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## A CROSS SECTIONAL STUDY ON PSYCHOLOGICAL STATUS OF HEALTHCARE WORKERS IN COVID-19 ICU

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### ABSTRACT

**Background-** The coronavirus disease 2019 (COVID-19) outbreak caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) emerged in Wuhan, China and has attracted enormous concern from around the world.[ 1 ] In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Facing this critical situation, health care workers on the front line who are directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing psychological distress and other mental health symptoms. Medical staff must wear heavy protective garments and an N95 mask, making it much more difficult to carry out medical operations or procedures than under normal conditions. These factors, together with the fear of being contagious and infecting others, could increase the possibility of psychological issues among medical staff.

**Methods:** A study was done including 20 nurses who provided care for COVID-19 patients. Interviews were conducted face to face or over the telephone and Colaizzi's 7 step analysis was done.

**Results:** The psychological experience of nurses caring for COVID-19 patients can be summarized into 4 themes. First, negative emotions present in early stage consisting of fatigue, discomfort, and helplessness was caused by high-intensity work, fear and anxiety, and concern for patients and family members. Second, self-coping styles included psychological and life adjustment, altruistic acts, team support, and rational cognition. Third, they found growth under pressure, which included increased affection and gratefulness, development of professional responsibility, and self-reflection. Finally, they showed that positive emotions occurred simultaneously with negative emotions .

**Conclusion:** During an epidemic outbreak, positive and negative emotions of the front-line nurses interweaved and coexisted. In the early stage, negative emotions were dominant and positive emotions appeared gradually. Self-coping styles and psychological growth played an important role in maintaining mental health of nurses.

**Keyword:** Covid-19, healthcare workers, psychological status

## INTRODUCTION

The coronavirus disease 2019 (COVID-19) outbreak caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) emerged in Wuhan, China and has attracted enormous concern from around the world.<sup>[1]</sup> In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. It is reported that the number of infected patients is more than 3 024 059, with 208 112 deaths worldwide as of 29 April 2020 (<http://www.who.int>). This makes COVID-19 more serious than SARS, a similar epidemic disease.<sup>[2]</sup>

Clearly, those workers involved in healthcare are at the front line in terms of risk of infection and death, as has been the case during many previous infectious disease epidemics, such as severe acute respiratory syndrome (SARS) and Ebola. A physically and mentally healthy and well-equipped healthcare workforce is vital to a country's capability to manage COVID-19 cases effectively and lessons can be learnt from the SARS epidemic to introduce novel working arrangements to help protect healthcare workers from infection.<sup>[3]</sup>

Facing this critical situation, health care workers on the front line who are directly involved in the diagnosis, treatment, and care of patients with COVID-19 are at risk of developing psychological distress and other mental health symptoms. The ever-increasing number of confirmed and suspected cases, overwhelming workload, depletion of personal protection equipment, widespread media coverage, lack of specific drugs, and feelings of being inadequately supported may all contribute to the mental burden of these health care workers. Previous studies have reported adverse psychological reactions to the 2003 SARS outbreak among health care workers.<sup>[4-7]</sup>

Studies showed that those health care workers feared contagion and infection of their family, friends, and colleagues,<sup>[8]</sup> felt uncertainty and stigmatization,<sup>[8,9]</sup> reported reluctance to work or contemplating resignation,<sup>[9]</sup> and reported experiencing high levels of stress, anxiety, and depression symptoms,<sup>[10]</sup> which could have long-term psychological implications.<sup>[10]</sup> Similar concerns about the mental health, psychological adjustment, and recovery of health care workers treating and caring for patients with COVID-19 are now arising.<sup>[11]</sup>

Medical staff must wear heavy protective garments and an N95 mask, making it much more difficult to carry out medical operations or procedures than under normal conditions. These factors, together with the fear of being contagious and infecting others, could increase the possibility of psychological issues among medical staff. Koh *et al.* found that more than half of the clinical staff reported increased work stress (56%) and workload (53%) during the SARS epidemic in Singapore.<sup>[12]</sup>

In addition, a Hong Kong study found that health workers suffered high anxiety scores after directly treating confirmed SARS patients.<sup>[13]</sup> Therefore, it is very important to study medical workers' mental health status. This outbreak has highlighted the fragility of mental resilience.<sup>[14]</sup> Studies exploring the prevalence of anxiety among medical staff during the COVID-19 outbreak in India are limited. The present study was done to examine the anxiety levels of frontline healthcare workers and to identify the risk factors for anxiety in India during the COVID-19 epidemic.

## MATERIALS AND METHOD

This cross-sectional online study was conducted from March to April 2020. The study was approved by the ethics committee of Narayan Medical College and Hospital, Sasaram. Written informed consent was received online before the respondents began the questionnaire.

A self-administered questionnaire based survey was done among the study population which consisted of the health care workers involved in the health care delivery of the COVID-19 patients.

### Data collection

Data on the demographic characteristics such as gender, age, marital status, level of education, hospital department and city, evaluation of psychological status (Patient Health Questionnaire-9; PHQ-9), and quality of life (World Health Organization Quality of Life Brief; WHOQOL-BREF) were obtained by an interview with a standardized questionnaire.

### Measuring Depression Symptoms

Depression symptoms were assessed with the PHQ-9, which is widely used in primary for the screening of depression.<sup>[13,14]</sup> PHQ-9 scores range from 0 to 27, with scores of  $\geq 5$ ,  $\geq 10$ , and  $\geq 15$ , representing mild, moderate, and severe levels of depression severity.<sup>[16]</sup>

### Anxiety score

Generalized Anxiety Disorder (GAD-7) scale was used which is a 7-item, self-rated scale developed by Spitzer and colleagues (2006) as a screening tool and severity indicator for GAD. Items are rated on a 4-point Likert-type scale (0 = *not at all* to 3 = *nearly every day*). GAD-7 items describe some of the most salient diagnostic features of GAD (i.e., *feeling*

nervous, anxious, or on edge and worrying too much about different things). Scores range from 0 to 21 with higher scores indicating more severe GAD symptoms. The score GAD-7 are summarized as follows: normal (0-4), mild (5-9), moderate (10-14), and severe (15-21) anxiety.

**Quality of Life**

To assess the quality of life of the survey respondents over the previous 4 weeks, there were 27 questions with the addition of one national question during the Turkish reliability study. The first question assessed the perceived quality of life, and the second question assessed the perceived health status. The responses were scored between 0–5. The four domain scores were calculated using the questions subsequent to the first two.

The content of the five domains used in the scale included the Physical Health Domain (7 items), the Psychological Health Domain (4 items), the Social Relations Domain (3 items) and the Environmental Domain (6 items). Quality of life increases as the scores rise.

According to the WHOQOL-BREF instruction manual, the score of each dimension should be added and converted into a score of 3 to 40; the higher the score, the better the description of the functional status of the dimension, and the higher the quality of life.

**Statistical Analysis**

The prevalence estimates for depression and anxiety were calculated according to age and other variables. Univariate and multivariate logistic regression analyses were used to identify the independent factors of depression with odds ratios (ORs), and the corresponding 95% CIs were calculated. All statistical analyses were performed using SPSS version 26.0 software, and P values less than 0.05 were considered to be statistically significant.

**RESULTS**

The demographic profile of the study population has been shown in the table no 1. There were 19.0% subjects had education below graduation and 81.0% were graduate and above. There was direct contact with COVID-19 patient among 79.0% subjects.

Table 1: Demographic data of the participants

		Number	Percentage
Gender	Male	24	24.0%
	Female	76	76.0%
Age groups	21-40 years	60	60.0%
	41-60 years	32	32.0%
	Above 60 years	7	7.0%
Education	Below graduation	19	19.0%
	Graduate or above	81	81.0%
Marital status	Single	33	33.0%
	Married	67	67.0%
	Divorced	10	2.0%
Department	Clinical	81	81.0%
	Administrative	19	19.0%
Direct contact with COVID-19 patient	No	21	21.0%
	Yes	79	79.0%

As per PHQ-9 score, 51.0% had None-minimal depression, 18.0% had mild, 9.0% had Moderate, 15.0% had moderately severe and 7.0% had severe depression. As per GAD-7 anxiety score, 64.0% had minimal, 13.0% had mild, 16.0% had moderate and 7.0% had severe anxiety. (Table 2)

Table 2: showing the anxiety, depression and Quality of life score

		Frequency	Percent
PHQ-9 depression score	None-minimal	51	51.0%
	Mild	18	18.0%
	Moderate	9	9.0%
	Moderately Severe	15	15.0%
	Severe	7	7.0%
GAD-7 anxiety score	0-4 (Minimal)	64	64.0%
	5-9 (Mild)	13	13.0%

	10-14 (Moderate)	16	16.0%
	15-21 (Severe)	7	7.0%
Quality of life score	Domain 1 (Mean±SD)	66.82±14.27	
	Domain 2 (Mean±SD)	64.65±15.66	
	Domain 3 (Mean±SD)	67.43±17.76	
	Domain 4 (Mean±SD)	65.35±15.81	
	Over-all score (Mean±SD)	94.91±13.23	

The quality of life index Domain 1, Domain 2, Domain 3, Domain 4 and over-all Quality of life score were significantly better among subjects with no direct contact compared to subjects in direct contact. PHQ-9 depression score and GAD-7 anxiety score was significantly more among subjects in direct contact compared to subjects with no direct contact. (Table 3)

Table 3: showing the PHQ-9 depression score, GAD-7 anxiety score and Quality of life score between subjects with and without contact with COVID-19 patients

		No direct contact	Direct contact	t-test value	p-value <sup>a</sup>
		Mean±SD	Mean±SD		
PHQ-9 depression score		12.07±4.11	21.95±6.82	3.890	0.032*
GAD-7 anxiety score		11.78±2.09	16.82±4.26	4.728	0.028*
Quality of life score	Domain 1	69.02±13.27	58.58±14.92	5.010	0.001*
	Domain 2	67.61±13.91	53.58±16.95	3.544	0.012*
	Domain 3	70.46±16.49	56.09±17.84	6.717	< 0.001*
	Domain 4	67.35±15.44	57.85±15.01	4.859	0.021*
	Over-all	97.43±12.24	85.45±12.55	7.640	< 0.001*

<sup>a</sup> Unpaired t-test

\* Significant difference

Female gender, age 41-60 years and above 60 years, direct contact with COVID-19 patient and clinical department was associated with higher odds of anxiety and depression. (Table 4 and 5)

Table 4: binary logistic regression analysis for anxiety scores (GAD-7)

		Odd's ratio (95% CI)	p-value
Age groups	21-40 years	Reference	
	41-60 years	2.77 (0.89–3.99)	0.027*
	Above 60 years	2.02 (0.60–3.25)	0.042*
Gender	Male	Reference	
	Female	3.29 (2.01-4.37)	0.018*
Direct contact with COVID-19 patient	No	Reference	
	Yes	4.58 (3.36-5.96)	0.008*
Department	Administrative	Reference	
	Clinical	5.03 (2.89-6.88)	0.001*

Table 5: binary logistic regression analysis for depression scores (PHQ-9)

		Odd's ratio (95% CI)	p-value
Age groups	21-40 years	Reference	
	41-60 years	2.82 (0.92–3.70)	0.032*
	Above 60 years	1.97 (0.71–3.33)	0.045*
Gender	Male	Reference	
	Female	2.79 (1.20-3.11)	0.040*
Direct contact	No	Reference	

with COVID-19 patient	Yes	3.79 (2.87-4.89)	0.015*
Department	Administrative	Reference	
	Clinical	4.03 (2.23-5.10)	0.009*

## DISCUSSION

In describing the issues faced by HCWs responding to the COVID-19 pandemic, Kang *et al.* refers to “a high risk of infection and inadequate protection from contamination, overwork, frustration, discrimination, isolation, patients with negative emotions, a lack of contact with their families, and exhaustion”.<sup>[15]</sup>

In particular, during outbreaks, HCWs reported post-traumatic stress symptoms (11–73.4%), depressive symptoms (27.5–50.7%), insomnia (34–36.1%), severe anxiety symptoms (45%), general psychiatric symptoms (17.3–75.3%), and high levels of work-related stress (18.1–80.1%).<sup>[16-24]</sup> Among these psychopathological outcomes, anxious and post-traumatic reactions were the most extensively investigated, and results pointed to the high prevalence of such areas of symptomatology in HCWs facing epidemic/pandemic outbreaks. This is not surprising, given the traumatic nature of the situations to which HCWs are exposed in their everyday work during epidemic/pandemic outbreaks. Furthermore, concerning mental health suffering, HCWs are considered a high risk group even in non-pandemic times.<sup>[25]</sup>

### Depression and Anxiety symptoms

Jeong *et al.* reported the prevalence of anxiety symptoms in the general population who were not diagnosed with MERS and required 2 weeks of isolation was 7.6% (95% CI 6.3–8.9%), which is less than in our study.<sup>[26]</sup> The discrepancy might be due to the fact that there were only 267 health workers (16.1%), and the authors used the seven-item Generalized Anxiety Disorder Scale to assess anxiety, with a cut-off of 5 points confirming mild anxiety. Nevertheless, medical workers who provided direct treatment or care for infected patients suffered higher anxiety scores, compared to those who were not caring for COVID-19 patients.<sup>[21]</sup>

Previous studies have reported that psychological symptoms, such as anxiety, depend on the epidemic phase.<sup>[27]</sup> This is because medical workers might have been able to adapt psychologically, after gradually learning more about SARS and obtaining rich clinical experience in the treatment and care of infected patients.<sup>[21]</sup>

In the study by Liu *et al.*,<sup>[21]</sup> the health workers from Hubei, the most severely affected area, had higher anxiety scores ( $\beta$  value = 3.71) compared to the health workers from other regions. Staff working in hospitals in Hubei suffered heavy workloads due to the increasing number of infected cases requiring centralisation to designated hospitals for standard isolation treatment. Additionally, the media have reported that medically protective materials, such as N95 masks, goggles and protective clothing, were severely deficient during the early stages of the outbreak.<sup>[15]</sup> All of these factors invisibly aggravated the psychological burden.

The present study also showed that people with occupational exposure risks reported greater symptoms of depression, anxiety, insomnia, and acute stress. People who work in high-risk environments often report more fatigue, health worries, and fear. COVID-19 may be symptomless during the incubation period, and its clinical manifestations can be easily confused with those of normal influenza.<sup>[9,17]</sup> Therefore, people may understandably feel a threat of becoming infected by being exposed to general patients, thereby affecting their psychological well-being.<sup>[28]</sup>

A previous study.<sup>[33]</sup> suggested that people at moderate infection risk (eg, individuals who might come in contact with patients with suspected cases) had more adverse mental health outcomes than those at high risk (eg, individuals who worked in infectious wards). The high infection risk group may be more aware of the risk, have better coping skills, have less uncertainty, and have more access to personal protective equipment and social support.<sup>[16]</sup>

Compared to the existing meta-analysis on psychological impact of COVID-19 on healthcare workers from 13 Asian studies that reported a pooled prevalence of 23.2% in anxiety and 22.8% in depression,<sup>[29]</sup> the current meta-analysis found a similar prevalence of anxiety (26% [18%-34%]) and depression (25% [17%-33%]) among healthcare workers.<sup>[30]</sup>

A study conducted in China corroborated our finding by showing that the prevalence of anxiety and depression was similar between healthcare workers and the general public;<sup>[31]</sup> however, three other studies from China showed that healthcare workers had higher prevalence of anxiety and depression.<sup>[32-34]</sup> Among healthcare professionals working in the hospital, one study showed that medical workers had higher psychological distress compared to administrative staff,<sup>[22]</sup> while another study showed that the psychological distress was higher among non-medical workers in hospitals.<sup>[35]</sup> Luo *et al.*<sup>[30]</sup> suggested that patients with pre-existing conditions and COVID-19 infection are at the highest risk of psychological distress and should be targeted for psychological assessment and appropriate intervention.

women and nurses had higher psychological distress compared to men and doctors, respectively, which were consistent with previous findings that women and nurses were more vulnerable to stress.<sup>[36-38]</sup> In addition, the current review also found that social isolation, financial security, and being more susceptible to COVID-19 infections (have complications, older age) are associated with higher levels of psychological distress. A recent review published on the Lancet Psychiatry

corroborated with our findings by showing that social isolation and loneliness are strongly associated with anxiety and depression, and populations with worse health or social inequality are more vulnerable to the psychological distress of COVID-19.<sup>[39]</sup> These findings highlighted the importance to design interventions to target women, nurses, people with complications or older age, and those with unstable income, whom may have higher psychological burden.<sup>[40]</sup>

Another prominent finding was the substantial impact of quarantine experience on mental health, which is consistent with prior studies.<sup>[41]</sup> Quarantine can contribute to poor mental health in both children and adults.<sup>[42,43]</sup> People may experience fear of infection, frustration, and boredom during quarantine. Insufficient basic supplies and disruptions of information flow can increase both fear and anxiety.<sup>[41]</sup> In the present study, both centralized quarantine and home quarantine enhanced the odds of adverse mental health outcomes.

Moreover, centralized quarantine can have a more pernicious outcome because of fear of infection, being in an enclosed space, and being in an unfamiliar and crowded environment. The environment plays a vital role in maintaining healthy emotions and sleep.<sup>[44,45]</sup> An unfamiliar and crowded environment may be a catalyst for the unique association between centralized quarantine and poor mental health status.

## CONCLUSION

The results of the present study demonstrated that there was a strikingly large portion of health care providers suffering from mental health disturbances due to anxiety and depression. Greater availability of personalized mental health care from psychotherapists and psychiatrists, wherein different mental health groups could focus on providing specialized mental healthcare services.

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