



Research article

The mental health of the health care professionals in India during the COVID-19 pandemic: a cross-sectional study

Short title: COVID-19 and its impact on mental health

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Abstract: The COVID-19 pandemic has resulted in dramatic challenges to healthcare systems worldwide. There has been an increased awareness to protect frontline workers from COVID-19 exposure and its consequences. To assess the prevalence of healthcare professionals in India during the COVID-19, a cross-sectional web-based survey was conducted with healthcare professionals from

medical colleges and hospitals from different states across the country. The study comprised 772 healthcare professionals aged ≥ 18 years. The main outcome measures studied were anxiety, depression, and stress. Among the healthcare professionals, 37.17%, 33.68%, and 23.7% were reported to have anxiety, depression, and stress respectively. The physicians, female, aged population, and professionals sleeping less than 7 hours are more prone to psychological problems. The results of this study predict the high levels of anxiety, depression, and stress among healthcare professionals in different states of India. Increased COVID-19 cases, high pressure, workload, and lack of training are the main reasons for the psychological problems in healthcare professionals. Proper strategies must be followed in healthcare settings to reduce the burden of stress.

Keywords: COVID-19; healthcare professionals; anxiety; depression; stress

1. Introduction

A novel coronavirus, named SARS-CoV2, emerged in early 2019 from Wuhan, China, has led to a fast spread outbreak of COVID-19 pneumonia. Due to its widespread transmission, World Health Organization (WHO) recognized it as a pandemic and declared COVID-19 as a public health emergency of international concern [1]. The first case of COVID-19 in India was reported on 30 January 2020 in Kerala. Currently (as of 12 June 2021), India has the largest number of confirmed cases in Asia and the second highest in the world (after the United States) with 29.3 million reported cases of COVID-19 infection and the third-highest number of COVID-19 deaths (after the United States and Brazil) at 367,081 deaths [2]. During this study period i.e. 10 June 2020 to 20 February 2021, the number of cases in India was 276,583 with death cases of 7,745 and 10,977,387 with death cases of 156,212 respectively [2].

The general public undertakes such safety measures, but health care professionals are unfortunately left exposed to deal with the many issues that arise due to this situation. Firstly, due to a huge load of cases as a result of the pandemic, health care professionals face increasingly long working hours, often with limited resources and a dubious infrastructure [3]. Secondly, they face physical discomfort and sometimes even breathing difficulties while wearing personal protective equipment (PPE), which is essential to keep them safe from exposure to the virus [3].

Many studies have reported that mental health implications for professionals involved in healthcare during epidemics and pandemics are long-lasting. Even after some time had transpired after such events, high levels of stress, anxiety, depression, and even post-traumatic stress disorder (PTSD) were observed in many cases [4]. Healthcare workers, as a result, are susceptible to experiencing psychological and mental problems. Thus, in this critical situation, the mental health of health care professionals is considered a crucial public health concern.

A study conducted in India to evaluate the mental health of doctors working in COVID-19 wards reported having depression and anxiety [5]. Another study carried out on health care professionals in India showed to have acute severe anxiety, stress, and depression [6]. Therefore, it is exceedingly important to identify the healthcare professionals who are at high risk of acquiring mental problems and are more likely to suffer from anxiety, depression, and stress in this pandemic, so that help can be provided where and when needed [3]. The current study aimed to assess the mental health of the health care professionals in India during the COVID-19 pandemic.

2. Materials and methods

2.1. Study design and settings

A cross-sectional study was conducted during the lockdown and post-lockdown period for a complete duration of 8 months (10 June 2020 to 20 February 2021). This study was conducted in various medical colleges and hospitals of different states of India using the convenience sampling method. The healthcare professionals were those employed in various departments and were physicians, nurses, lab professionals, and others (pharmacists, radiographers, dentists, physiotherapists, and medical social workers).

2.2. Study participants and sample size

This study included health care professionals over 18 years of age who agreed to participate in this study by online. Healthcare professionals who were quarantined or on leave or unable to participate due to physical or emotional distress were excluded. The purpose of the study was explained in the written form attached to the questionnaire. The Google form link was successfully sent to the healthcare professionals via emails. Adequacy of the sample was determined by using the formula $n = (Z_{1-\alpha})^2 \times (P(1 - P) / D^2)$, where $Z_{1-\alpha} = Z_{0.95} = 1.96$, P is the proportion of depression, anxiety, and stress among the population (we assumed that depression, anxiety, and stress would be present in 50% of the population) and D is the margin of error (0.05). A minimum of 384 participants would be required to obtain precise estimates of population value as per the formula used.

2.3. Ethical approval

The study was conducted in compliance with the protocol of the Institutional Ethics Committee (IEC). Ethical approval was obtained from IEC before the study dated 03/06/2020 (Subbaiah Institute of Health Sciences, Shivamogga, Karnataka, India). All the participants were provided informed consent electronically before registration.

2.4. Study instruments

The questionnaire used in this study consisted of two sections: (1) demographic and occupational characteristics of the healthcare professionals and (2) the shorter version of the validated depression, anxiety, and stress scale (DASS-21). Demographic data included gender, occupation, age, marital status, sleep duration, contact with suspected COVID-19 patients, contact with confirmed COVID patients, and direct contact with COVID-19 lab specimen.

The 21-item DASS version was administered to measure the depression, anxiety, and stress among healthcare professionals. It is a psychological screening instrument capable of measuring negative emotional states of depression, anxiety, and stress [7]. The DASS scale has demonstrated adequate reliability (ranging from 0.81 to 0.97) and construct validity [8,9]. Each of the three domains comprises seven items scored on a Likert scale from 0–3 (0: did not apply to me at all, 1: applied to me to some degree, 2: applied to me to a considerable degree, 3: applied to me very much). The final score for each sub-scale was multiplied by 2 and used to evaluate the negative emotional states.

Respondents' scores ranging from 0–9 for depression, 0–7 for anxiety, and 0–14 for stress represented the normal category. Higher scores indicated higher depression, anxiety, or stress, which ranged from mild to extremely severe disorder.

2.5. Data analysis

All data were entered in Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA) version 25. Demographic characteristics were summarized using frequencies and percentages. Internal consistency was calculated for DASS-21. We used a t-test to measure the differences in DASS sub-scales according to gender, marital status, sleep duration, contact with suspected COVID patients, contact with confirmed COVID patients, and direct contact with COVID lab specimens. Furthermore, we used one-way analysis of variance (ANOVA) and the post-hoc Bonferroni test to make comparisons of DASS sub-scale scores about profession and age. P-value which was lesser than 0.05 was set as significant statistics.

3. Results

In total, 786 participants filled the questionnaires, of which 14 were incomplete and 772 responses were considered for the analysis of the present study. Approximately 55% of the participants were women and a majority of them were single (60.4%) and physicians by profession (51%). Three hundred and forty-two (44.3%) participants were from the age group of 21–30, and a majority of them (57.3%) slept less than 7 hours. Of them, 32.3% of participants did contact with the suspected COVID-19 patients, 14.2% had contact with confirmed COVID-19 patients and 15.9% had direct contact with COVID-19 lab specimens (Table 1). In the current study, Cronbach's alpha coefficients in depression, anxiety, and stress sub-scales were higher than 0.90.

Figure 1 shows the prevalence of depression, anxiety, and stress among healthcare professionals during COVID-19. Of the total 772, there were 266 (33.68%) participants with depression, which consisted of 63 (8.16%) mild, 104 (13.4%) moderate, and 93 (12.05%) severe depression. Also, 37.18% had different degrees of anxiety, of which about 7% of participants showed mild, 13.7% showed moderate, and 16.45% showed severe anxiety. Concerning stress, 23.7% of participants had stress symptoms, where 6.74% had mild, 7.53% showed moderate and 9.22 showed a severe level of stress.

Table 2 summarizes the comparative analysis of depression, anxiety, and stress scores of healthcare professionals with the demographic and educational variables. With regards to depression, significant differences were recorded among participants from different healthcare professionals ($p < 0.05$). Post hoc tests showed that physicians had a higher level of depression than lab workers ($p < 0.05$) and other health professionals ($p < 0.05$). Significant differences were observed among the healthcare professionals of different age groups ($p < 0.05$). Post hoc tests for ANOVA showed a significant difference in the depression scores of healthcare professionals: 30 years and younger and 41–50 ($p < 0.05$), 31–40 and 41–50 ($p < 0.05$). Healthcare professionals who slept less than 7 hours had higher depression scores than those whose sleep duration was more than 7 hours ($p < 0.05$). Higher depression scores were found in healthcare professionals who had contact with either suspected or confirmed COVID-19 patients in comparison with those without such contact ($p < 0.05$). Additionally, a significant difference was observed between the healthcare professionals who had direct contact with the COVID-19 lab specimen and without such direct contact ($p < 0.05$).

Table 1. Demographic information of participants (n = 772).

Participants characteristics	Frequency	Percentage
Gender		
Male	347	44.9
Female	425	55.1
Profession		
Physicians	394	51.0
Nurses	86	11.1
Lab Professionals	108	14.0
Others	184	23.8
Age		
21–30	342	44.3
31–40	264	34.2
41–50	107	13.9
Above 50	59	7.6
Marital Status		
Married	306	39.6
Single	466	60.4
Sleep Duration		
< 7 hours	442	57.3
7 hours and above	330	42.7
Contact with suspected COVID patients		
Yes	249	32.3
No	523	67.7
Contact with confirmed COVID patients		
Yes	110	14.2
No	662	85.8
Direct contact with COVID Lab specimen		
Yes	123	15.9
No	649	84.1

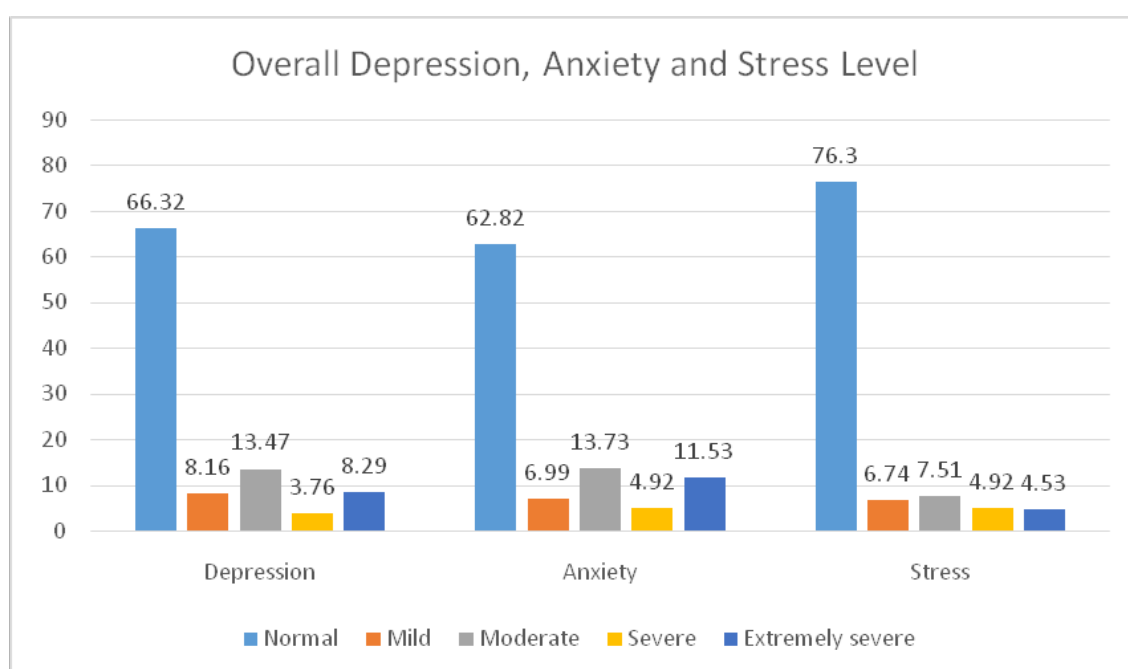
**Figure 1.** Depression, anxiety and stress among healthcare professionals.

Table 2. Comparative analysis of depression, anxiety, and stress based on socio-demographic characteristics (n = 772).

Characteristics	Depression		Anxiety		Stress	
	Mean (SD)	p value	Mean (SD)	p value	Mean (SD)	p value
Gender						
Male	8.29 (20.23)	0.406	7.27 (7.72)	0.387	8.82 (10.28)	0.176
Female	8.90 (10.21)		7.84 (9.68)		9.83 (10.29)	
Profession						
Physicians	10.12 (11.68)	< 0.001 *	9.22 (11.36)	< 0.001 *	11.24 (11.62)	< 0.001 *
Nurses	8.16 (7.19)		8.49 (7.21)		8.67 (7.99)	
Lab Workers	5.93 (7.88)		4.56 (6.80)		6.91 (8.57)	
Others	6.82 (8.60)		5.34 (7.18)		7.15 (8.17)	
Age						
30 and below	8.75 (9.45)	0.018 *	7.68 (8.78)	0.023*	9.46 (9.64)	0.002 *
31–40	9.19 (11.26)		8.28 (10.88)		10.56 (11.19)	
41–50	5.68 (8.17)		4.97 (7.33)		5.98 (8.34)	
Above 50	9.46 (12.12)		8.34 (12.13)		9.76 (11.72)	
Marital Status						
Married	8.78 (10.93)	0.405	7.91 (10.61)	0.225	9.76 (10.89)	0.199
Single	8.15 (9.02)		7.04 (8.10)		8.79 (9.26)	
Sleep Duration						
< 7 hours	9.42 (10.49)	0.005 *	8.33 (9.89)	0.011 *	10.45 (10.51)	0.001 *
7 hours and above	7.34 (9.72)		6.54 (9.50)		7.94 (9.81)	
Contact with suspected COVID patients						
Yes	13.74 (12.73)	< 0.001 *	13.46 (12.46)	< 0.001 *	15.38 (12.18)	< 0.001 *
No	6.05 (7.61)		4.75 (6.38)		6.52 (7.72)	
Contact with confirmed COVID patients						
Yes	17.75 (14.05)	< 0.001 *	17.09 (13.65)	< 0.001 *	18.75 (13.07)	< 0.001 *
No	7.00 (8.52)		5.98 (7.84)		7.82 (8.84)	
Direct contact with COVID Lab specimen						
Yes	10.78 (11.27)	0.008 *	9.58 (10.29)	0.012 *	11.74 (11.11)	< 0.005 *
No	8.10 (9.95)		7.18 (9.54)		8.93 (10.07)	

Note: * significant at 0.05 level.

Regarding anxiety, significant differences were recorded among the participants from different healthcare professionals ($p < 0.05$). In post hoc tests for ANOVA, mean differences were found to be significant among physician and lab workers, physicians and other healthcare professionals, nurses, and other healthcare professionals ($p < 0.05$). Furthermore, significant differences were recorded among the healthcare professionals of different age groups ($p < 0.05$). Post hoc ANOVA tests showed a significant difference between the age groups of 31–40 and 41–50 ($p < 0.05$). The mean anxiety scores of the healthcare professionals who slept less than 7 hours had significantly higher than those who slept 7 hours and above ($p < 0.05$). Additionally, the mean anxiety scores were significantly higher among the healthcare professionals who had contact with either suspect or confirmed COVID-19

patients in comparison with those without such contact ($p < 0.05$). Furthermore, there was a significant difference between the healthcare professionals who had direct contact with the lab specimen and those who did not have such contact ($p < 0.05$).

Regarding stress, significant differences were recorded among the participants from different healthcare professionals ($p < 0.05$). Post hoc ANOVA test revealed that the mean scores of physicians were significantly higher than lab workers ($p < 0.05$) and other healthcare professionals ($p < 0.05$). Significant differences were recorded among the healthcare professionals of different age groups ($p < 0.05$). Post hoc ANOVA tests showed a significant difference in the stress scores of healthcare professionals: 30 years and younger and 41–50 ($p < 0.05$), 31–40 and 41–50 ($p < 0.05$). Furthermore, the mean stress scores of the healthcare professionals who slept less than 7 hours were significantly higher than those who slept more than 7 hours ($p < 0.05$). The mean stress scores were significantly higher among the healthcare professionals who had contact with either suspect or confirmed COVID-19 patients or contact with COVID-19 lab specimen in comparison with those without such contact ($p < 0.05$).

4. Discussion

The current study revealed a high prevalence of anxiety (37.17%), depression (33.68%), and stress (23.7%) among healthcare professionals. Extreme severity was observed for anxiety 11.53%, and depression 8.29%, whereas less severity was observed for stress 4.53%. From our results, it has been observed that the female participants are affected more than the male participants in terms of anxiety, depression, and stress respectively. A similar study with 403 participants revealed that healthcare professionals were found to have a moderate rate of anxiety and mild rate of depression and stress, both females and males had moderate anxiety and mild depression and stress [10]. A meta-analysis revealed a high mean score of females (13.14) than males (11.31) in depression [11].

The psychological problems affect the physicians more than the nurse, lab workers, and others. It might be because the physicians have direct dealing with the patients, increased number of positive cases, lack of medical device supplements and medications, heavy workload might also the main reasons for the mental health issues in physicians. Our results have a similar line with an observational study conducted in India with the 300 healthcare (physicians, nurses, and technical staff) and non-healthcare professionals resulted in a high prevalence of anxiety (55.65%) and depression (32.1%) in physicians than the nurses, technicians and non-healthcare professionals [12]. The marital status of the healthcare professionals is also a crucial factor in the development of mental issues, the most common reason is their worry regarding their family members getting infected from them [13]. The healthcare professionals who slept below 7 hours had more psychological problems than the participants sleeping more than 7 hours and above.

The analysis of the impact of psychological problems during COVID-19 was conducted around the world. Two different studies were reported in China, a web-based survey conducted on healthcare professionals confirms the risk of psychological problems acquired during the pandemic conditions in China. Here, the study reports a high prevalence of anxiety (46.04%), depression (44.37%), and insomnia (28.75%) [14]. In another study, the high pressure and workload on healthcare professionals have resulted in a high prevalence of posttraumatic stress (40.2%), anxiety (13.9%), depression (13.6%), and stress (8.6%) respectively [15]. These two studies were conducted in different provinces of China, which has a different set of results associated with psychological problems. Here, different factors have been reported as the causative agent for problems in healthcare professionals such as contact with

the confirmed cases, increased level of mortality, irregular duration of quarantine, short supplies of medical equipment, infection fear, discrimination, and stigma. Mainly, social support and active coping are the important negative factor for psychological problems among healthcare professionals [16,17].

Our previous study on healthcare workers conducted in Trinidad and Tobago, reveals high levels of anxiety 56.2%, depression 42.28%, and stress 17.97% [18]. In North West Ethiopia, a study has resulted in anxiety 64.7%, depression 58.2%, and stress 63.7%. The factors affecting mental health are physical and mental illness, confirmed COVID-19 cases, lack of social support, chronic illness of family members, lack of training and personal protective equipment [19].

Overall, our findings reveal a high prevalence of anxiety, depression, and stress in healthcare professionals in different states of India. Physicians are highly affected by psychological problems than nurses and others in pandemic conditions. These findings are similar to the previously conducted study in India [12]. When compared to males, females are highly prone to mental illness. Older age is also an important factor for anxiety, depression, and stress conditions. Different international studies on healthcare professions during the pandemic falls in the same line which supports the high prevalence of anxiety [12,15]. Healthcare professionals are at high risk of psychological problems due to various factors such as stigma, social discrimination in the working environment, high risk of infection due to direct contact with the patients, afraid of transmitting to the family, increased workload with long working duration, lack of personal protective equipment, social media coverage and uninformed quarantines, lack of training in handling the pressure [3,16,17].

This pandemic condition employs significant mental health issues on healthcare professionals, to handle such pressure and heavy workload certain changes should be made in the healthcare environment. To provide counselling to the healthcare professionals, offering helpline services, assigning shift basis work, make availability of online services for medical assistance, incentives, providing breaks and leisure activities like yoga, exercises, and motivational speeches. Also providing personal protective equipment to all the healthcare professionals, creating public awareness about COVID-19 all these efforts by the government may have a positive impact on mental health issues on healthcare professionals [12].

5. Conclusions

In the present study high levels of anxiety, depression and stress were identified among the healthcare professionals. Here, we have observed the characteristics like the females, physicians, age above 50, and professionals sleeping below 7 hours are more prone to psychological problems. The increased number of confirmed cases, lack of medical equipment, increased level of mortality, stigma, social isolation and infection fear, the heavy workload is the underlying factors for the psychological problems among healthcare professionals. To protect healthcare professionals from being affected by mental stress, certain strategies must be followed within healthcare institutions. Implications of such practices may solve the psychological problems among the healthcare professionals, who are important for the sustainment and efficiency of the healthcare systems in our country.

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Conflict of interest

The authors declare no conflicts of interest in this paper.

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