Mental Health of Healthcare Workers During the Third Wave of the COVID-19 Pandemic: Did We Forget them after the First Wave?

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Abstract

Background: Since December 2019, countries experienced different numbers of COVID-19 pandemic waves. The COVID-19 pandemic led to adverse psychologic problems in the communities and among healthcare workers (HCWs), but the dynamic of these problems through different waves needs to be established more.

Materials and Methods: This cross-sectional study was conducted in October 2020, through the third wave of the COVID-19 pandemic, in Isfahan, Iran. We studied HCWs' depression, anxiety, and stress using Depression, Anxiety, Stress Scale-21 (DASS-21) and insomnia using Insomnia Severity Index (ISI) questionnaires. Multiple linear regression was used to evaluate the association of some characteristic factors with different psychologic symptoms.

Results: Our results showed that about 80% of HCWs had one or more psychological problems. The prevalence of depression, anxiety, stress, and insomnia was 46.0%, 50.2%, 44.6%, and 66.5%, respectively. Female sex, working in ICU, and having a history of chronic disease were predictors of psychological symptoms in our participants.

Conclusion: HCWs' mental health state could be underestimated or neglected. The third pandemic wave negatively affected the mental health of the HCWs. Since mental health problems of HCWs may reduce the quality of care, the potential impact of not addressing this issue should be highlighted.

Keywords: Anxiety, COVID-19, depression, health personnel, mental health, stress, psychological, pandemics, sleep initiation and maintenance disorders

INTRODUCTION

More than three years have passed since the announcement of the COVID-19 pandemic by the World Health Organization (WHO). All countries involved with the infection and experienced different levels of infection.[1] Although it was thought that COVID-19 is a medical problem, it soon became apparent that other aspects such as economics, politics, social life, public health, and education were also affected.[2] The health system and healthcare workers (HCWs) were under significant pressure from the very first day. The staff of COVID-19 referral hospitals was prone to increased workload, risk of infection, and mental health problems.[3]

The mental health state of HCWs is an essential public health issue in health crises, and many studies have been conducted on this topic. After previous outbreaks, studies

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reported adverse psychological effects on HCWs, including depression, anxiety, insomnia, and posttraumatic stress disorder (PTSD).[4] Considering the COVID-19 pandemic, studies reported a different prevalence of mental health disorders in HCWs. A study on 1,257 HCWs of China in January and February 2020 showed that a considerable percent of HCWs have depression (50%), anxiety (45%), and insomnia (34%).[5] A study through the first wave of COVID-19 in Iran showed that 45% of HCWs suffer from depression.[6] Most of these studies were conducted through the first months of the pandemic, and a few studies focused on the trend of mental health problems. A survey by Dehon *et al.*[7] in the fall of 2020 indicated insomnia, depression, and anxiety in 18%, 17%, and 13% of the emergency physicians, respectively. Sagherian *et al.*[8] studied the long-term impact of COVID-19 on the mental health of nurses through the summer of 2021 and reported some improvements in psychological distress. A study conducted in the second year of the pandemic indicates that about 22%, 19%, and 14% of the general population of Turkey suffer from depression, anxiety, and stress, respectively.[9] Even systematic reviews mainly included studies that reported the mental health problems of HCWs through the acute phase of the pandemic.[10,11]

Psychological problems of HCWs may decrease their efficiency and, consequently, the quality of care.[12,13] Moreover, mental problems during a pandemic can result in long-term mental health disorders, which may persist for years,[14] and ignoring this issue may lead to mental health crisis in the healthcare system. In this situation, the prevalence and trend of psychological symptoms during the COVID-19 pandemic is an essential concern of governments. In this study, we aimed to evaluate the state of mental health in HCWs through the third wave of the COVID-19 pandemic in Isfahan, Iran. We also studied the relevant factors predicting the mental health disorders in our study population.

MATERIALS AND METHODS

Study design
This study is a cross-sectional survey conducted in October 2020 in Alzahra hospital, the largest hospital designated to COVID-19 patients in Isfahan, Iran. We evaluate four mental health dimensions: depression, anxiety, stress, and insomnia.

The Isfahan University of Medical Sciences Ethics Committee approved this study (IR.MUI.MED.REC.1399.860). The Helsinki Guideline was followed in every step. All participants signed the informed consent before participation. All data were managed anonymously. This study is reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[15]

Participants and recruitment
The study population includes all HCWs who worked in the Alzahra hospital through the study recruitment period. We used a convenience sampling strategy and sent an invitation (including time and place of the study) to the hospital virtual groups. HCWs who had contact with COVID-19 patients were included, and those with a self-report mental disease were excluded from the study. Participants were asked to complete the demographic form; Depression, Anxiety, and Stress Scale-21 (DASS-21); and Insomnia Severity Index (ISI) in person.

Measurement tools
1. Demographic form: Demographic and baseline data include information on age; sex (male, female); profession (physician or medical student, nurse, and others including nursing assistant, transporter, and patient care assistant); working in the ICU (yes, no); history of comorbidities such as cardiovascular disease, diabetes, and respiratory disorders (yes, no); and previous history of COVID-19 (yes, no).
2. Depression, anxiety, and stress were evaluated using DASS-21. This scale was developed by Lovibond *et al.* in 1995 to measure mental distress[16] and validated by Asghari *et al.*[17] in Persian. This questionnaire consists of 21 questions in three domains of depression, anxiety, and stress. Each question scores on a Likert scale (0: not at all to 3: absolutely), and the final score would be calculated for each domain separately. Based on the final score, depression severity would be recognized as no problem (0-9), mild (10-13), moderate (14-20), severe (21-27), and very severe (≥28); anxiety would be categorized into no problem (0-7), mild (8-9), moderate (10-14), severe (15-19), and very severe (≥20); and stress would be regarded as no problem (0-14), mild (15-18), moderate (19-25), severe (26-33), and very severe (≥34).
3. We used the Persian version of ISI to evaluate the insomnia state of our participants.[18] ISI is a self-administered scale to assess insomnia's nature, severity, and effects. This questionnaire was designed by Morin and consisted of seven questions.[19] Each question scores on a Likert scale from 0 (not at all) to 4 (always), and the final score would be 0-28. The higher the score, the worst the insomnia problem. Based on the total score, different levels of insomnia would be defined as no problem (0-7), mild (8-14), moderate (15-21), and severe (22-28).

Data analysis
Data were analyzed using IBM SPSS Statistics version 25 (IBM corp. Armonk, New York, USA). Mean (Standard deviation) and frequency were used to show continuous and categorical variables, respectively. Independent sample T-test and ANOVA were used to compare the mean score of outcomes between demographic subgroups. Four separate linear multiple regression analyses were performed to assess whether individual factors were predictive of psychological problems. The dependent variables were depression, anxiety, stress, and insomnia. The variables that show association in univariate analysis, and those with a positive association in previous studies were included in regression analysis. The level of significance was set at 0.05.

RESULTS

In this cross-sectional study, 301 HCWs who work in Alzahra hospital participated. Sixteen HCWs were excluded due to previous mental health disorders, and 285 HCWs (67.4% female, 54.7% nurse) completed the questionnaire and were included in the study. The mean age of the study population was 38.4 ± 9.04 years (age range: 18-64). Most of the respondents (56.8%) were occupied in the ICU. Most participants (81.8%) did not report any previous comorbidities. Diabetes, cardiovascular, and respiratory diseases were reported by 4.5%, 2.1%, and 2.1% of the participants, respectively; 23 HCWs (9.5%) reported some other comorbidities in their past medical history. The previous history of COVID-19 was reported by 108 (37.9%) HCWs. Table 1 presents the basic characteristics of the participants.

Mental health outcomes

All participants filled out the demographic form and DASS-21 questionnaire. Four ISI questionnaires were not completed. The result of the Pearson correlation test shows a significant positive correlation between all four disorders [Supplementary 1]. Based on the provided cutoffs by DASS-21 and ISI, only 58 (20.6%) HCWs report no symptoms of depression, anxiety, stress, or insomnia, and the rest of them (227 HCWs, 79.4%) suffer from one psychologic health problem at least.

Table 1: Characteristics of the healthcare workers who participated in the COVID-19 mental health survey

Participant characteristics	Whole sample = 285 *n* (%)
Sex	
Female	192 (67.4)
Male	93 (32.6)
Age	
40 and younger	169 (59.5)
Older than 40	115 (40.5)
Profession	
Physician or medical student	30 (10.5)
Nurse	156 (54.7)
Others	99 (34.7)
Working in the ICU	
Yes	123 (43.2)
No	162 (56.8)
Any comorbidities	
Yes	52 (18.2)
No	233 (81.8)
Previous COVID-19 history	
Yes	108 (37.9)
No	177 (62.1)
Frequency of studied mental health problems	
No problem	58 (20.6)
One problem	56 (19.9)
Two problems	39 (13.9)
Three problems	42 (14.9)
Four problems	86 (30.6)

COVID-19: Coronavirus disease-2019; MD: Medical doctorate

About half of the participants (46.0%) reported some levels of depression. Severe and very severe depression were detected in 24 (8.4%) and 17 (6.0%) HCWs, respectively. Different levels of anxiety were reported in 143 HCWs (50.2%); mild and moderate anxiety was detected in 40 (14.0%) and 39 (13.7%) HCWs, respectively. Others suffered from severe (10.5%) and very severe (11.9%) anxiety symptoms. The prevalence of stress among HCWs was 44.6%. Very severe stress was detected in 12 (4.2%) HCWs. The prevalence of mild, moderate, and severe stress was almost the same in the participants (around 13%). About half of the participants reported no stress symptoms. Insomnia was the most prevalent mental health problem in our study sample (187 HCWs, 66.5%); the severity of insomnia was described as no problem (33.5%), mild (45.5%), moderate (15.7%), and severe (5.3%). Table 2 details the frequency of psychologic problems and the score of DASS-21 and ISI. Information on the frequency of psychological symptoms regarding participants' characteristics is presented in Supplementary 2.

Predictors of mental health problems

To understand the factors predicting mental health problems in the HCWs, we examined the association of HCWs' characteristics with depression, anxiety, stress, and insomnia separately. The result of the univariate analysis shows that females in comparison with males suffer more from depression (5.3 ± 4.54 vs. 4.1 ± 4.3, *P* value, 0.029), anxiety (5.1 ± 4.06 vs. 3.2 ± 3.38; *P* value < 0.001), stress (7.7 ± 4.80 vs. 6.2 ± 5.06; *P* value, 0.015), and insomnia (11.0 ± 5.92 vs. 9.0 ± 6.13; *P* value, 0.011). Although older HCWs had higher scores in each dimension, it was not statistically significant compared to youngers (*P* value > 0.05). Regarding occupation, nurses had higher scores in each dimension than doctors, medical students, and other HCWs, but it was not statistically significant (*P* value > 0.05). The depression, anxiety, stress, and insomnia score was higher in those working in the ICU than in other wards; this association was statistically significant for depression (*P* value, 0.049). A history of previous comorbidities showed a positive association with depression (*P* value, 0.025) and anxiety (*P* value, 0.006) but not with stress or insomnia (*P* value > 0.05). Table 3 presents the details of the univariate analysis.

We entered characteristic factors in four separate linear regression analyses with a backward method. The final models for each outcome are presented in Table 4.

Depression

We found that the final model explains 5% of the variation in depression score (F, 5.117; *P* value, 0.002). After accounting for basic individual characteristics, variables that remain significant include sex, working in the ICU, and having comorbidities. Female HCWs show a higher depression score compared to males (standardized Beta coefficient, 0.127; 95% CI, 0.118-2.330; *P* value, 0.030). Those HCWs who work in the ICU show more depression symptoms (standardized Beta coefficient, 0.121; 95% CI, 0.051-2.152; *P* value, 0.040).

Table 2: Status of mental health problems of healthcare workers using DASS-21 and ISI

	Questionnaire score		Severity of psychological problems *n* (%)				
	Mean (SD)	Median (IQR)	No problem	Mild	Moderate	Severe	Very severe
Depression	4.9 (4.51)	4.0 (1.0-8.0)	154 (54.0)	42 (14.7)	48 (16.8)	24 (8.4)	17 (6.0)
Anxiety	4.4 (3.95)	4.0 (1.0-7.0)	142 (49.8)	40 (14.0)	39 (13.7)	30 (10.5)	34 (11.9)
Stress	7.3 (4.93)	7.0 (3.0-11.0)	158 (55.4)	39 (13.7)	39 (13.7)	37 (13.0)	12 (4.2)
Insomnia*	10.3 (6.04)	10.0 (6.0-14.0)	94 (33.5)	128 (45.5)	44 (15.7)	15 (5.3)	-

IQR=Interquartile range, SD=Standard deviation, *Four participants did not fill out the ISI questionnaire

Table 3: Depression, anxiety, stress, and insomnia regarding the study populations' characteristics

	Depression		Anxiety		Stress		Insomnia	
	Mean (SD)	*P*	Mean (SD)	*P*	Mean (SD)	*P*	Mean (SD)	*P*
Sex		**0.029**		**0.000**		**0.015**		**0.011**
Female	5.3 (4.54)		5.1 (4.06)		7.7 (4.80)		11.0 (5.92)	
Male	4.1 (4.3)		3.2 (3.38)		6.2 (5.06)		9.0 (6.13)	
Age (years)		0.453		0.341		0.434		0.249
40 and younger	4.8 (4.25)		4.3 (3.87)		7.4 (5.10)		10.0 (5.63)	
Older than 40	5.2 (4.88)		4.7 (4.09)		7.01 (4.68)		10.8 (6.61)	
Profession		0.219		0.087		0.153		0.467
Physician or medical student	4.7 (4.77)		3.1 (3.73)		6.0 (5.06)		9.8 (7.22)	
Nurse	5.3 (4.71)		4.8 (4.06)		7.7 (5.07)		10.7 (5.91)	
Others	4.3 (4.06)		4.4 (3.78)		6.9 (4.59)		9.8 (5.88)	
Working in the ICU		**0.049**		0.145		0.882		0.851
Yes	5.4 (4.54)		4.7 (4.02)		7.3 (4.84)		10.4 (6.02)	
No	4.3 (4.41)		4.1 (3.84)		7.2 (5.06)		10.3 (6.10)	
Any comorbidities		**0.025**		**0.006**		0.080		0.133
Yes	6.2 (5.05)		5.8 (4.65)		8.3 (5.12)		11.5 (6.57)	
No	4.6 (4.34)		4.1 (3.73)		7.0 (4.86)		10.1 (5.90)	
Previous COVID-19 history		0.113		0.327		0.260		0.796
Yes	4.4 (4.47)		4.2 (3.70)		6.8 (4.61)		10.2 (5.97)	
No	5.2 (4.51)		4.6 (4.10)		7.5 (5.11)		10.4 (6.10)	

Bolded *P* values denote statistical significance

Another factor associated with depression was comorbidities, which increased the score of depression by 0.154 units (95% CI, 0.452-3.156; *P* value, 0.009).

Anxiety

About 7% of the variance in anxiety is predictable by our model (F, 12.302; *P* value < 0.001). After adjusting for confounders, the results of linear regression analysis show that female HCWs (standardized Beta coefficient, 0.235; 95% CI, 1.030-2.931; *P* value < 0.001) and those with a history of previous comorbidity (standardized Beta coefficient, 0.170; 95% CI, 0.592-2.917; *P* value, 0.003) suffer more from anxiety. Other variables were not statistically significant and were deleted from the final model.

Stress

The final model for the prediction of stress score includes sex and previous comorbidities (adjusted R square, 0.026; F, 4.722; sig, 0.010). Females were more stressed than males

(Standardized Beta coefficient, 0.149; 95% CI, 0.348-2.777; *P* value, 0.012). Also, previous comorbidities increase the stress score by 0.109 units (95% CI, 0.087-2.883; *P* value, 0.065).

Insomnia

About 2% of Variations in insomnia are explainable by the final linear regression model (F, 6.416; *P* value, 0.012). The only variable that remains statistically significant after adjusting for other factors was sex. Females show a higher score in ISI compared to males (standardized Beta coefficient, 0.150; 95% CI, 0.432- 3.447; *P* value, 0.012).

DISCUSSION

We studied the mental health status of 285 HCWs in a COVID-19 designated hospital through the third wave of the COVID-19 pandemic. About 80% of HCWs in our sample had at least one mental health problem. This rate is much higher than our previous study through the first COVID-19 wave, with only 34% of HCWs suffering from some psychological distress,[20] but almost consistent with the results of a study on Italian HCWs, which reported somatization in 71% and distress in 55% of participants.[21] The most prevalent mental health problem among our study participants was insomnia (66.5%); almost higher than the 51% reported

Table 4: Linear regression for depression, anxiety, stress, and insomnia

	Unstandardized Coefficients		Standardized Coefficient Beta	95% CI for Beta		P
	B	Std. error		Lower	Upper	
Depression						
Sex	1.224	0.562	0.127	0.118	2.330	0.030
Working in the ICU	1.102	0.534	0.121	0.051	2.152	0.040
Any comorbidities	1.804	0.687	0.154	0.452	3.156	0.009
Constant	8.158	1.697		4.818	11.498	0.000
Anxiety						
Sex	1.981	0.483	0.235	1.030	2.931	0.000
Any comorbidities	1.755	0.590	0.170	0.592	2.917	0.003
Constant	10.316	1.296		7.765	12.867	0.000
Stress						
Sex	1.562	0.617	0.149	0.348	2.777	0.012
Any comorbidities	1.398	0.754	0.109	0.087	2.883	0.065
Constant	11.915	1.656		8.656	15.175	0.000
Insomnia						
Sex	1.939	0.766	0.150	0.432	3.447	0.012
Constant	12.945	1.076		10.826	15.063	0.000

The reference variable for sex is male; for working in the ICU is no, and for any comorbidities is no

rate of moderate to severe insomnia in Young *et al.*'s[22] study from the USA after the first wave of the pandemic and also higher than the 44% pooled prevalence of sleep disorders in a meta-analysis.[23] The prevalence of anxiety and stress symptoms in our study was 50.2% (22.4% severe and very severe) and 45%, respectively. The prevalence of moderate-to-severe symptoms of anxiety was 31% in Young *et al.*'s study,[22] 29% in Salazar's study,[24] and 45% in China through the first days of the pandemic.[5] Forty-six percent of our participants presented depression symptoms, of which 14.5% suffered from severe and very severe symptoms. This prevalence was much lower than the 83% reported by HCWs in the USA[22] and higher than the 13% reported by Si *et al.* in China.[25]

The difference in the prevalence of mental health symptoms could be related to several factors. Stress and anxiety are rooted in unfamiliar situations and a lack of information.[26] The body of knowledge about the pandemic increases significantly over time, which may decrease the prevalence of severe stress and anxiety. On the other hand, new waves of the pandemic and fear of an ambiguous future may evoke the condition of the first days again[27] and increase stress and anxiety. As Young *et al.* believe, in the acute phase of any crisis, there is not much time for HCWs to involve with their emotions. When the crisis ends, post-traumatic disorders and depression show up as individuals find enough time to think about the challenging situations they have gone through.[22] Again by the initiation of the next wave, while they have not fully recovered, they get desperate to return to normal life and go under the workload pressure again.[28] Therefore, it is not surprising to witness a lower depression rate in our study compared to the study of Young *et al.*, which was conducted after the first wave, and a higher depression rate compared to studies through the first months of the pandemic.

It should be noted that coping strategies arise following any chronic stress. If we assume the pandemic as a chronic stress and each pandemic wave as an acute one, through the COVID-19 pandemic, multiple acute stresses mounted on a chronic one. This situation may disrupt the function of coping strategies and may result in unsolved chronic problems. This is why we report a higher insomnia rate than previous studies. A meta-analysis reported an increase in sleep disorders from 22% in January–February 2020 to 56% in March–May 2020,[23] supporting this hypothesis.

Different risk factors are mentioned for the increased burden of psychologic symptoms in HCWs through the COVID-19 pandemic, including being a nurse, being female, low economic state, isolation and high risk of COVID-19 infection, insufficient personal protective equipment, insufficient knowledge of the virus, low social support, and low experience.[29,30] Among the factors we studied, female sex, working in the ICU, and history of comorbidities were associated with lower mental health status. Other factors, including age, profession, and positive history of COVID-19, were not associated with psychological symptoms in our participants.

Consistent with other studies,[31] female HCWs presented more psychological symptoms in our study, partly related to the sex gap in psychological problems as women are prone to more stressful life situations.[32] In addition, the closure of schools through the COVID-19 pandemics adds to women's responsibility to care for their children's education more than before.[33] Hence, they must put more effort into balancing their social and domestic roles.

Working in the ICU ward was associated with more depressive symptoms in our participants. This is not surprising as HCWs who work in ICUs encounter more patients, especially severe cases, and higher mortality rates every day, which contribute to disturbed mental health.[34]

The results of our study, in line with previous studies,[35] show a positive association between anxiety and depression in HCWs with a history of comorbidities. A history of hypertension, diabetes, asthma, and cardiovascular diseases is a risk factor for severe COVID-19 and may result in stress and anxiety. Moreover, these individuals suffer from some depression symptoms due to their chronic situations, which may worsen through the COVID-19 pandemic.

Age was not associated with our participants' mental health status, although the psychologic symptom score was higher in older HCWs. A survey on 6000 Americans shows that older people have more positive perceptions about COVID-19 and fewer psychological problems.[36] Depression is known as culturally related and shows different cross-national prevalence.[37] On the other hand, older age is a risk factor for severe COVID-19 infection and death, which could be a stressor for the elderly.

Being a nurse is mentioned as a determinant of psychological disorders. In similar outbreaks, nurses presented the highest levels of occupational stress compared to other groups.[38,39] In our study, nurses earned a higher score for psychological symptoms but were not statistically different from doctors. The higher score could be justified considering the longer working hours of nurses and their greater involvement with patients. Also, nurses experience more close contact situations with COVID-19 patients, resulting in more fear of getting infected.[40]

Although a history of COVID-19 infection is reported as a risk factor for psychological problems, we did not find any association. The high infection rate in HCWs may induce a shared feeling of not being alone and may increase peer social support, which is a protective coping strategy.[41] Moreover, the loneliness due to infection, which is supposed to be related to psychological symptoms in the community,[42] does not apply to HCWs as they will be hospitalized in a familiar place if they get infected.

Our study has some limitations. First, our limited sample size may decrease the power of our study in detecting statistically significant associations and, added to not having longitudinal data, restrict us in concluding that COVID-19 is a risk factor for psychological disturbance regardless of other factors. Second, the convenience sampling of our study could interfere with the generalization of the results. Also, there is a potential for sampling bias as the participation was voluntary, and those who agreed to participate may be more concerned about their mental health. In this regard, we also prefer to exclude HCWs who report previous psychiatric problems, and hence, it may interfere with generalizability of the results to the whole HCW's population. Third, we do not gather longitudinal data (due to the nature of cross-sectional studies), so we cannot interpret the exact effect of the pandemic on the mental health of HCWs and find a causality association. Fourth, data representativeness to other HCWs working at non-COVID-19 designated hospitals or health centers is questionable as our study recruitment site was a COVID-19 designated hospital.

Fifth, the mental health status of HCWs may change after the introduction of COVID-19 vaccines; our study was conducted before that time, so we have no claim about new conditions. Finally, although we used strong measurement tools, there is a possibility for different results using other instruments.

Conclusions

Altogether, HCWs experienced remarkable psychologic pressure. Although the rate of severe symptoms was lower compared to earlier studies, the frequency of all psychological symptoms was higher, significantly in females, those working in ICU, and those with previous comorbidities.

Our results suggest that to manage the subsequent waves of the COVID-19 pandemic, it is necessary to take care of the mental health status of HCWs and implement screening programs to find HCWs at higher risk of presenting psychologic symptoms to deliver timely professional interventions.

Conflicts of interest
There are no conflicts of interest.

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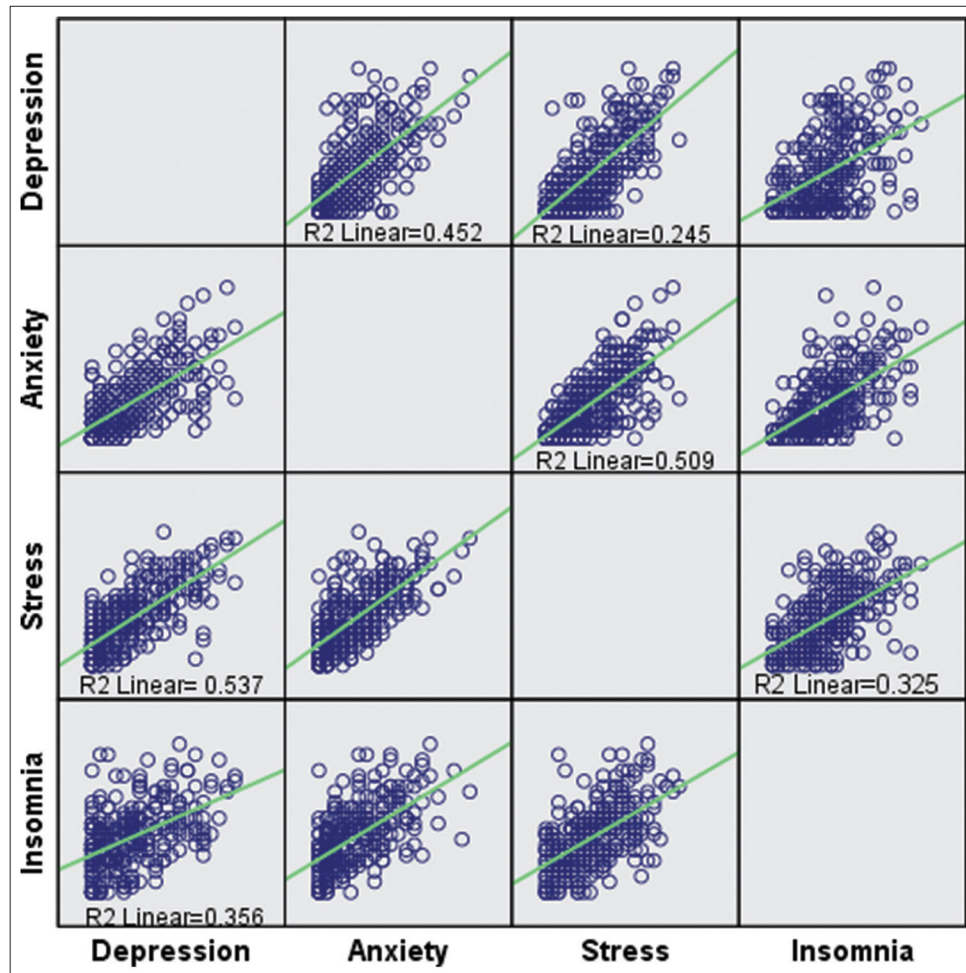
Supplementary 1: Results of the correlation analysis of the four mental health problems

	Depression	Anxiety	Stress	Insomnia
Depression				
Pearson correlation	1	0.669**	0.733**	0.495**
P		0.000	0.000	0.000
Anxiety				
Pearson correlation	0.669**	1	0.710**	0.597**
P	0.000		0.000	0.000
Stress				
Pearson correlation	0.733**	0.710**	1	0.570**
P	0.000	0.000		0.000
Insomnia				
Pearson correlation	0.495**	0.597**	0.570**	1
P	0.000	0.000	0.000	

**Correlation is significant at the 0.01 level

Supplementary 2: Prevalence of depression, anxiety, stress, and insomnia regarding participants' characteristics

	Depression		Anxiety		Stress		Insomnia	
	Negative or mild	Moderate to very severe	Negative or mild	Moderate to very severe	Negative or mild	Moderate to very severe	Negative or mild	Moderate to very severe
Sex								
Female	129 (67.2)	63 (32.8)	109 (56.8)	83 (43.2)	128 (66.7)	64 (33.3)	143 (75.3)	47 (24.7)
Male	67 (72.0)	26 (28.0)	73 (78.5)	20 (21.5)	69 (74.2)	24 (25.8)	79 (86.8)	12 (13.2)
Age								
40 and younger	120 (71.0)	49 (29.0)	110 (65.1)	59 (34.9)	118 (69.8)	51 (30.2)	139 (83.7)	27 (16.3)
Older than 40	75 (65.2)	40 (34.8)	72 (62.6)	43 (37.4)	78 (67.8)	37 (32.2)	82 (71.9)	32 (28.1)
Profession								
Physician or medical student	22 (73.3)	8 (26.7)	22 (73.3)	8 (26.7)	22 (73.3)	8 (26.7)	24 (82.8)	5 (17.2)
Nurse	102 (65.4)	54 (34.6)	93 (59.6)	63 (40.4)	108 (69.2)	48 (30.8)	117 (76.0)	37 (24.0)
Others	72 (72.7)	27 (27.3)	67 (67.7)	32 (32.3)	67 (67.7)	32 (32.3)	81 (82.7)	17 (17.3)
Working in the ICU								
Yes	104 (64.2)	58 (35.8)	96 (59.3)	66 (40.7)	111 (68.5)	51 (31.5)	95 (77.9)	27 (22.1)
No	92 (74.8)	31 (25.2)	86 (69.9)	37 (30.1)	86 (69.9)	37 (30.1)	127 (79.9)	32 (20.1)
Any comorbidities								
Yes	31 (59.6)	21 (40.4)	27 (51.9)	25 (48.1)	34 (65.4)	18 (34.6)	38 (73.1)	14 (26.9)
No	165 (70.8)	68 (29.2)	155 (66.5)	78 (33.5)	163 (70.0)	70 (30.0)	184 (80.3)	45 (19.7)
Previous COVID-19 history								
Yes	77 (71.3)	31 (28.7)	70 (64.8)	38 (35.2)	79 (73.1)	29 (26.9)	85 (79.4)	22 (20.6)
No	119 (67.2)	58 (32.8)	112 (63.3)	65 (36.7)	118 (66.7)	59 (33.3)	137 (78.7)	37 (21.3)