with a handful of paramedical/allied health staff. Further studies should attempt to enlarge the number of non-physicians HCWs in their sample especially nurses since they would be expected to bear the burden, along with physicians' of providing direct care to the sickest COVID-19 patients. Further longitudinal studies should evaluate the persistence of mental health symptoms, if any, beyond the duration of the acute COVID-19 pandemic. Realizing the high level of stress related symptoms among healthcare workers, King Edward Medical University and affiliated hospitals administration has established dedicated staff support services to help doctors, nurses and allied professionals during the pandemic situation. This is necessary and is a form of Emotional Personal Protective Equipment (EPPE), which is needed just as much as COVID-19 related Personal Protective Equipment. Provision of such EPPE is essential to allow HCWs to function at their best during this global health emergency.

To conclude, our study documents the high psychological distress experienced by HCWs caring for COVID-19 patients in a large tertiary care center in Lahore, Pakistan. HCWs especially physicians and frontline workers (women more than men) experience considerable psychological distress while caring for COVID-19 patients. It is imperative to provide adequate psychosocial support for HCWs during a crisis situation such as COVID-19. Failure to do so can significantly impair the functioning of HCWs and compromise patient care.

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