

A Study of Perception of Stress in Health-Care Workers Involved in the Management of COVID-19 Patients in Tertiary Care Center during COVID-19 Pandemic First Wave

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Abstract

Introduction: Health-care providers on the front line who are involved in managing patients with COVID-19 are at risk of developing emotional stress and other mental health symptoms. It is imperative to study mental stability in these health-care providers, which helps take the necessary steps to improve mental health during the pandemic period. **Aims and Objectives:** This study aimed to study the perception of stress in health-care workers (HCWs) involved in managing COVID-19 patients during the first wave. **Materials and Methods:** This was a prospective cross-sectional study conducted from March 2020 to July 2020. After obtaining informed consent over the phone, the Google Form link was sent to participants whose app number and response were accepted until July 15th, 2020. Google Form consisted of patient demographic characteristics and ten-item Perceived Stress Scale (PSS). Two hundred and seventy-two responses were analyzed. **Results:** We contacted 470 HCWs, of which 272 (57%) response was obtained, of which 145 (53.3%) were females, and 127 (46.7%) were males. The mean age of the participants was 30.44 years (standard deviation = 5.01). The mean PSS score was 17.73 ± 5.33 . Among participants, 136 (50%) were postgraduate students, 93 (34%) were nursing officers, and 43 (15.8%) were staff. Majority of HCWs, about 75.7% (206), had moderate stress, followed by low stress in 21.0% (57) and high stress in 3.3% (9). There was a statistically significant correlation between the perceived stress score and the total number of working days. **Conclusion:** The study conducted during the COVID-19 pandemic showed that three-fourths of HCWs had moderate stress, which has a significant impact on physical, mental, and psychological health. Females had more stress compared to male participants. Health-care providers in IP services had significant stress compared to HCWs in outpatient services.

Keywords: COVID-19, health-care workers, mental health, psychological distress, stress

INTRODUCTION

COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was declared as a pandemic disease by WHO on March 11, 2020. It is a highly infectious disease, with droplets and fomites being the primary transmission mode.^[1] It has globally affected 84,474,195 people resulting in 1,848,704 deaths as per the WHO report on January 5, 2021.^[2] In India, the first case was reported from Kerala in the 1st week of February 2020. Since then, it has rapidly spread across the state resulting in 9,997,272 confirmed cases and 150,114 deaths as of January 5, 2021.^[3] Facing this critical situation, health-care providers on the front line who are directly involved in managing patients with COVID-19 are at risk of developing emotional stress and other mental health

symptoms. Disease morbidity, mortality, workload, social stigma, social media coverage, and lack of administrative support may further contribute to the mental burden of these health-care workers (HCWs). Previous studies have studied the impact of pandemic disease on the mental health of the community and health-care providers, especially during H1N1 and SARS.^[4] Few studies have been published on the

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psychological impact of COVID-19 on HCWs from China, but only measurable studies have been published from India. It is imperative to study the mental health status of these HCWs as it will affect performance and attendance at the workplace, which will, in turn, affect patient care. This study provides information on the severity of the psychological impact of COVID-19. This, in turn, helps to take necessary steps to improve mental health during the pandemic period.

Aims and objectives

This study aimed to study the perception of stress in HCWs involved in managing COVID-19 patients during the COVID-19 pandemic first wave.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted in the Department of Pulmonary Medicine, Victoria Hospital, Bangalore Medical College and Research Institute. We have ethical committee clearance for the study from March 2020 to July 2020. Inclusion criteria were (1) HCWs between the ages 18 and 49 years, (2) HCWs (including postgraduates, assistant and associate professors, and nursing staff) involved in the outpatient department and inpatient management of COVID-19 patients, and (3) HCWs consenting to participate in the study. Exclusion criteria were (1) not willing to give consent and (2) history of psychiatric illness or on psychiatric medications.

After obtaining approval and clearance from the institutional ethics committee, the HCWs fulfilling the inclusion criteria were enrolled for the study after obtaining informed consent over the phone. A Google Form was created consisting of demographic characteristics (i) age, sex, designation, department, involvement in outpatient care or in-patient care, and total working days, and (ii) 10-item Perceived Stress Scale (PSS). Google Form link was sent to the participant's WhatsApp number, and the response was accepted till July 15th, 2020. All the responses were recorded in the author's Gmail account. Our hospital was designated 1000-bedded COVID hospital in the city. All the working staff such as doctors, nursing officers, and paramedical staff were posted for COVID duty for 7 days and quarantined for 14 days. Ten-item PSS was assessed 7 days after COVID duty.

The PSS is the most widely used psychological instrument for measuring the perception of stress. The questions were easy to understand, and the reply alternative was simple to grasp. Furthermore, the questions are universal and not explicit to any race, sex, and continent. The questions in the PSS ask about feelings and thoughts during the last month. Respondents are asked how often they felt a certain way in each case. PSS scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1, and 4 = 0) to the four positively stated items (items 4, 5, 7, and 8) and then summing across all scale items. Higher the score, the higher the stress level, which needs to be addressed accordingly. A score between 0 and 12 represents a medium-low level of stress. This result has no

clinical significance. A score between 13 and 19 represents a medium-high stress level and may have clinical significance. A score over 20 represents a high-stress level and may have clinical significance. A short 4-item scale can be made from questions 2, 4, 5, and 10 of the PSS 10-item scale.^[4-6] The PSS is one of the most widely used psychological instruments for measuring stress perception. It is a measure of the degree to which situations in one's life are appraised as stressful. Items were designed to tap how unpredictable, uncontrollable, and overloaded respondents find their lives.^[6] The PSS has been widely used in India in a smaller population, so it is yet to be validated in a wider population.

Statistical analysis

Descriptive variables (age, total working days, and PSS) were presented as mean \pm standard deviation (SD). Categorical variables (gender, designation, department, duty, and PSS) were presented as counts and percentages. Chi-square test used to compare clinical variables in between-group differences for gender, designation, department, and geographic location (outpatient/inpatient). The Pearson correlation test was used to analyze the correlations between the study variables.^[7]

RESULTS

We contacted 470 health-care workers (including staff, postgraduate students, and nursing officers) through phone and briefly explained the study, and consent was taken during the same conversation. The questionnaire link was sent to all consented participants through WhatsApp. Two hundred and seventy-two (57%) response was received, of which 145 (53.3%) were females and 127 (46.7%) were males. The mean age of the participants was 30.44 years (SD = 5.01) [Table 1]. The mean PSS score was 17.73 \pm 5.33. Among participants, 136 (50%) were postgraduate students, 93 (34%) were nursing officers,

Table 1: General characteristics of the study population (n=272)

Characteristic	n (%)
Age (mean \pm SD)	30.43 \pm 5.01
Total working days (mean \pm SD)	8.38 \pm 5.44
PSS (mean \pm SD)	17.73 \pm 5.33
Low stress	57/272 (21.0)
Moderate stress	206/272 (75.7)
High stress	9/272 (3.3)
Male	127/272 (46.7)
Female	145/272 (53.3)
Designation	
Assistant professor	24/272 (8.8)
Associate professor	2/272 (0.7)
Nursing staff	93/272 (34.2)
Postgraduate trainee	136/272 (50)
Professor	2/272 (0.7)
Senior resident	15/272 (5.5)

SD: Standard deviation, PSS: Perceived Stress Scale

and 43 (15.8%) were the staff. According to the order of the department, 93 (34.2%) were from nursing, 42 (15.4%) were from internal medicine, 30 (11.0%) were from anesthesia, 20 (7.4%) were from pulmonary medicine, 21 (7.7%) were from surgery, and 66 (24.2%) from other various departments. We looked into stress scores based on department, 80 (29.4%) from the nursing department, 29 (10.7%) from medicine, 25 (9.2%) from anesthesia, 17 (6.3%) from pulmonary medicine, and 15 (5.5%) from surgery had significant stress score. Other HCWs from anatomy, biochemistry, physiology, pathology, microbiology, pharmacology, dermatology, ENT, OBG, ophthalmology, orthopedics, pediatrics, physiology, radiology, and radiotherapy had a low-stress score ranging from 10 to 22.

We had outpatient and inpatient COVID services. 79.4% (216) of HCWs from whom we received responses worked in inpatient care, 15.8% (43) worked in outpatient care, and 4.8% (13) worked in both setups. The majority of HCWs, about 75.7% (206), had moderate stress, followed by low stress in 21.0% (57) and high stress in 3.3% (9). When looking into gender distribution, 43.3% of females (118/145) and 35.6% males (97/127) had significant perceived stress levels. Taking all HCWs together in this study, postgraduate students had more moderate (33.8%)-to-high-stress levels (1.8%), as shown in Table 2. Most of the nursing officers had low-to-moderate-stress levels compared to doctors participants who had a high level of stress (3.3%). The majority were from pulmonology, followed by the ophthalmology and nursing department, as shown in Table 3. HCWs who worked in inpatient services had significant stress compared to participants who worked in outpatient services 59.2% versus 12.8%, as shown in Table 4. Even high-stress levels were more prevalent in participants who worked in inpatients service than participants who worked in outpatient services. Pearson correlation showed statistically significant differences observed in respect to perception of stress and the departments of work, highest in nursing, and lowest being in the OBG, anatomy, physiology, radiology, and radiotherapy. There was a statistically significant correlation between perceived stress score and the total number of working days being highest in participants who worked more than 7 days. Pearson Chi-square test showed statistically significant differences observed in respect to perception of stress and the departments of work where nursing staff had significant stress levels ($P = 0.02$). There was a statistically significant correlation present between the perceived stress score and the total number of working days ($P = 0.00$).

DISCUSSION

We studied the mental health of HCWs in the tertiary care center during the first wave of the COVID-19 pandemic. We sent a questionnaire to 470 HCWs and received valid responses from 272 people. The overall response rate in our study was 57% compared to 54.9% in a study conducted in Japan.^[8] Allied health-care team, ancillary workers, and associate professors were among the nonresponders. Nonresponding was ignorance about digital Google Forms, change in phone numbers, language, and work schedule. Other studies conducted in China and Jordan showed a response rate of 88% and 93%, respectively.^[9,10] The mean score of the PSS was 17.73 ± 5.3 , which was lower than an Indian study by Das *et al.* (PSS- 20.14 ± 5.2) 11. The mean PSS score ranged from 18 to 24 among HCWs compared to 15–19 among the general population in the international studies done in China, Arab, and Spain.^[11-15] In our study, the majority were female staff and had significant stress compared to male participants. In a study conducted in West Bengal, females (96.9%) demonstrated higher (moderate or severe) stress than males (80.6%), this difference being statistically significant ($P = 0.005$).^[16] Similarly, studies showed higher scores among female HCWs and females in the general population.^[11,17] Three-fourths of participants had moderate-stress scores, the highest observed among physicians, followed by nursing staff. However, in other studies, there was no significant difference between physicians and nurses in mean score of PSS (23.46 ± 6.94 versus 23.70 ± 6.18).^[18] In our study, a majority had moderate-level stress, but 9/272 (3.3%) had high-level stress with a PSS score >20 . High-level stress was observed among pulmonary medicine staff (3/9), followed by ophthalmology staff (2/9) and nursing staff (2/9). Moderate level of stress was noticed among medicine department staff, anesthesia, nursing, and surgery staff. Staff who worked in COVID wards had significantly moderate-to-high-level stress compared to staff who worked in COVID outpatient services. Pearson Chi-square test showed statistically significant differences observed in respect to perception of stress and the departments of work where nursing staff had significant stress levels ($P = 0.02$).

There was a statistically significant correlation between the perceived stress score and the total number of working days ($P = 0.00$). Participants who worked more than 7 days had significant stress compared to staff who worked <7 days. The COVID-19 pandemic has significantly affected health-care providers mentally, physically, and socioeconomically. Our study observed that all the HCWs experienced stress during

Table 2: Perceived Stress Scale score and designation of health-care workers

PSS score	Assistant professor, <i>n</i> (%)	Associate professor, <i>n</i> (%)	Nursing staff, <i>n</i> (%)	Postgraduate trainee, <i>n</i> (%)	Professor, <i>n</i> (%)	Senior resident, <i>n</i> (%)	Total, <i>n</i> (%)
High stress	2 (0.7)	0	2 (0.7)	5 (1.8)	0	0	9 (3.3)
Low stress	3 (1.1)	0	11 (4.0)	39 (14.3)	0	4 (1.5)	57 (21.0)
Moderate stress	19 (7.0)	2 (0.7)	80 (29.4)	92 (33.8)	2 (0.7)	11 (4.0)	206 (75.7)

PSS: Perceived Stress Scale

Table 3: Perceived Stress Scale score and departments of health-care workers

Departments	PSS score		
	High, n (%)	Low, n (%)	Moderate, n (%)
Anesthesia	0	5 (1.8)	25 (9.2)
Anatomy	0	0	1 (0.4)
Dermatology	0 (1.1)	1 (0.4)	1 (0.4)
ENT	0	5 (1.8)	3 (1.1)
Medicine	1 (0.4)	12 (4.4)	29 (10.7)
Microbiology	0	0	4 (1.5)
OBG	0	0	1 (0.4)
Ophthalmology	2 (0.7)	2 (0.7)	7 (2.6)
Orthopedics	0	8 (2.9)	3 (1.1)
Pathology	0	2 (0.7)	6 (2.2)
Pediatrics	0	3 (1.1)	3 (1.1)
Pharmacology	0	1 (0.4)	7 (2.6)
Physiology	0	1 (0.4)	2 (0.7)
Pulmonary medicine	3 (1.1)	0	11 (6.3)
Radiology	1 (0.4)	0	1 (0.4)
Radiotherapy	0	0	1 (0.4)
Surgery	0	6 (2.2)	15 (5.5)
Nursing	2 (0.7)	11 (4.0)	80 (29.4)

PSS: Perceived Stress Scale, ENT: Ear, nose, and throat, OBG: Obstetrics and Gynaecology

Table 4: Perceived Stress Scale score and workplace of health-care workers

PSS score	IPD, n (%)	OPD, n (%)	IPD + OPD, n (%)	Total, n (%)
High stress	6 (2.2)	1 (0.4)	2 (0.7)	9 (3.3)
Low stress	49 (18.0)	7 (2.6)	1 (0.4)	57 (21.0)
Moderate stress	161 (59.2)	35 (12.9)	10 (3.7)	206 (75.7)

PSS: Perceived Stress Scale, OPD: Outpatient department treatment, IPD: Inpatient department

COVID duty, predominantly female staff, which might affect their patient relationship, performance at the workplace, and mental health. Family members' health, social media, lockdown restrictions, quarantine, and loneliness had further increased the mental stress among HCWs. Our study highlights the need for psychological support, interventions, programs, and regular screening, which could help HCWs to face this pandemic.

CONCLUSION

The study conducted during the COVID-19 pandemic showed that three-fourths of HCWs had moderate stress, which has a significant impact on physical, mental, and psychological health. There is very much need for regular counseling, regular assessment, interventions, and supportive measures for HCWs, which help reduce their stress levels and improve the quality care of COVID-19 patients.

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Conflicts of interest

There are no conflicts of interest.

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