



Estimation of Prevalence and Comparing the Levels of Stress, Anxiety, Depression, and Psychological Impact Before and After COVID-19 Lockdown Among Front Line Health Care Workers

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Abstract

The main objective of the study is to estimate the prevalence and compare the levels of psychological impact, anxiety, depression, and stress experienced by the frontline health care workers (HCWs) during the lockdown and post lockdown periods at Apollo Institute of Medical Sciences and Research, Hyderabad, India. All participants involved in the study were evaluated by using depression, anxiety and stress scale 21, the impact of event scale revised scale for post-traumatic stress disorder (PTSD), and a standardized questionnaire. During the lockdown period, the score for depression was observed mean scores to be more in front desk people (2.70) followed by pharmacists and technicians (2.60) and security (2.28) in the lockdown period. During the lockdown, the highest levels of anxiety were seen in security staff (4.72) and housekeeping (4.8), with a considerable increase after the lockdown situation. During the lockdown period, the mean score of pharmacists and technicians (10.33) were more stressed than other HCWs, and the second-highest levels of stress were observed in security (10.11) and front desk workers (10.09), respectively. Our results show that there was a worsening of the psychological impact of the pandemic and an increase in PTSD, stress, anxiety, and depression among HCWs. Female gender, pharmacists, and technicians were the most vulnerable group to develop psychiatric comorbidities.

Keywords

frontline health care workers, psychological impact, depression, post-traumatic stress disorder, and anxiety.

Introduction

Today, the term ‘Coronavirus disease or COVID-19’ is well known to each and every corner of the globe and by all age groups. Countries have implemented lockdown as a safety measure to combat the spread of the virus. India has imposed a phase-wise lockdown for the safety of its citizens. In this context, the government has taken stringent measures to execute complete lockdown. This is a novel coronavirus, which was first detected in Wuhan, China in late 2019. As it has been spreading at a quick pace, the World Health Organization (WHO) declared it as a global emergency on 30 January 2020 (1). The rate of transmission of the COVID-19 virus from country to country and human to human are exceptionally higher as the virus reached more

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than 213 countries, areas, or territories within a few months. As of 31 January 2021, more than 1 crore confirmed cases of COVID-19, including 2,209,195 deaths globally (2). Amid this global pandemic, countries are talking about the urgent need for trained doctors, and the critical need for personal protective equipment, respirators, and need for testing. Doctors and medical staff are the only people on the frontline handling the infected patients and risking their lives. There was no mention of the effects of mental health therapies on health care professionals in any of the research that used them. The only data available to estimate the impact of the pandemic on the mental health of health care professionals came from low-methodological-quality longitudinal survey studies that tracked changes over time. In another study, surveyed health care professionals before and during the outbreak, but provided no more chronological information. Participants in the study comprised both frontline workers and those who had unknown exposure to COVID-19 (3).

It has been reported that nearly 570,000 health workers across the region of America have fallen ill and more than 2,500 have succumbed to the virus. In another survey among members of the ID-IRI (Infectious Diseases International Research Initiative), 37 countries participated, where the data showed the number of a substantial number of a substantial number of health care workers have lost their lives (4). As of October 2020, Spain has reported 40,957 infections, Italy has reported 30,927 infections, Germany has reported 13,941 infections, and 8691 infections of COVID reported in Ireland. In India, the trend of infected medical staff is becoming a big concern due to the poor availability of medical aids. Over 20.2 lakh HCWs have been tested for the COVID-19 (5). Facing this critical situation, HCWs on the frontline are at risk of developing psychological distress and other mental health symptoms. But no one is talking about a potential mental health crisis faced by HCWs during this pandemic. The ongoing COVID-19 pandemic is now greatly inducing fear among the HCWs and a timely understanding of mental health status is urgently needed for society. Many issues concerning social, health, finance and a myriad of psychological comorbidities sprout up during lockdown and exacted a huge toll on human lives. Though people have adopted resilient measures during the initial phases of the COVID-19 crisis after lockdown situations were even more worsened with an increase in the number of COVID-19 infective cases, which in turn increases the psychological burden among HCWs. So, this study aims to compare levels of psychological impact, anxiety, depression, and stress during the lockdown and post lockdown of COVID-19 pandemic among the HCWs at Apollo Institute of Medical Sciences and Research (AIMSR), Hyderabad, India.

Methodology

Study Design

A prospective questionnaire-based cross-sectional survey was conducted in the voluntarily participated individuals by the

Department of Psychiatry at AIMSR, Hyderabad, during the stipulated time – 4 months: May 2020 to August 2020.

Recruitment of Participants

HCWs such as doctors, nurses, and other hospital staff (pharmacists, administrators/front desk staff, technical staff, housekeeping staff, and security) working in the hospital environment of AIMSR during the COVID-19 outbreak were involved in the study. The study was approved by AIMSR Research Committee, Hyderabad and the approval number ID is AIMSR/IRB/RC/2020/04/004. Only the consented participants were recruited in the study.

Questionnaire Survey

It was a comparative cross-sectional survey study to assess the psychological impact of HCWs during lockdown and post lockdown. Participants were evaluated by using specific standardized questionnaires. A demographic characteristic was assessed by socio-demographic proforma. Mental health status was measured using the widely employed and standard depression, anxiety, and stress scale 21 (DASS-21). The DASS-21 is a 21-item system that provides independent measures of depression, stress, and anxiety with recommended severity thresholds. Cut-off scores such as >9 , >7 , and >14 are indicative of a positive screen for depression, anxiety, and stress, respectively. Impact of event scale revised (IES-R) scales is a 22-item self-report instrument that measures the subjective distress caused by traumatic events. It has 3 subscales (intrusion, avoidance, and hyperarousal), which are closely affiliated with post-traumatic stress disorder (PTSD) symptoms. A total IES-R cut-off score of 24 is used to classify PTSD as a clinical concern.

Sample Size and Statistical Analysis

The required sample size is 345, with an estimated absolute precision of 5% and a level of significance of 5%, and a 10% non-response rate of 10%. The pre-production sample (PPS) method was used to achieve equal proportions from each group of people in the sample size, which included multiple categories of people. For socio-demographic parameters, descriptive statistics were calculated. The number of respondents per response was divided by the total number of responses for each question to calculate response percentages. The mean and standard deviation (SD) of the DASS-21 subscales and IES-R scores were calculated. The associations were investigated using the chi-square test. The *P*-value was set at .05. The statistical analysis in this study was performed using SPSS windows version 24.0.

Results

Socio-Demographic Characteristics

A total of 345 health care employees from a tertiary care hospital took part in the study; the majority of the participants

were females (66.4%), aged 50 years (326 [94.5%]), married (339 [98.3%]), and had a high school education or less (256 [74.2%]). Eighty-eight (22.5%) of the 345 responders were doctors, 122 (35.4%) were nurses, and 15 (4.3%) were pharmacists and technicians. Other non-medical staff included in the study were housekeeping (64 [17.7%]), security (33 [10.4%]), and front desk staff (23 [17.7%]). Among the participants, 60% were residents of the green zone (GZ), 22% were from the orange zone (OZ), and 18% were from the red zone (RZ).

The mean IES-R scores for PTSD during lockdown were nearly the same in both genders (males: 23.28; females: 23.48; $P = .017$), although there was a higher level of distress in females (29.24) than in males after lockdown. In post lockdown conditions, both males and females experienced significant increases in sadness, anxiety, and stress mean scores as compared to the lockdown period. When compared to the lockdown period (RZ = 23.42; OZ = 23.12; GZ = 23.56), respondents from the RZ, OZ, and GZ had higher PTSD levels in post lockdown times (RZ = 28.19, OZ = 28.17, GZ = 29.09). According to the above table, there has been a significant increase in depression, anxiety, and stress levels in persons from all zones from lockdown to post lockdown scenarios, implying an increase in psychological comorbidities in this COVID pandemic. In the post lockdown phase, persons living in the GZ had the highest levels of stress (11.67), anxiety (6.62), depression (5.9), and PTSD (29.1) (Table 1).

Comparisons of PTSD Among HCWs During Lockdown and Post Lockdown. During the lockdown, the highest levels of PTSD levels have been observed in pharmacists and technicians (25.27) followed by nurses (23.81) and front desk people (23.57). The lowest levels of PTSD were observed in security people. In post lockdown also, pharmacists and technicians were the people who had the highest levels of PTSD

(31.60), followed by nurses (29.98) and housekeeping (29.71) (Table 2). The PTSD scores in doctors increased from 23.42 to 26.32 indicative of increased traumatic stress.

Comparisons of Depression among HCWs During Lockdown and Post Lockdown. As expected, depression was observed to be more in front desk people (2.70) followed by pharmacists and technicians (2.60) and security (2.28) in the lockdown period. On the contrary lowest levels of depression were seen in nurses (1.89), followed by doctors (2.27). After lockdown, there has been a considerable increase in depression levels in all HCWs, where pharmacists and technicians (6.53) were more depressed followed by housekeeping (6.33) and nurses (6.18). However, doctors were the least depressed (4.88).

Comparison of Anxiety among HCWs During Lockdown and Post Lockdown. During the lockdown, the highest levels of anxiety were seen in security staff (4.72) and housekeeping (4.8), with a considerable increase after the lockdown situation. The lowest levels of anxiety were seen in nurses (4.0) followed by doctors (4.2) during lockdown but after lockdown, doctors had low anxiety (5.6) levels compared to other HCWs

Comparison of Stress Levels among HCWs During Lockdown and Post Lockdown. During the lockdown period, pharmacists and technicians (mean = 10.33) were more stressed than other HCWS, and second-highest levels of stress were observed in security (10.11) and front desk workers (10.09), respectively. The lowest mean stress levels were seen in doctors (8.85). Over a course of time, that is, after lockdown, there has been an increase in stress levels in all HCWS, where the highest levels were seen in pharmacists and technicians (mean = 12.40; $P = .147$) along with housekeeping staff (mean = 12.38; $P = .098$).

Table 1. Comparison of Mean Scores of Psychiatric Comorbidities with Socio-Demographic Variables.

	PTSD		Depression		Anxiety		Stress	
	During lockdown	Post lockdown	During lockdown	Post lockdown	During lockdown	Post lockdown	During lockdown	Post lockdown
Gender								
Male	23.28	27.64	2.30	5.18	4.42	6.13	9.51	10.63
		$P = .017$		$P = .840$		$P = .988$		$P = .195$
Female	23.48	29.24	2.07	5.98	4.25	6.74	9.11	11.83
		$P = .664$		$P = .459$		$P = .624$		$P = .772$
Location								
RZ	23.42	28.19	2.15	5.66	4.35	6.50	9.05	11.15
		$P = .116$		$P = .625$		$P = .670$		$P = .459$
OZ	23.12	28.17	2.08	5.30	4.32	6.13	8.92	11.05
		$P = 0.609$		$P = .658$		$P = .565$		$P = .743$
GZ	23.56	29.09	2.17	5.89	4.30	6.72	9.49	11.67
		$P = .655$		$P = .459$		$P = .482$		$P = .810$

Abbreviations: PTSD, post-traumatic stress disorder; RZ, red zone; OZ, orange zone; GZ, green zone.

Table 2. Comparison of Mean DASS-21 and IES-R Scores Among HCWS in Lockdown and Post Lockdown.

Occupation	PTSD During lockdown	Depression Post lockdown	Anxiety During lockdown	Stress Post lockdown	During lockdown	Post lockdown	During lockdown	Post lockdown
Doctors	23.42 <i>P</i> = .866	26.32	2.27 <i>P</i> = .305	4.88	4.22 <i>P</i> = .165	5.6	8.85 <i>P</i> = .824	10.27
Nurses	23.81 <i>P</i> = .832	29.98	1.89 <i>P</i> = .832	6.18	4.0 <i>P</i> = .781	7.0	9.01 <i>P</i> = .669	12.12
Pharmacists and technicians	25.27 <i>P</i> = .0354	31.60	2.60 <i>P</i> = .18	6.53	4.5 <i>P</i> = .206	7.2	10.33 <i>P</i> = .147	12.40
Housekeeping	22.28 <i>P</i> = .395	29.71	2.08 <i>P</i> = .250	6.33	4.8 <i>P</i> = .670	7.2	9.16 <i>P</i> = .708	12.38
Security	23.14 <i>P</i> = .018	28.22	2.28 <i>P</i> = .952	5.22	4.7 <i>P</i> = .235	6.7	10.11 <i>P</i> = .098	11.03
Front desk	23.57 <i>P</i> = .455	27.22	2.70 <i>P</i> = .290	5.09	4.9 <i>P</i> = .35	5.7	10.09 <i>P</i> = .51	9.04

Abbreviations: DASS-21, depression, anxiety and stress scale 21; IES-R, impact of event scale revised; HCW, health care worker; PTSD, post-traumatic stress disorder.

During the lockdown, HCWs show the highest levels of PTSD showing mean and SD scores of the IES-R scale (23.4 ± 5.25). The second-highest post lockdown mean and SD values were observed with DASS-21-sub-scale scores of stress (11.4 ± 2.12) and anxiety (6.5 ± 1.44), respectively. The lowest mean and SD scores were seen in depression (5.7 ± 1.76). The data also show a substantial number in mean and SD values of PTSD (23.4 ± 5.25), depression (2.2 ± 1.2), anxiety (4.3 ± 1.4), and stress (9.2 ± 2.27) during lockdown situations with highly significant *p* values (*p* = .00), marking the impact of COVID-19 on HCWs (Table 3).

The current study found that all of the HCWs had psychiatric morbidities, with the severity of symptoms worsening from lockdown to post lockdown (see Table 4).

Depression showed the greatest worsening (90.4%) in the post lockdown period, with no recovery rate. Anxiety levels increased by 74.5% with only a 1.7% recovery. PTSD symptoms worsened by 64.6%, with a recovery rate of only 0.6%. Stress scores (62.2%) showed the least amount of deterioration, indicating a faster recovery rate (5.8%).

Discussion

As a matter of fact, HCWs became the only savers to face COVID-19 patients for the sake of disease control and to reduce the spread. However, HCWs indeed fear of becoming

infected during the treatments leads to various psychological complications. This study proves that there has been an increase in mean IES-R and DASS-21 scores during the post lockdown period implicating increased psychiatric comorbidities among all the HCWs. Consistent with findings in previous studies of HCWs functioning during pandemics, more than half (total of 56.88% including male and female) of our sample of HCWs endorsed PTSD with worsening of severity of symptoms from lockdown to post lockdown period (6). The data clearly shows that the increased workload and the constant contact with COVID-19 patients are related to the levels of increased psychological aspects. Both the genders were equally affected with depression, anxiety, and stress over a while except that females had higher levels of anxiety in post lockdown period owing to the social, domestic, and financial crisis. This finding corresponds to a previous multicentric study (7), which found that women were at higher risk of depression (8–16). It is known from prior studies that the female population has a greater impact on mental health (17). The current study results are consistent with another previous study (18), being both male and female gender were associated with being at risk for PTSD and anxiety (9,10,19,20), respectively. However, our study shows that females were associated with an increased risk for PTSD (21), and stress, anxiety, and depression, respectively. HCWs faced the largest brunt of

Table 3. Mean and SD Values of Psychological Variables Over Time.

Psychological variables	N value	During lockdown	Post lockdown	CI	t value	P-value
PTSD	345	23.4 ± 5.25	28.5 ± 4.00	−5.7981 to −4.4019	15.2	.0001
Depression	345	2.2 ± 1.2	5.7 ± 1.76	−3.7253 to −3.2747	30.4	.0001
Anxiety	345	4.3 ± 1.4	6.5 ± 1.44	−2.4124 to −1.9876	20.9	.0001
Stress	345	9.2 ± 2.27	11.4 ± 2.12	−2.5285 to −1.8715	13.3	.0001

Abbreviations: SD, standard deviation; CI, confidence interval; PTSD, post-traumatic stress disorder.

Table 4. Gradual Shift of Psychological Variables Over Time Among HCWs.

	Recovered people (%)	People with no change of symptoms	Worsening of symptoms
PTSD	0.6	35.4	64.6
Depression	0	9.6	90.4
Anxiety	1.7	23.8	74.5
Stress	5.8	32.0	62.2

Abbreviations: HCW, health care worker; PTSD, post-traumatic stress disorder.

McNemar-Bowker test – 167.4, p -value = .000.

the COVID-19 pandemic. Amongst them, intermediate technical staffs such as pharmacists and technicians have the highest mean scores of DASS-21 and IES-R both in lockdown and post lockdown situations, possibly due to direct exposure to affected individuals and infected materials. These results are consistent with the study conducted in Singapore during the COVID-19 pandemic where non-medical HCWs have a higher psychological impact than medical HCWs (22). Yet in another study also concluded that intermediate technical staff was at higher risk of anxiety and PTSD (23). One possible reasoning was that HCWs with an intermediate staff received more work responsibility, as well as longer work time in the wards than HCWs with senior staff. From the above study, it is also inferred that nurses and doctors had less prevalence of IES-R and DASS-21 scores compared to other HCWs during and post lockdown. Our findings are consistent with those of a recent COVID-19 study demonstrating that frontline nurses had significantly lower vicarious traumatization scores than non-frontline nurses and the general public (24). This could be attributed to enough awareness of infection control measures and extensive preparedness to combat the situation among them.

Study Limitations

First, it has a limitation in the generalization of our findings. There is also a lack of longitudinal follow-up. The long-term psychological implications of this population are worth further research.

Conclusion

HCWs, the frontline warriors, face not only mental and physical hardships but also additional burdens of responsibilities. Our study highlights that, over some time from lockdown to post lockdown, there was a worsening of the psychological impact of the pandemic and an increase in PTSD, stress, anxiety, and depression among HCWs. Female gender, pharmacists, and technicians were the most vulnerable group to develop psychiatric comorbidities. Our results from the study help to implement specific targeted treatment and

organizational strategies to improve the mental health and overall wellness of the individual HCW. The findings from the study also help to formulate specific educational interventions which include counselling services and treatment strategies with the psychiatrists targeting vulnerable HCWs. This should be taken into consideration during health care planning to tackle the unexpected and inexperienced pandemic situations in India.


Declaration of Conflicting Interests

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Supplemental Material

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