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Anxiety, stress and depression levels among nurses of educational hospitals in Iran: Time of performing nursing care for suspected and confirmed COVID-19 patients

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Abstract:

BACKGROUND: Following the global emergency of coronavirus disease 2019 (COVID-19), health-care workers, especially nurses were encountered with an increasing workload. Therefore, due to the importance of this issue, the present study aimed to examine stress, anxiety, and depression levels among nurses during the COVID-19 pandemic in Iran.

MATERIALS AND METHODS: This cross-sectional study was conducted in four educational hospitals affiliated to Kerman University of Medical Sciences in 2020. The standard Depression, Anxiety and Stress Scale-21 questionnaire was applied to assess the levels of stress, anxiety, and depression in nurse personnel with a census method ($n = 403$). Data were analyzed using descriptive statistics and analytic statistics such as Kolmogorov–Smirnov, Mann–Whitney, Kruskal–Wallis, and multiple linear regression tests through the version 20, SPSS Inc., Chicago, IL, USA, Software at the level of $P < 0.05$.

RESULTS: The results of the study showed that the mean scores of depressions (9.18 ± 4.45), stress (9.62 ± 4.94), and anxiety (10.32 ± 4.85) in nurses were at moderate level. A significant relationship was observed between stressed, anxious, and depressed participants in the gender, marital status, level of education, and working hours per month. No statistically significant relationship was found between other demographic variables including age, work experience, and employment status with anxiety, depression, and stress categories.

CONCLUSION: The results of this study can increase the awareness of health system managers, especially hospitals, about the level of stress, anxiety, and depression and can help in order to provide psychological support programs for improving the mental health of nurses during the COVID-19 pandemic.

Keywords:

Anxiety, coronavirus disease 2019 pandemic, depression, nurse, stress

Introduction

The coronavirus disease 2019 (COVID-19) pandemic is a substantial health burden that has major implications for public health globally.[1] COVID-19 is a pneumonia-like disease caused by a novel coronavirus that emerged in the Province of Wuhan in China in November 2019.[2] The world has experienced several pandemics of contagious diseases in the past two decades

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such as SARS in 2003, H1N1 in 2009, Ebola, Zika, and MERS in 2016.[3] High levels of psychological disorders have been documented among nurses who cared for infected patients during these disease outbreaks.[4]

During COVID-19 pandemic, the heavier workload and life-threatening condition of nurses aggravated the psychological pressure, even mental illness. Therefore, health-care workers particularly nurses in the hospital were more exposed to psychological disorders after contacting with COVID-19 patients.[5,6] Stress, anxiety, and depression cause problems in the professional role and responsibility for the health of nurses in the society at present and future. Therefore, it is important to prevent stress, anxiety, and depression in nurses and increase their interest in work and responsibility.[5,7,8] Stress and anxiety have a negative effect on the quality of nurses' life, and their clinical practice and may cause drop out from the nursing care program.[9,10] Among health-care workers, nurses were reported to experience the highest anxiety levels and the highest prevalence of anxiety, ranging from 15% to 92%, rates that were significantly higher than those observed in the general population.[11]

Many studies have shown psychological disorders during the epidemic of acute respiratory diseases in nurses.[12-14] Study of Labrague *et al*.[15] showed that 37.8% were found to have levels of anxiety in nurses and concluded that the COVID-19 pandemic may cause dysfunctional levels of anxiety in front-line nurses. Pouralizadeh *et al*.[16] studied the anxiety and depression and the related factors in nurses of Guilan University of Medical Sciences hospitals during COVID-19 and declared the prevalence of anxiety and depression was 38.8% and 37.4%, respectively, and their reported health-care workers are at high risk for mental illness. Lai *et al*.[17] conducted a study in China on 1257 of hospitals health-care providers and reported that 50.4% of the participants had symptoms of depression, while 44.6% had anxiety symptoms. Studies reported an increase in psychological distress in health-care workers, especially nurses in the world and declared immediate psychological impact of COVID-19 on the hospital nurses is still unknown.[15,16] Also several individual and population-level strategies should be implemented in order to preserve the mental wellbeing of vulnerable groups and decrease the impact of several modifiable factors associated with anxiety.[13,18]

Several researchers have studied the psychological status of medical staff during the ongoing COVID-19 pandemic, but to our knowledge, no studies have addressed the psychological status of the nurse's personnel in Iran during this time. Therefore, the present study aimed to examine stress, anxiety, and depression levels among nurses of four educational hospitals during the COVID-19 pandemic in Kerman, Iran. In other words, the present research attempts to answer the following questions: (a) what is the level of stress, anxiety, and depression in educational hospitals nurse personnel? (b) Is the level of stress, anxiety, and depression different in terms of the demographic characteristics of the participants? The results of this study can increase the awareness of health system managers, especially hospitals, about the level of stress, anxiety, and depression and can help to provide psychological support programs for improving the mental health of nurses during the COVID-19 pandemic.

Materials and Methods

Study design and setting

This cross-sectional study was conducted in four educational hospitals affiliated to Kerman University of Medical Sciences including Shafa, Shahid Bahonar, Shahid Beheshti, and Affzalipourin 2020.

Study participants and sampling

The target population of this study was nurses who work in the emergency and corona departments of hospitals. The sample included (n = 403) nurses using a census method. Inclusion criteria consisted have the least associate degree in nursing, at least 1 year of work experience in one of the hospital departments, and willingness to participate in the study; exclusion criteria included lack of consent for participation in the study and incomplete questionnaires.

Data collection tool and technique

The data collection tool consisted of demographic information form and the Depression, Anxiety and Stress Scale-21, which included 21 items to measure depression, anxiety, and stress in nurses' personnel. The questionnaire was completed as a self-reporting form because there was no need for a skilled and experienced psychologist to complete the questionnaire. Loviband designed the questionnaire in two versions, 42-item and 21-item. In the 21-item version, seven items have been designated to each of the emotional states. This questionnaire is a multiple-choice test and its score ranges from 0 to 3. The highest score in each of the subscales is 21. The scoring system in this tool includes normal (0–4), moderate (5–11), and severe (more than 12). This questionnaire was first presented by Loviband in 1995 and was tested in a large human sample. Antony *et al*. analyzed this questionnaire and obtained Cronbach's alpha coefficient values of 0.97, 0.92, and 0.95 for stress, depression, and anxiety, respectively. Ten of the faculty members of the Kerman University of Medical Sciences (psychologist, psychological health physician, and mental health nurse) approved the face and content validity of the questionnaire. For the reliability, a pilot study was conducted over the scale of the depression, anxiety, and stress. Thirty nurse personnel, who were not

involved in the study process, were asked to complete the questionnaire. Cronbach's alpha coefficient was applied to assess reliability, which was 83% for stress, 85% for anxiety, and 81% for depression.

To prevent COVID-19 transmission through direct contact, we used an electronic web-based questionnaire. Data collection was conducted through social media and the questionnaires were available for the participants using the online platform of WhatsApp. We sent the questionnaires to the nursing virtual groups through the nursing managers in the hospitals of educational where the COVID-19 patients had been admitted. In total, 403 questionnaires were distributed; 364 questionnaires were returned from which 44 were excluded due to being incomplete, which is an overall response rate of 79.4% for inclusion in the analyses.

Data analysis

Data were analyzed using descriptive statistics including mean, standard deviation, frequency, percentage, and analytic statistics such Kolmogorov–Smirnov test were conducted to indicate whether the data followed a normal distribution. The Mann–Whitney and Kruskal–Wallis tests were used to compare mean scores of depression, anxiety, and stress of participants. The multivariate regression was used to determine the impact of demographic variables on stress, anxiety, and depression using the 20, SPSS Inc., Chicago, IL, USA, Software at the level of $P < 0.05$.

Results

A total of 320 nurses were included in the study, most participants (221, 69.1%) were female, and most participants (158, 49.4%) had bachelor degree, most of the participants (118, 36.9) were more than 40 years old, other demographic characteristics are shown in Table 1. The results of the study showed that the mean scores of depressions (9.18 ± 4.45), stress (9.62 ± 4.94), and anxiety (10.32 ± 4.85) in nurses were at moderate level, as shown in Table 2.

The Mann–Whitney test showed a statistically significant difference in the mean scores of anxieties ($P = 0.032$), depression ($P < 0.001$), and stress ($P < 0.001$) in terms of gender. The results base of mean ranks showed that the female nurses had more stress, anxiety, and depression in comparison with male nurses, as shown in Table 3. The Mann–Whitney test showed a statistically significant difference in the mean score of anxiety ($P < 0.001$) and depression ($P < 0.001$) in terms of married status; the results base of mean ranks showed the single nurses "had more anxiety and depression in comparison with married nurses" personnel, as shown in Table 3.

Table 1: Demographic characteristics of the research participants

Variables	Frequency, *n* (%)
Age (years)	
20-30	96 (30.0)
31-40	106 (33.1)
>40	118 (36.9)
Gender	
Female	221 (69.1)
Male	99 (30.9)
Marital status	
Single	46 (14.4)
Married	274 (85.6)
Level of education	
Associate degree	91 (28.4)
Bachelor	158 (49.4)
MA	71 (22.2)
Work status	
Permanent	175 (54.7)
Partial	145 (45.3)
Working hours per month	
Up to 100	56 (17.5)
101-150	63 (19.7)
151-200	90 (28.1)
>200	111 (34.7)
Work experience (years)	
1-5	51 (15.9)
6-10	148 (46.3)
>10	121 (37.8)

Table 2: Mean scores of stress, anxiety, and depression among the research participants

Variable	Mean±SD	Minimum	Maximum
Depression	9.18±4.45	0	20
Anxiety	10.32±4.85	0	19
Stress	9.62±4.94	1	21

SD=Standard deviation

The Kruskal–Wallis test showed a statistically significant difference in the mean score of stress ($P = 0.02$) and depression ($P = 0.02$) in terms of the level of education. Therefore, nurses with associate degree were more stress and depression, shows in Table 4. The Kruskal–Wallis test showed a statistically significant difference in the mean score of anxiety ($P < 0.001$), depression ($P < 0.001$), and stress ($P < 0.001$), in terms of working hours per month. According to the mean values of the ranks, the rate of stress, anxiety, and depression is higher in participants working more than 200 h per month, as shown in Table 4. No statistically significant difference was found between other demographic variables anxiety, depression, and stress.

Multiple regression models showed among all demographic variables influencing depression, anxiety, and stress participants based on β coefficient, gender had the most impact on participants' depression, as shown in Table 5

Table 3: Comparing levels of the depression, anxiety, and stress among nurse's base of gender and married status

Variable	Gender	*n*	Mean rank	Mann-Whitney U	*P*
Depression	Female	221	164.89	7748.00	<0.001*
	Male	99	128.26		
Anxiety	Female	221	159.88	8779.500	0.032*
	Male	99	138.68		
Stress	Female	221	165.69	7582.500	<0.001*
	Male	99	126.59		
Variable	**Married status**	***n***	**Mean rank**	**Mann-Whitney U**	***P***
Depression	Single	46	199.79	4494.500	0.002*
	Married	274	153.90		
Anxiety	Single	46	191.93	4856.00	0.013*
	Married	274	155.22		
Stress	Single	46	166.41	6030.00	0.638
	Married	274	159.51		

*Test is significant at the 0.05 level

Table 4: Comparing levels of the depression, anxiety, and stress among nurse's base of education level and working hours per month

Variable	Education	*n*	Mean rank	χ^2	*P*
Depression	Associate degree	91	169.71	7.571	0.023*
	Bachelor	158	138.00		
	MA	71	168.84		
Anxiety	Associate degree	91	165.08	1.878	0.391
	Bachelor	158	149.29		
	MA	71	164.68		
Stress	Associate degree	91	173.79	7.790	0.020*
	Bachelor	158	138.03		
	MA	71	167.47		
Variable	**Working hours per mouth**	***n***	**Mean rank**	χ^2	***P***
Depression	Up to 100	56	136.53	35.054	<0.001*
	101-150	63	135.81		
	151-200	90	153.46		
	>200	111	218.25		
Anxiety	Up to 100	56	143.85	21.955	<0.001*
	101-150	63	136.16		
	151-200	90	153.00		
	>200	111	205.28		
Stress	Up to 100	56	143.71	13.373	<0.001*
	101-150	63	143.87		
	151-200	90	154.56		
	>200	111	194.36		

*Test is significant at the 0.05 level

and marital status had the most impact on participants' anxiety and stress, as shown in Tables 6 and 7.

Discussion

The results of the study showed that the mean scores of stress, anxiety, and depression in nurses at the hospitals' educational were at moderate level. These results are consistent with the studies of Pouralizadeh *et al*.[16] Braquehais *et al*.[19] and Krishnamoorthy *et al*.[20] This study highlighted the effects of COVID-19 not only on nurses' physical health but also on their mental health, However, most nurses have chosen to take care of patients with COVID-19 infections despite the risk to themselves and their families.

The results showed a statistically significant difference in the mean score of anxiety, depression, and stress in terms of gender. These results are consistent with the studies of Ali *et al*.[21] Cao *et al*.[22] and Wu *et al*.[23] but not consistent with the study of Rathnayake *et al*.[24] Also base of multiple regression model gender had the most impact on participants depression. The present study found that women are more likely to have anxiety, depression, and stress than men, results may be partly confounded by the fact that nurses of this research are mostly female but could be also attributed to some factor included they may face a greater risk of exposure to COVID-19 patients as they spend more time on wards and provide direct care to patients and are responsible for the collection of sputum for virus detection.

Results showed a statistically significant difference in the mean score of anxiety and depression in terms of marital status. Therefore,single nurses had more anxiety and depression in comparison with married nurses', this result is line with the studies results of Nemati *et al*.[25] and Poursadeghiyan *et al*.[26] Also base of multiple regression model's marital status had the most impact on participants' anxiety and stress. Understandably, the rapid spread of COVID-19 has put severe pressure on health-care providers, especially nurses around Iran, and in this regard, we can say support social relationships, including family relationships are inversely related to anxiety and depression and married nurses experience less feelings of depression because more receive of support from their family.

The results showed a statistically significant difference in the mean score of stress and depression in terms of the level of education. Therefore, participants with associate degree are more stressed and depressed. These results are consistent with the studies Bell *et al*.[15] and Poursadeghiyan *et al*.[26]. The lower of stress and depression levels among nurses with levels of higher education is probably due to increased awareness and experience per increasing education. Thus, nurses with more awareness and experience about the COVID-19 infection disease and related nursing care process demonstrated lower stress and depression.

The results showed a statistically significant difference in the mean scores of anxiety, depression, and stress,

Table 5: Multiple regression for evaluating effect demographic variables on participants depression

Variable	Coefficient	SE	β	*P*
Age group (years)	0.18	0.29	0.03	0.536
Gender	1.58	0.59	0.16	0.008
Married status	1.44	0.53	0.06	0.009
Education level	1.14	0.30	0.02	<0.001
Work status	0.02	0.52	0.01	0.963
Working hours per month	0.86	0.33	0.14	<0.001
Work experience (years)	0.38	0.35	0.05	0.278
Intercept	18.22	2.57		

SE=Standard error

Table 6: Multiple regression for evaluating effect demographic variables on participants anxiety

Variable	Coefficient	SE	β	*P*
Age group (years)	0.58	0.33	0.09	0.084
Gender	1.21	0.58	0.11	0.009
Married status	2.06	0.65	0.16	0.002
Education level	0.27	0.34	0.04	0.426
Work status	1.02	0.60	0.10	0.091
Working hours per month	0.74	0.27	0.15	0.007
Work experience (years)	0.59	0.40	0.08	0.144
Intercept	22.55	2.96		

SE=Standard error

Table 7: Multiple regression for evaluating effect demographic variables on participants stress

Variable	Coefficient	SE	β	*P*
Age group (years)	0.25	0.32	0.04	0.428
Gender	1.65	0.64	0.15	0.011
Married status	3.05	0.80	0.18	<0.001
Education level	1.24	0.62	0.14	0.048
Work status	0.14	0.57	0.01	0.805
Working hours per month	0.89	0.35	0.16	<0.001
Work experience (years)	0.78	0.38	0.10	0.043
Intercept	22.53	2.96		

SE=Standard error

in terms of working hours per month. These results are consistent with the studies Bentley *et al*.[27] Kurd *et al*.[28] and Khazei *et al*.[29] There was a significant relationship between overtime hours and work stress.[30] Other studies have shown that workloads as well as vacations can affect the stress, depression, and anxiety of the health-care worker[15,31,32]. In Iran, it seems that the more nurses worked overtime because of elevated workload, their work engagement, and mental health became exacerbated and also the conflict between job and family responsibilities, which leads to increased stress in employees.

Limitation and recommendation

Potential limitations of the present study were a lack of cooperation of the participants and not responding to the questions truly due to embarrassment and fear of revealing information. These limitations were partially overcome by communicating to the participants properly and explaining that their participation is optional, their responses will be kept confidential, and they can fill it without writing their names on it.

Conclusion

Based on the findings of this study, it can be stated that depression, anxiety, and stress in nurses working in four educational hospitals were in moderate level. The spread of the new coronavirus can impact the mental health of nurses and it is essential to preserve the mental health of nurses and to develop psychological interventions that can improve the mental health of nurses during the COVID-19 pandemic. Therefore, continuous supervision of the psychological consequences following infectious diseases outbreaks should be a part of the preparedness efforts of health-care systems, and the results of this study can increase the awareness of health system managers, especially hospitals, about the level of stress, anxiety, and depression and can help in order to provide psychological support programs for improving the mental health of nurses during the COVID-19 pandemic.

Ethical consideration

An informed consent form was attached to the e-questionnaire, and each participant consented to participate in the survey after reading the consent form, and participation in this study was voluntary. This study was approved by the Ethics Committee of the Kerman University of Medical Sciences before the collection of data. A cross-sectional design was employed in 2020. The code of ethics No. is IR.KMU.REC.1399.159 and pajoohan code: 99000033.

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Conflicts of interest

There are no conflicts of interest.

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