

Psychological impact of managing COVID-19 patients among doctors: A pre- and post-survey study

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ABSTRACT

Objective: In any struggling healthcare system, it is always the frontline workers – doctors, nurses, and paramedical staff—that are affected first. This study aimed to assess the psychological impact—*anxiety, stress, depression, and post-traumatic stress disorder (PTSD)*—among doctors working in COVID-19 wards and the underlying triggers in a public hospital in Karachi.

Methods: Pre- and post-survey methodologies were adopted. Post-graduate trainees working in COVID-19 isolation facilities from April till September 2020 were interviewed before starting their one-month rotation and after completing it. The psychological impact was assessed using two standard instruments—*Depression Anxiety and Stress 21 (DASS-21)* and the *Impact of Event Scale-Revised (IES-R)*. Data were entered and analyzed through SPSS version 22.0.

Results: For 100 doctors, the mean score for stress, anxiety, stress, and depression on DASS-21 and PTSD on IES-R significantly increased after the rotation ($p < 0.01$). The mean score of depression and IES-R was higher in younger (<28 years) doctors ($p \leq 0.05$). Married doctors scored higher on anxiety and IES-R ($p \leq 0.05$). Doctors who were not willfully performing their duties scored worse on all measures of DASS-21 and IES-R ($p < 0.01$). Doctors facing family resistance scored significantly higher on stress, anxiety, and IES-R ($p < 0.01$).

Conclusion: Working in COVID-19 facilities is imparting a negative impact on the psychological health of doctors. Healthcare administration should be aware of this psychological distress and should introduce mental health aid at administrative levels to prevent a mental health epidemic among care providers.

Key words: anxiety, COVID-19 pandemic, depression, healthcare providers, severe acute respiratory syndrome coronavirus 2, stress, post-traumatic stress

INTRODUCTION

It was on the last day of 2019 when a pneumonia-like illness of unknown cause was reported to the Country Office of the World Health Organization (WHO) in China. The outbreak was discovered to be caused by a novel virus—coronavirus. This outbreak was declared a Public Health Emergency of International Concern on January 30, 2020. Since then, almost 110 countries and territories across the globe have reported cases of coronavirus disease. On February 11, 2020, WHO announced a name for the new coronavirus disease: COVID-19.¹

The first two cases of COVID-19 from Pakistan were reported to WHO on March 11, 2020. Both were positive for travel history and were immediately isolated and managed.² Since then, there has been a rapidly surging trajectory observed in Pakistan. By the end of 2 months after the first two cases, as of

April 28, 2020, there are 14,000+ cases in Pakistan which include both people who have traveled from other regions and also those who have not traveled.³

Pakistan has a struggling healthcare system with almost 70 percent input from the private sector and 73 percent out-of-pocket payments.⁴ In times of healthcare emergencies such as the COVID-19 pandemic, the first ones to be affected are almost always the frontline workers. A healthcare system includes doctors, nurses, and paramedical staff. According to an official statement, per the update of June 30, 2020, 5,367 healthcare providers (HCPs) have been infected with COVID-19 in Pakistan; of these 3,275 (61.0 percent) are doctors.⁵ These medical care providers who have contracted the infection in line of their work and constantly fear transferring it to their families and other care providers who are exposed to and in direct contact with the confirmed and suspected COVID-19 cases are highly vulnerable to mental health problems including excessive worry, fear, bereavement, trauma, and post-traumatic stress. The underlying triggers of this psychological pressure are hypothesized to be a high risk of infection, inadequate personal safety gear, isolation, exhaustion from long working hours, lack of contact with family, and witnessing their colleagues succumbing to the infection.⁶

We still have little literature from Pakistan highlighting the psychological impact of this pandemic on its care providers and the factors making the HCPs vulnerable to anxiety, stress, depression, and post-traumatic stress disorder (PTSD) while dealing with this highly contagious infection. This study aimed to assess the psychological impact among post-graduate trainee doctors working in COVID-19 wards of a public hospital in Karachi.

MATERIAL AND METHODS

As the number of COVID cases rapidly increased in Pakistan, especially Karachi, a state-wide strict lockdown was put in place from April 1, 2020, which was gradually eased in phases till August 2020. As the daily cases spiked during this period, all tertiary public, as well as some private hospitals, were under emergency. COVID-19 testing booths, triage, outpatient facility, and inpatient facilities including

multiple wards, high dependency units (HDU), and intensive care units (ICU) were established. Dr. Ruth K. M. Pfau Civil Hospital is among the three large tertiary care hospitals in Karachi that responded to the pandemic. The hospital established a COVID-19 testing center, a triage, and converted three of its inpatient wards for mild to moderate COVID-19 patients comprising 135 beds including 90 HDU beds. The already functional ICU was reallocated for COVID-19 with a capacity of 12 beds.

For all of these isolation wards, post-graduate trainees working in different departments were summoned. These trainees were employed by the hospital under the national four-year residency/specialization program—Fellow of College of Physician and Surgeons (FCPS). They were provided with a brief training regarding the disease and its management as per WHO guidelines, and then they worked to manage COVID-19 patients under the supervision of infectious diseases consultants and fellows. Post-graduate trainees rotated in COVID-19 facilities for one month during which they performed 24-hour duties every fourth/fifth day which averaged six to seven duties during the rotation.

We designed a pre- and post-survey study to assess the psychological impact of working in COVID-19 isolation facilities among our post-graduate trainees from April till September 2020. The consecutive non-probability sampling technique was adopted and all trainees rotated in the COVID-19 isolation facilities were approached to participate at two instances—one at the start of their rotation and the second when their rotation ended. Trainees who were unavailable to be followed up (and unable to be tracked for the second phase of data collection) and trainees who did not perform their duties in the COVID-19 facility for at least two or more 24-hour duties due to any personal or professional reason were excluded from the study.

Informed consent was obtained from the participants after providing the details of the study. A semi-structured questionnaire was constructed, in two parts (pre- and post-rotation), for data collection. It included the sociodemographic profile of the participants and two standard scales—Depression Anxiety

and Stress 21 (DASS 21)⁷ and Impact of Event Scale-Revised (IES-R).⁸

DASS-21 is a set of three self-report scales designed to measure the emotional states of depression, anxiety, and stress. Each of the three DASS-21 scales contains seven items, divided into subscales with similar content. Scores for depression, anxiety, and stress are calculated by summing the scores for the relevant items. The DASS items are scored on a 4-point scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time). Scores on each of the three scales are multiplied by 2 and then categorized as normal, mild, moderate, severe, and extremely severe. For depression: normal 0–9, mild 10–13, moderate 14–20, severe, 21–27, and extremely severe 28+. For anxiety: normal 0–7, mild 8–9, moderate 10–14, severe, 15–19, and extremely severe 20+. For stress: normal 0–14, mild 15–18, moderate 19–25, severe, 26–33, and extremely severe 34+.⁷

IES-R is an easily administered self-report questionnaire. It is an appropriate instrument to assess the subjective response to a specific traumatic event, especially in the response sets of intrusion (intrusive thoughts, nightmares, intrusive feelings and imagery, and dissociative-like re-experiencing), avoidance (numbing of responsiveness, avoidance of feelings, situations, and ideas), and hyperarousal (anger, irritability, hypervigilance, difficulty concentrating, and heightened startle). It has 22 questions. Each question is rated on a 5-point Likert scale with 0 indicating “not bothersome at all” and 4 indicating “extremely bothersome.” Although there is no specific cutoff score, scores higher than 24 are of concern; the higher the score the greater the concern for PTSD and associated health and well-being consequences.

Data were entered and analyzed through SPSS version 22.0. Mean and standard deviation (SD) were calculated for quantitative variables. Frequency and percentage were calculated for qualitative variables. A chi-square test was applied after stratification for the comparison of categorical variables. A paired sample *t*-test was applied to compare the mean scores of DASS and IES-R before and after rotation.

An independent sample *t*-test was applied for the comparison of means. P-value <0.05 was considered significant.

RESULTS

Participant characteristics

In this study, 100 post-graduate trainees completed the questionnaire before and after their rotation in the COVID-19 isolation facility. Among these, 27 (27 percent) were males and 73 (73 percent) were females. There were 28 (28 percent) trainees from the department of internal medicine, 23 (23 percent) from neurology, 22 (22 percent) from cardiology, 14 (14 percent) from dermatology, and 13 (13 percent) from psychiatry department. Fourteen (14 percent) trainees were in their final year of training, 27 (27 percent) in their third year, 25 (25 percent) in their second year, and 34 (34 percent) in their first year of training. Their mean age was 28.90 ± 2.32 years (range: 26–34 years). There were 68 (68 percent) single and 32 (32 percent) married trainees. The trainees performed a mean of 6.99 ± 1.00 duties in their one-month rotation.

Comparison of DASS-21 and IES-R scores before and after COVID facility rotation

Before initiation of the COVID-19 facility rotation, the mean score of stress on DASS was 8.90 ± 6.53 which increased to 20.41 ± 9.25 ($p = 0.000$). Mean anxiety levels increased from 4.06 ± 3.14 before rotation to 11.01 ± 5.13 ($p = 0.000$). Mean depression before rotation was 11.38 ± 5.46 which increased to 14.77 ± 6.01 ($p = 0.000$). The mean IES-R score before rotation was 11.41 ± 7.79 which increased to 28.29 ± 15.25 ($p = 0.000$).

DASS-21 scores and IES-R scores were then categorized according to their severity and presented in Table 1. An increase in the severity of stress after COVID facility rotation showed a weak statistical significance ($p = 0.049$). Comparatively, depression and anxiety showed strong statistical differences in pre- and post-survey ($p < 0.01$).

IES-R scores of the participants were also compared before and after completion of COVID-19 facility rotation as shown in Table 2. Before initiation of rotation, none of the participants reported a

Table 1: Comparison of stress, anxiety, and depression on DASS-21 before and after the completion of COVID-19 facility rotation

Stress before rotation, n (percent)	Stress after rotation n (percent)					Total	p-value
	None	Mild	Moderate	Severe	Extremely severe		
None	24 (32.9)	14 (19.2)	23 (31.5)	2 (2.7)	10 (13.7)	73 (100)	0.049
Mild	3 (13.6)	1 (4.5)	7 (31.8)	3 (13.6)	8 (36.4)	22 (100)	
Moderate	1 (20.0)	0	3 (60.0)	0	1 (20.0)	5 (100)	
Total	28 (28.0)	15 (15.0)	33 (33.0)	5 (5.0)	19 (19.0)	100 (100)	
Anxiety before rotation n (percent)	Anxiety after rotation n (percent)					Total	p-value
None	Mild	Moderate	Severe	Extremely severe			
None	28 (34.6)	0	44 (54.3)	0	9 (11.1)	81 (100)	0.000
Mild	0	1 (5.9)	8 (47.1)	4 (23.5)	4 (23.5)	17 (100)	
Moderate	1 (50.0)	0	1 (50.0)	0	0	2 (100)	
Total	29 (29.0)	1 (1.0)	53 (53.0)	4 (4.0)	13 (13.0)	100 (100)	
Depression before rotation n (percent)	Depression after rotation n (percent)					Total	p-value
None	Mild	Moderate	Severe	Extremely severe			
None	22 (29.7)	7 (9.5)	38 (51.4)	4 (5.4)	3 (4.1)	74 (100)	0.015
Mild	2 (8.3)	8 (33.3)	10 (41.7)	4 (16.7)	0	24 (100)	
Moderate	0	0	1 (50.0)	1 (50.0)	0	2 (100)	
Total	24 (24.0)	15 (15.0)	49 (49.0)	9 (9.0)	3 (3.0)	100 (100)	

Note. Italic are of statistical importance.

Table 2: Comparison of IES-R score before and after the completion of COVID-19 facility rotation

IES-R score before rotation n (percent)	IES-R score after rotation n (percent)		Total	p-value
	24 or less	More than 24		
24 or less	40 (44.0%)	51 (56.0%)	91 (100%)	0.008
More than 24	0	9 (100%)	9 (100%)	
Total	40 (40.0%)	60 (60.0%)	100 (100%)	

Note. Italic are of statistical importance.

score >24. The transition from a score of 24 or less to more than 24 was statistically significant between the groups ($p < 0.01$).

To understand the sociodemographic factors influencing the DASS-21 and IES-R scores in our sample, the correlation was established as shown in Table 3. Gender did not impact any DASS-21 or IES-R post-survey score in our sample. The mean score of depression and IES-R was higher in younger (<28 years) participants ($p \leq 0.05$). Single participants scored lower on anxiety and IES-R as compared to married ones ($p \leq 0.05$). Participants who were not willfully performing their duties scored worse on all measures of DASS-21 and IES-R as compared to those

performing with their own will ($p < 0.01$). A similar pattern was seen where family resistance was high. These participants scored significantly higher on stress, anxiety, and IES-R as compared to those who were not struggling with family resistance ($p < 0.01$) (Table 3).

DISCUSSION

Our study demonstrated a statistically strong increase in scores of depression, anxiety, and PTSD among HCPs after performing in COVID isolation wards and a statistically weak increase in stress scores. Younger participants scored higher on depression and PTSD, married participants scored higher

Table 3: Correlation of post-survey DASS-21 and IES-R scores with the sociodemographic profile of the participants

Characteristics	Stress	Anxiety	Depression	IES-R score
Gender				
Male	20.62 ± 9.67	11.92 ± 5.81	14.62 ± 5.09	27.88 ± 17.20
Female	20.34 ± 9.16	10.69 ± 4.88	14.82 ± 6.33	28.43 ± 14.63
p value	0.896	0.295	0.880	0.876
Age in years				
Less than 28	20.05 ± 5.83	10.67 ± 2.52	16.17 ± 5.07	32.29 ± 11.32
28 or above	20.67 ± 11.13	11.26 ± 6.41	13.76 ± 6.47	25.40 ± 17.07
p value	0.741	0.572	<i>0.048</i>	<i>0.025</i>
Marital status				
Single	19.65 ± 7.97	9.74 ± 3.93	15.12 ± 6.34	25.88 ± 12.57
Married	22.03 ± 11.48	13.72 ± 6.30	14.03 ± 5.25	33.41 ± 19.01
p value	0.231	<i>0.000</i>	0.402	<i>0.021</i>
Duties performed willingly				
Yes	14.61 ± 5.44	7.39 ± 4.06	11.00 ± 6.06	12.30 ± 6.04
No	22.14 ± 9.47	12.09 ± 4.94	15.90 ± 5.55	33.06 ± 13.85
p value	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>	<i>0.000</i>
Family resistance				
Yes	21.17 ± 8.95	11.16 ± 5.12	15.10 ± 5.97	29.86 ± 14.33
No	8.50 ± 4.88	8.67 ± 5.16	9.67 ± 4.45	3.67 ± 3.01
p value	<i>0.001</i>	0.251	<i>0.031</i>	<i>0.000</i>

Note. Italic are of statistical importance.

on anxiety and PTSD, participants who were unwillingly performing the duties scored higher on all four parameters, and participants whose family showed resistance scored higher on stress, depression, and PTSD. The results of pre- and post-surveys remain consistent with other studies.^{9,10} Among Italian HCPs, as many as 50 percent reported post-traumatic stress, 25 percent reported depression, 22 percent reported perceived stress, and 20 percent reported anxiety.⁹ Several reasons could be attributed to the rise in psychological distress in HCPs such as concern for their health, for the health of their family, and loved ones, loss of control, and increase in vulnerability due to the uncertain nature of the virus and the rapidly changing information regarding its properties.¹¹ Besides, lack of proper protective gear, changes in working conditions, an influx of COVID cases, as well as being isolated may also contribute toward psychological distress.¹²

Similarly, sociodemographic factors also had a huge impact. Both males and females were affected

equally. This is in contrast to other studies that showed that women were at a generally increased risk for mental illnesses.^{9,13} Perhaps, the overwhelming majority of females being present on the floor prompted a camaraderie among the female HCPs, thereby making them resilient. Willingness to perform duties also had an impact as it was noted that participants who willfully agreed to work reported fewer psychological symptoms compared to participants who were not willing to perform their duties due to better emotional preparedness as a result of making the decision themselves, hence equipping themselves with the knowledge that they need to survive in the ward.¹⁴ A similar pattern was seen for family resistance as doctors with unsupportive families were more likely to experience symptoms of anxiety and depression, thereby emphasizing the role that a strong support system plays in such situations and how the lack of one can have a detrimental effect on the well-being of the HCPs.¹⁵ The resistance shown by families is not

surprising, especially for a government-owned hospital in a country like Pakistan, which neither ensures safety and security of the doctors nor provides any additional incentives in monetary terms or in kind.

HCPs have always been the most exposed group among the population, working at odd hours, long duty times, and competitive post-graduate training with vigorous schedules and assignments. However, with the current pandemic and subsequent psychological burden, it has become evident that strict measures need to be taken to provide HCPs with relevant professional support. First, adequate disinfection facilities along with proper protective gear should be made available immediately. Second, symptoms of anxiety and depression should be noted early on so that psychological intervention can take place as soon as possible to encourage post-traumatic growth and to prevent further psychological disorders such as PTSD, substance abuse, and severe depression, among others.^{16,17} Educating HCPs regarding palliative care and grief management in addition to facilitating access to proactive psychologists will also help reduce the mental health burden tremendously. Some ideas that have shown promise but may require further research include ensuring safety and security of the doctors and boosting their morales by monetary benefits and social recognition for their efforts.

Although, this study has substantially contributed toward highlighting the mental health dilemma being faced by the frontline COVID-19 warriors in a low-income country, it has its limitations too. First of all, the sample size was small and only one hospital setting was included. Next, the data were collected online, and the bias that some people may choose to withhold certain information was there. There was also a risk of recall bias as participants may not accurately remember their feelings at the time. Hence, the authors recommend more research in this area with a robust methodology to accurately estimate the magnitude of this problem.

CONCLUSIONS

Working in COVID-19 facilities is imparting a negative impact on the psychological health of trainee doctors. Healthcare administrative teams should be

aware of the potential for the COVID-19 outbreak to elevate the risk of psychological distress among doctors. Therefore, swift actions need to be taken to prevent the occurrence of a mental health epidemic among care providers.

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