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# Level of anxiety and depression among health-care professionals amidst of coronavirus disease: A web-based survey from India

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## Abstract:

**BACKGROUND:** The spread of novel coronavirus diseases-2019 (COVID-19) across the world and its associated morbidity and mortality confronted the nations by various means. COVID-19 pandemic had significant psychological effects not only on the general population but also on health-care workers (HCWs). Hence, we aimed to find the level of anxiety and depression among health-care professionals amidst coronavirus.

**MATERIALS AND METHODS:** This is a cross-sectional study conducted on 829 participants including doctors and nurses and other medical staff who were posted in the COVID ward and COVID intensive care unit using a well-structured questionnaire through the Google Forms. The two scales used to measure anxiety and depression among the HCWs were the Hamilton anxiety scale (HAM-A) and the Patient Health Questionnaire (PHQ-9), Cronbach's alpha of HAM A is 0.921 and Cronbach's alpha of PHQ 9 is 0.851. Data analysis was done using SPSS 26, Chi-square test and Fisher's exact test were used to establish the association between categorical independent and dependent variables.

**RESULTS:** The results of this study demonstrate that anxiety and depression were significantly higher in doctors and staff nurses as compared to other medical staff. According to HAM-A, 65.1% of respondents were in the mild category, 22.0% mild to moderate, and 12.9% moderate to severe. The HAM-A ( $P = 0.022$ ) and PHQ-9 ( $P = 0.001$ ) for anxiety and depression respectively were significantly higher in females. The means of the scales got increased after postings in the corona wards.

**CONCLUSION:** Concerning the high occurrence of anxiety and fear among health-care professionals, appropriate psychological/psychiatric intervention necessitates and emphasizes the need to implement urgent measures to prevent further progress to severe mental health disorder.

## Keywords:

Anxiety, coronavirus diseases-2019, depression, health-care workers

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## Introduction

The dramatic debut of coronavirus diseases-2019 (COVID-19) on the global stage has left everyone feeling vulnerable and helpless. COVID-19 pandemic is a medical and social disaster. It is believed to have originated in a wet market of Wuhan, China, and then spread to infect the whole world at an alarming rate.<sup>[1,2]</sup>

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The outbreak of COVID-19 has been substantially influencing the life and living of the people globally, especially after declaration of a global pandemic by the World Health Organization in the 2<sup>nd</sup> week of March 2020.<sup>[3]</sup> As of June 7, 2020, about 6.91 million people were infected with COVID-19, with validated fatality of another 0.4 million worldwide.<sup>[4]</sup> Hence, several countries implemented a range

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of anti-epidemic measures, like restricting journey for foreign nationals, shutting down public spaces, and closing down entire transit systems to contain transmission of highly communicable infections from human to human.<sup>[5]</sup>

Outbreaks of communicable diseases are well known to have noteworthy psychological effects not only on the general public but on health-care workers (HCWs) also. For example, psychological ramifications were observed during severe acute respiratory syndrome (SARS) outbreak where studies depicted acute stress reactions faced by HCWs.<sup>[6]</sup> Evidence from studies performed during the outbreaks of SARS and Ebola showed that HCWs were expected to suffer from undesirable psychological conditions such as fear, anxiety, and depression.<sup>[7]</sup>

HCWs are subjected to the increased amounts of strain during this pandemic. This is because of the nature of their jobs like direct contact and handling of infected patients. This increases fear for contraction of pathogens, risk of transmitting the virus to their family unit, and working under huge pressure because of increased patient load. The rise in the number of cases, mortality, exhaustion of personnel protection equipment, and increased workloads also adds to psychological stress.<sup>[8]</sup> Many HCWs have been reassigned to work inside COVID-19 units outside of their typical medical specialties and proficiency to manage huge workload and the patient volume. In New York, HCWs taking care of COVID-19 cases have been reported to commit suicide.<sup>[9]</sup>

Apart from the pathological and physical effects of diseases on human body, a few symptoms may be attributed to psychological sequelae of these communicable disease outbreaks. Such symptoms have been observed in the SARS and Ebola virus outbreaks.<sup>[6]</sup> Studies have reported 10.0% of HCWs having anxiety, somatization, and feeling depressed as an outcome of working during such outbreaks. A Chinese study recently found that depression, symptoms related to stress, and anxiety were prevalent in 50.7%, 44.7%, and 73.4%, respectively, of their HCWs.<sup>[8]</sup>

The COVID-19 pandemic has been a challenge for the HCWs across the globe when it comes to their mental health, and the situation seen in India is no different. Unfortunately, there is a scarcity of data regarding anxiety, mental health, and stress levels being faced by frontline HCWs in the country. This study aims to assess the level of anxiety and depression among health care professionals amidst of coronavirus Disease.

## Materials and Methods

### Study design and setting

This is a cross-sectional study conducted on 829 participants including doctors and nurses and other medical staff who were posted in the COVID ward and COVID intensive care unit (ICU). The study was performed at the Department of Psychiatry, Hind Institute of Medical Sciences (HIMS), Safedabad. The duration of the study was 2 weeks.

### Study participants and sampling

The sampling method used was complete enumeration process as all the medical professionals who fulfilled the criteria within the stipulated time period of 2 weeks were included. Participants were recruited pan India. A total of 963 HCWs were screened, 119 were deemed unfit to participate in the study and 15 were not fulfilling inclusion–exclusion criteria, and finally, 829 subjects were enrolled for the study.

### Data collection tool and technique

Data were collected using Google Forms. A self-reporting questionnaire was distributed among participants through WhatsApp. The questionnaire was divided into two parts. The first part consisted of basic sociodemographic details of the participants including name, age, sex, marital status, and designation. In the second part, we asked questionnaire based on Patient Health Questionnaire (PHQ-9) and Hamilton Anxiety Scale (HAM-A) for anxiety.

All health-care workers who were willing to participate in the study those HCWs posted in COVID ward or COVID ICU were included in the study, while participants who have not given informed consent, participants with physical illness, and participants with psychiatric illness were excluded from the study.

Participants were given the link of Google Forms via Whatsapp, E-mail, and other social media by the group of investigators. Once the link clicked, participants were briefed about the nature and purpose of the study. Phone numbers of primary investigators were provided so that they could ask any doubts and asked for consent to participate in the survey. Those who had given consent were directed to the questionnaires assessing the above-mentioned factors; otherwise, they were straight-away directed to the submission page. Data were recorded in a semi-structured pro forma on the basis of findings of the Hamilton Anxiety Rating Scale for anxiety level and PHQ for depression.

This is a most widely used instrument for screening depression in primary health care.<sup>[10]</sup> PHQ-9 is a self-measure questionnaire whose Cronbach's alpha is

0.851 and validity is 0.73, each of the 9 items was divided into 4 point degrees of the scale (0 – not at all; 1 – some of the time; 2 – more than half the time; and 3 – nearly every day) in past 2 weeks. The score ranged from 0 to 27.<sup>[11]</sup> PHQ-9 scores were categorized using a cutoff score of  $\geq 5$  indicating the presence of any depressive symptoms and a cutoff score of  $\geq 10$  for the presence of moderate to severe depression.

The HAM-A for anxiety whose, Cronbach's alpha is 0.921 and validity is 0.529–0.727 consists of 14 items, each described by the series of symptoms, and measures both psychic anxiety (psychological distress and mental agitation) and somatic anxiety (physical complaints associated with anxiety). Each item is scored on the scale of 0 (not present) to 4 (severe), with a score range of 0–56 where less than 17 indicates mild severity, 18–24 mild-moderate severity, and  $\geq 25$  moderate severe.<sup>[12]</sup>

The responses of the study participants were then compared among professional rank, gender, and duration of practice. Data analysis was done using SPSS 26 (IBM, Chicago, IL, USA). Descriptive analysis was performed by calculating the frequency and percentages for the categorical variables and mean and standard deviation for continuous variables. The Chi-square test and Fisher's exact test were used to establish the association between categorical independent variables and the categorical dependent variables.  $P < 0.05$  was considered significant for all the tests.

### Ethical consideration

This study has been approved by the Ethics Committee of HIMS (ethics code: IEC/IRB NO: HIMS/IRB/2020-21/1154).

## Results

In this cross-sectional study, 829 participants including doctors and nurses and other medical staff who were posted in the COVID ward and COVID ICU were analyzed on the basis of their anxiety and depression level before and after the posting in the COVID ward.

The mean age of the studied patients in our study was  $30.14 \pm 6.56$  (19–64 years) and the majority of the studied patients were in the age group ranging from 26 to 35 years (52.0%). Males (57.3%) were in majority than females (42.7%). Staff nurse were in majority (28.5%), followed by doctors (18.1%) and paramedical staff (15.0%) [Table 1].

Talking about the other details, majority of the subjects were from private hospitals (73.5%) and 49.5% were married and 39.5% had children. 57.1% had under 10-year old children or above 60-year old persons presently

residing. Only 15.4% had one or the other existing medical problem, whereas very small number, that is 3.4%, had a past history of psychiatric illness [Table 2].

Majority of the studied subjects had none to mild level of anxiety calculated by HAM-A (65.1%) and depression by PHQ-9 (64.7%) followed by mild to moderate level and the least were in the category of moderate-to-severe category in both anxiety and depression groups [Table 3].

In the association of anxiety level with the demographic variables, it was found that the level of anxiety was significantly more in 26–35 age group subjects than other groups. The mean age was also significantly higher in the severe group of anxiety. Males were significantly more affected with anxiety but the level was mild in majority of the males (60.4%), whereas females were significantly more affected with severe level anxiety (53.3%) than mild level (39.6%). On the basis of work title, the doctors had a significantly higher level of severe anxiety (35.5%) than any other working staff [Table 4].

The studied subjects who were married had a significantly higher level of moderate (65.9%) and severe (59.8%) anxiety than mild anxiety (41.9%). In addition, the studied subjects with children had a significantly higher level of moderate anxiety (60.4%) as compared to mild (31.3%) or severe (43.9%) anxiety [Table 5].

When we observed the association between depression level and the demographic variables of the studied subjects, we found that in 26–35 age group, subjects' level of depression was significantly more than other groups. Males had a significantly higher level of mild depression (62.5%), while females had a significantly higher level of severe depression (55.1%) [Table 6].

On the basis of level or severity of depression, no statistically significant difference was seen on the basis of marital status, having children, or type of job unlike anxiety [Table 7].

## Discussion

In this cross-sectional study, 829 participants including doctors and nurses and other medical staff who were posted in the COVID ward and COVID ICU were analyzed on the basis of their anxiety and depression level before and after the posting in the COVID ward. The mean age of the studied patients in our study was  $30.14 \pm 6.56$  years (19–64 years) and the majority of the studied patients were in the age group ranging from 26 to 35 years. Males were in majority than females. About half of the studied subjects were married and more than one-third had children. Those who were married majority had under 10-year-old children or above 60-year

**Table 1: Demographic details (n=829)**

Parameters	Frequency, n (%)
Age	
≤25	234 (28.2)
26-35	431 (52.0)
36-45	139 (16.8)
>45	25 (3.0)
Mean age±SD (minimum-maximum)	30.14±6.56 (19-64 years)
Sex	
Male	475 (57.3)
Female	354 (42.7)
Country working	
India	720 (86.9)
Others	109 (13.1)
Are you presently working in a hospital (yes)	512 (61.8)
When you are supposed to get allotted in COVID-19 department	
I am not supposed to get allotted in COVID-19 department	181 (21.8)
Within a month supposed to get allotted in COVID-19 department	125 (15.1)
Presently working in COVID-19 department	77 (9.3)
Already completed duty in COVID-19 department	57 (6.9)
Not sure/can't say	389 (46.9)
Work title	
Staff nurse	236 (28.5)
Doctor	150 (18.1)
Paramedical	124 (15.0)
Interns/students	91 (11.0)
Nursing teaching faculty	89 (10.7)
Administrative personnel	68 (8.2)
Technician	51 (6.2)
Others	20 (2.4)

SD=Standard deviation, COVID-19=Coronavirus diseases-2019

**Table 2: Other details of the health-care workers (n=829)**

Parameters	Frequency, n (%)
Types of job types of hospital	
Government	220 (26.5)
Private	609 (73.5)
Marital status	
Married	410 (49.5)
Single	380 (45.8)
In a relationship	36 (4.3)
Separated	2 (0.2)
Widow	1 (0.1)
Having children	326 (39.3)
Any under 10 years old children or above 60 years old person presently residing	473 (57.1)
Any existing medical problem	128 (15.4)
Are you suffering from having a past history of any psychiatric illness	28 (3.4)
Do your family members parents siblings kids suffer from having past history	61 (7.4)

old persons presently residing. Majority of the studied subjects had none to mild level of anxiety calculated by HAM-A (65.1%) and depression by PHQ-9 (64.7%) followed by mild to moderate level and the least were in the category of moderate to severe category in both anxiety and depression groups. In the association of anxiety level with the demographic variables, it was found that the level of anxiety was significantly more in

26–35 age group subjects than other groups. The mean age was also significantly higher in the severe group of anxiety. Males were significantly more affected with anxiety, but the level was mild in majority of the males, whereas females were significantly more affected with severe level anxiety than mild level. On the basis of work title, the doctors had a significantly higher level of severe anxiety than any other working staff. The

level of depression was also more in 26–35 age group subjects than the other group. Males had a significantly higher level of mild depression, while females had a significantly higher level of severe depression.

In our study, the level of anxiety and depression was more in doctors followed by nurses, similar findings were there in a study done by Khanal *et al.*<sup>[13]</sup> The level of anxiety and depression in male was significantly higher than in females, similar results were there in a study done by Vahedian-Azimi *et al.*<sup>[14]</sup> In our study, majority of subjects was 26–35 years and majority of them were male and married, similar results were also there in a study done by Jain *et al.*<sup>[15]</sup> As per the findings of an Asian study,<sup>[16]</sup> nurses reported the highest anxiety and fear similar to our study where the level of anxiety and depression was significantly high. The health

workers involved directly in treatment, diagnosis, and care of the patients with COVID 19 are at the risk of developing the mental health symptoms in our study, similar psychological reactions were depicted among HCWs in the previous studies during the 2003 SARS outbreak.<sup>[17,18]</sup>

In our study, majority HCWs were facing anxiety and depression similar to the study done in Nepal where incidence is higher in health workers as compared to the general population. However, according to them, it was higher than found in the recent study performed among the general population during COVID-19 in Nepal.<sup>[19]</sup> The occurrence of depression, anxiety, and insomnia in the present study was lower than the study done in China where the level is much higher than in our study.<sup>[20]</sup> In our study, anxiety was significantly higher in the age group of 26–35 years and females were more severely affected than male patients. Staff nurses and doctors those who were married and having children were significantly more affected than any other medical staff. Suryavanshi *et al.* supported our findings and reported a higher prevalence of moderate-to-severe depression among younger HCWs compared to older HCWs.<sup>[21]</sup> A large number of studies indicate young and female gender health-care providers reporting increased levels of anxiety consistent with the findings of our study.<sup>[7,22]</sup> Female frontline workers had higher levels of stress and burnout compared to men.<sup>[23]</sup> This is because of the accumulation of tasks and their greater

**Table 3: Distribution of patients on the basis of level of anxiety and depression (n=829)**

Anxiety and depression level	Frequency, n (%)
Anxiety group (HAM-A)	
None to mild	540 (65.1)
Mild to moderate	182 (22.0)
Moderate to severe	107 (12.9)
Depression group (PHQ-9)	
None to mild	536 (64.7)
Mild to moderate	215 (25.9)
Moderate to severe	78 (9.4)

HAM-A=Hamilton Anxiety Scale, PHQ=Patient Health Questionnaire

**Table 4: Association of demographic details and anxiety level**

Demographical variables	Anxiety group (HAM-A)			P
	None to mild (n=540), n (%)	Mild to moderate (n=182), n (%)	Moderate to severe (n=107), n (%)	
Age				
≤25	174 (32.2)	39 (21.4)	21 (19.6)	<0.001*
26-35	290 (53.7)	88 (48.4)	53 (49.5)	
36-45	59 (10.9)	51 (28.0)	29 (27.1)	
>45	17 (3.1)	4 (2.2)	4 (3.7)	
Mean age±SD	29.18±6.14	31.86±6.56	32.06±7.62	<0.001**
Sex				
Male	326 (60.4)	99 (54.4)	50 (46.7)	0.022*
Female	214 (39.6)	83 (45.6)	57 (53.3)	
Country working				
India	459 (85.0)	166 (91.2)	95 (88.8)	0.082*
Others	81 (15.0)	16 (8.8)	12 (11.2)	
Work title				
Staff nurse	168 (31.1)	45 (24.7)	23 (21.5)	<0.001*
Doctor	72 (13.3)	40 (22.0)	38 (35.5)	
Paramedical	89 (16.5)	27 (14.8)	8 (7.5)	
Interns/students	68 (12.6)	16 (8.8)	7 (6.5)	
Nursing teaching faculty	55 (10.2)	24 (13.2)	10 (9.3)	
Administrative personnel	48 (8.9)	17 (9.3)	3 (2.8)	
Technician	25 (4.6)	9 (4.9)	17 (15.9)	
Others	15 (2.8)	4 (2.2)	1 (0.9)	

\*χ<sup>2</sup>, \*\*t-test. HAM-A=Hamilton Anxiety Scale, SD=Standard deviation

**Table 5: Association of other parameters and anxiety level**

Parameters	Anxiety group (HAM-A)			P
	None to mild (n=540), n (%)	Mild to moderate (n=182), n (%)	Moderate to severe (n=107), n (%)	
Types of hospital				
Government	142 (26.3)	56 (30.8)	22 (20.6)	0.161*
Private	398 (73.7)	126 (69.2)	85 (79.4)	
Marital status				
Married	226 (41.9)	120 (65.9)	64 (59.8)	<0.001*
Single	281 (52.0)	58 (31.9)	41 (38.3)	
In a relationship	30 (5.6)	4 (2.2)	2 (1.9)	
Separated	2 (0.4)	0	0	
Widow	1 (0.2)	0	0	
Having children				
Yes	169 (31.3)	110 (60.4)	47 (43.9)	<0.001*

\* $\chi^2$ . HAM-A=Hamilton Anxiety Scale

**Table 6: Association of demographic details and depression level**

Demographical variables	Depression group (PHQ-9)			P
	None to mild (n=540), n (%)	Mild to moderate (n=182), n (%)	Moderate to severe (n=107), n (%)	
Age				
≤25	163 (30.4)	54 (25.1)	17 (21.8)	0.003*
26-35	285 (53.2)	102 (47.4)	44 (56.4)	
36-45	69 (12.9)	54 (25.1)	16 (20.5)	
>45	19 (3.5)	5 (2.3)	1 (1.3)	
Mean age±SD	29.18±6.14	29.84±6.01	30.74±6.80	0.200**
Sex				
Male	335 (62.5)	105 (48.8)	35 (44.9)	0.076*
Female	201 (37.5)	110 (51.2)	43 (55.1)	
Country working				
India	455 (84.9)	195 (90.7)	70 (89.7)	0.082*
Others	81 (15.1)	20 (9.3)	8 (10.3)	
Work title				
Staff nurse	161 (30.0)	54 (25.1)	21 (26.9)	0.055*
Doctor	83 (15.5)	51 (23.7)	16 (20.5)	
Paramedical	93 (17.4)	22 (10.2)	9 (11.5)	
Interns/students	60 (11.2)	22 (10.2)	9 (11.5)	
Nursing teaching faculty	48 (9.0)	27 (12.6)	14 (17.9)	
Administrative personnel	46 (8.6)	19 (8.8)	3 (3.8)	
Technician	30 (5.6)	16 (7.4)	5 (6.4)	
Others	15 (2.8)	4 (1.9)	1 (1.3)	

\* $\chi^2$ , \*\*t-test. PHQ=Patient Health Questionnaire, SD=Standard deviation

dedication to issues related to work and family when they take double or triple workload (home, work, and family).<sup>[24]</sup> The resident doctors are more prone to mental health problems because of the long floor duty hours and direct involvement in patient care compared to other medical staff. Al-Hanawi *et al.* in their study on psychological stress among health workers and the general public during the COVID-19 pandemic in Saudi Arabia reported contrasting results that gender was the significant factor and marital status was an insignificant factor associated with psychological disorder and females were affected higher significantly.<sup>[25]</sup> Other study done by Ahmed *et al.* also reported similar results as in the present study.<sup>[26]</sup>

As COVID 19 pandemic has affected medical workers all over the world, they are under great mental and physical pressure due to this pandemic, particularly in developing countries like India where our health-care system was already overburdened, this pandemic had added to the misery of health-care workers. As our health-care workers are overworked and fear of exposure to the disease has become the major cause for stress, anxiety, insomnia, depressive symptoms, anger, and fear in them. These all stressed mental conditions not only affect medical workers' physical health but to some extent also effecting the understanding, focusing, and decision-making ability, which are essential for fighting against COVID-19.

**Table 7: Association of other parameters and depression level**

Parameters	Depression group (PHQ-9)			P
	None to mild (n=540), n (%)	Mild to moderate (n=182), n (%)	Moderate to severe (n=107), n (%)	
Types of hospital				
Government	152 (28.4)	45 (20.9)	23 (29.5)	0.094*
Private	384 (71.6)	170 (79.1)	55 (70.5)	
Marital status				
Married	259 (48.3)	115 (53.5)	36 (46.2)	0.099*
Single	247 (46.1)	92 (42.8)	41 (52.6)	
In a relationship	29 (5.4)	7 (3.3)	0 (0.0)	
Separated	0	1 (0.5)	1 (1.3)	
Widow	1 (0.2)	0	0	
Having children				
Yes	206 (38.4)	92 (42.8)	28 (35.9)	0.439*

\* $\chi^2$ . PHQ=Patient Health Questionnaire

### Limitation and recommendation

There are a few limitations in our study, first, it was a cross-sectional study which does not allow us to discern the fluctuations in depression and anxiety levels of the HCWs; hence, prospective longitudinal studies are required for this matter. Another limitation was that the geographic factors may have influenced results due to unique social and cultural contexts among the study locations where research was conducted. Furthermore, it could not tell *per se* that the psychological impact was the result of COVID-19 fear or the strict protocols of the lockdown and it has no baseline data to compare the mental health status of the study subjects before the onset of the pandemic.

### Conclusion

Depression and anxiety were seen quite higher in our population of health-care workers. Mental health plays an important role in describing the health-care response toward pandemic. Mental health needs to be prioritized for doctors and other health-care providers on frontline, and among global pandemic, it should be the key element of adaptability in the society that is tackled by a confounding number of challenges. Early detection of psychological suffering and supportive intervention should be taken according to related factors to prevent serious impact on frontline health workers.

Having rotational shifts, distribution of workload by the diversion of patients to other hospitals with facilities, and upscaling of COVID-19 treating facilities might be considered. We suggest that more research is needed to establish if there are baseline differences in the anxiety and depression levels among frontline health workers.

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### Conflicts of interest

There are no conflicts of interest.

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