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Research Article

Anxiety and Depression Levels of Nurses in the COVID-19 Pandemic and Their Effect in Menstrual Cycle

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Abstract

AIM: This study aimed to identify how anxiety and depression levels of female nurses were affected during the coronavirus disease 19 pandemic and its effect on their menstruation cycles.

METHOD: This cross-sectional study was conducted with 522 female nurses. The data were collected using an online Google questionnaire for sociodemographic and menstrual characteristics and the Hospital Anxiety Depression Scale. The data were analyzed using descriptive statistics, Student's *t*-test, the chi-squared test, and binary logistic regression. The data were obtained from an online Google questionnaire for sociodemographic and menstrual characteristics and the Hospital Anxiety Depression Scale from August to October 2020.

RESULTS: According to the findings, 53.3% of participants were at risk for anxiety and 66.3% were at risk for depression. While 58.6% of them had experienced menstrual irregularities in the last 6 months, 72.9 of them were at risk for depression, and 59.8 of them were at risk for anxiety. Logistic regression found a significant association between anxiety, depression, and regular menstruation. The anxiety levels of the nurses with irregular menstruation were 1.114 times higher and their depression levels were 1.119 times higher.

CONCLUSION: This study determined female nurses' anxiety and depression levels during the pandemic and their effect on the nurses' menstrual patterns. Female nurses are at risk of anxiety and depression during the pandemic, and this affects their menstrual cycles negatively.

Keywords: Anxiety, COVID-19 pandemic, depression, female nurses, menstrual cycles

Introduction

Coronavirus disease 19 (COVID-19) began as a viral pandemic in Wuhan, the capital of Hubei province of China, in December 2019. The World Health Organization defines it as a respiratory tract infection caused by severe acute respiratory syndrome coronavirus 2, the COVID-19 virus (World Health Organization [WHO], 2020). Coronavirus disease 19infection commonly causes respiratory problems, fever, cough, and dyspnea, and in more severe cases, pneumonia, severe acute respiratory infection, kidney failure, and even death (Aslan et al., 2020). Besides their physical effects, pandemics like COVID-19 also cause mental health problems such as depression and anxiety (Huang & Zhao, 2020; Montemurro, 2020). Huang and Zhao (2020) conducted a cross-sectional study on 7236 people in China during the COVID-19 pandemic and found that 35.1% of the participants experienced generalized anxiety disorder and 20.1% had depression symptoms. They also found that healthcare workers were more at risk of mental health problems (Huang et al., 2020). Due to long working hours during the pandemic, the risk of being infected, physical fatigue, and the possibility of transmitting the infection to their families (Rajkumar, 2020). Studies have also found that female healthcare workers have a higher risk of anxiety and depression during the pandemic (Zhang et al., 2020; Zhu et al., 2020). A study conducted in China by Zhang et al. (2020) reported that healthcare workers had a higher prevalence of depression and anxiety than non-healthcare workers during the COVID-19 pandemic. They also found that anxiety and depression were more common among women living in rural areas and for women who had contact with patients with COVID-19. Psychological factors such as stress, anxiety, and depression can cause menstrual irregularities and amenorrhea in women. Strine et al. (2005) found that women with menstrual irregularities had more anxiety, depression, and insomnia than women with regular menstruation. The COVID-19 pandemic has caused psychological distress, especially for female healthcare workers. This study investigates the levels of anxiety and depression of female nurses during the COVID-19 pandemic and their effect on their menstrual cycles.

Research Questions

1. What is the anxiety and depression level of female health workers during the Covid-19 period?

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2. Do anxiety and depression during the Covid-19 period affect their menstrual cycle?

Method

Study Design
This is a cross-sectional study.

Sample
The population of the study consisted of 204,969 nurses working in Turkey. Using the sample size formula (n=N.t2.p.q/d2.(N-1)+t2.p.q), a sample size of 384 female nurses was obtained. More nurses were contacted from August to October 2020, and the study was completed with 522 participants. The study used snowball sampling and a non-random sampling method, to select the sample. The inclusion criteria were being currently a working female nurse and agree to participate voluntarily. Nurses who were not working at the time of the study, males, pregnant and puerperal women, nurses who did not menstruate for any reason (surgery, cancer, cancer treatment, menopause, etc.), and nurses who did not agree to participate were not included in the study.

Data Collection
The study data were collected using a Google questionnaire with sociodemographic characteristics form and the Hospital Anxiety Depression Scale (HADS).

Data Collection Tools
The Sociodemographic Characteristics Form
The sociodemographic characteristics form includes questions about the nurses' individual characteristics (age, education level, region, current workplace, department, etc.) and menstruation (duration and frequency of menstruation, amount of bleeding, etc.) in the last 6 months.

The Hospital Anxiety Depression Scale (HADS)
This scale was developed by Zigmond and Snaith in 1983. The Turkish validity and reliability study of the scale was conducted by Aydemir et al. (1997). The HADS is a 14-item self-administered scale. The odd-number items assess anxiety and the even-number items assess depression. This 4-point Likert-type scale is scored from 0 (no, not at all) to 3 (yes, definitely). Items 1, 3, 5, 6, 8, 10, 11, and 13 show decreasing severity and are scored as 3, 2, 1, and 0. Items 2, 4, 7, 9, 12, and 14 are scored as 0, 1, 2, and 3. The cut-off point for the anxiety and depression subscales of the Turkish version of HADS is 10 and 7, respectively. Scores above the cut-off points indicate the risk of anxiety or depression. Aydemir et al. (1997) found that the Cronbach's alpha value of the anxiety and depression subscales was 0.852 and 0.778, respectively (Aydemir et al., 1997), and in this study, it was 0.853 for the anxiety subscale and 0.796 for the depression subscale.

Statistical Analysis
The data were analyzed using the SPSS v25.0 (IBM SPSS Corp., Armonk, NY, USA). Descriptive statistics (means, standard deviations, minima, and maxima). The groups were compared using Student's t-test and the chi-squared test. Binary logistic regression was used to examine the relationships between the dependent and independent variables.

Ethical Considerations
Ege University of Medicine Faculty ethics commitee approval (dated and numbered 22/07/2020-E.180220), consent from the participants, and permission to use the scale used in the study were obtained.

Results

The participants' mean age was 27.88 ± 5.46, and 78.5% of them were in the 20–30 age range. The nurse's mean work experience was 5.64 ± 5.90 years, and 60.9% had 1–5 years of work experience. Of the nurses, 30.1% lived in the Aegean region, 70.7% had bachelor's degree, and 64% were single. Of them, 74.5% did not have children and 62.3% had dependents. Of the nurses, 45.4% worked at training and research hospitals, 54.4% worked in the clinical departments of hospitals, and 41.4% did not work with COVID-19 patients (Table 1). In the last 6 months, 58.6% of the nurses experienced menstrual irregularities. Of them, 64.4% had a change in their menstrual cycles, 68.3% had a change in the amount of menstrual bleeding, and 61.8% had a change in the duration of menstrual bleeding. It was found that 58.5% of the participants who had a change in their menstrual cycle experienced menstrual bleeding at more than 35-day intervals. Of the participants who had a change in the amount of menstrual bleeding, 56.0% had less decreased bleeding, and of those who had a change in the duration of their menstrual bleeding, 52.6% had a shorter period of bleeding than normal (Table 2). The nurses' mean anxiety subscale score was 10.05 ± 4.37, and their mean depression subscale score was 8.38 ± 4.19. The nurses' cut-off scores indicate that 53.3% of them were at risk for anxiety and that 66.3% were at for depression (Table 3). The mean anxiety subscale score of the nurses who had regular menstruation in the last 6 months was 8.89 ± 4.19 and that of the nurses with menstrual irregularity was 10.86 ± 4.27. The mean depression subscale score of the nurses who had regular menstruation in the last 6 months was 7.29 ± 3.97 and that of the nurses with menstrual irregularities was 9.15 ± 4.20. There were statistically significant differences in the anxiety and depression subscale scores based on whether or not the nurses had regular menstruation in the last 6 months ($p < .05$). The anxiety and depression subscales scores of the nurses who did not have regular menstruation in the last 6 months were higher than the nurses who had regular menstruation (Table 4). The relationship between the nurses' regular menstruation in the last 6 months and their HADS scores was analyzed using the chi-squared test. There was a statistically significant relationship between anxiety and regular menstruation in the last 6 months ($p < .05$). Of the nurses who did not have regular menstruation in the last 6 months, 59.8% were at risk for anxiety. There was a statistically significant correlation between nurses' depression and regular menstruation in the last 6 months ($p < .05$). Of the nurses who did not have regular menstruation in the last 6 months, 72.9% were at risk for depression. Table 5 shows the coefficients of the independent variables in the model, standard errors of these coefficients, Wald statistics, *df*, significance levels, and odds ratios. Anxiety and depression had statistically significant effects on

Table 1.
The Nurses' Sociodemographic Characteristics (n=522)

Variables	n	%
Age (X ± SD)	27.88 ± 5.46	
20–30	410	78.5
31–40	84	16.1
41 and over	28	5.4
Work experience (X ± SD)	5.64 ± 5.90	
1–5 years	318	60.9
6–10 years	128	24.5
11 and more	76	14.6
Region		
Aegean	157	30.1
Marmara	97	18.6
Mediterranean	34	6.5
Black Sea	49	9.4
Central Anatolia	105	20.0
Eastern Anatolia	53	10.2
Southeastern Anatolia	27	5.2
Education level		
High school	29	5.6
Associate's	42	8.0
Bachelor's	369	70.7
Postgraduate	82	15.7
Marital status		
Married	188	36.0
Single	334	64.0
Children		
Yes	133	25.5
No	389	74.5
Dependents		
Yes	197	37.7
No	325	62.3
Current workplace		
Training research hospital	237	45.4
State-city hospital	162	31.0
District hospital	72	13.8
Private hospital	25	4.8
University hospital	26	5.0
Current department/unit		
Emergency room	54	10.4
Intensive care unit	115	22.0
Clinics (inpatient wards)	284	54.4
Operating room	21	4.0
COVID-19 department	48	9.2
Caring for COVID-19 patients		
Yes	216	41.4
No	306	58.6
Total	522	100.0

Note: SD = standard deviation; COVID-19 = coronavirus disease 19.

Table 2.
The Nurses' Menstruation Status in the Last 6 Months (n=522)

Variables	n	%
Regular menstruation in the last 6 months		
Yes	216	41.4
No	306	58.6
Total	522	100.0
Changes in menstruation in the last 6 months		
Experienced no changes	106	34.6
Experienced changes	200	65.4
Total	306	100.0
Change in the menstrual cycle		
Less than 21 days	79	39.5
Intermediate bleeding	117	58.
More than 35 days	4	2.0
Total	200	100.0
Changes in the amount of menstrual bleeding in the last 6 months		
Experienced no changes	97	31.7
Experienced changes	209	68.3
Total	306	100.0
Change in the amount of menstrual bleeding		
Amount of bleeding increased	90	43.0
Amount of bleeding decreased	117	56.0
Irregular	2	1.0
Total	209	100.0
Changes in the duration of menstrual bleeding in the last 6 months		
Experienced no changes	116	38.2
Experienced changes	190	61.8
Total	306	100.0
Change in the duration of menstrual bleeding		
Lasted shorter than normal	100	52.6
Lasted longer than normal	90	47.4
Total	190	100.0

Table 3.
The Nurses' HADS Subscale Scores and Distribution of the Nurses by Their HADS Cut-off Scores

Mean HADS Scores	*n*	Min-Max	X ± SD
Anxiety	522	0–21	10.05 ± 4.37
Depression	522	0–21	8.38 ± 4.19
HADS cut-off scores			*n* %
Anxiety			
No			244 46.7
Yes			278 53.3
Depression			
No			176 33.7
Yes			346 66.3
Total			522 100.0

Note: SD = standard deviation; HADS = Hospital Anxiety Depression Scale; Min = minimum; Max = maximum.

regular menstruation ($p < .05$). The anxiety rate of the nurses who did not have regular menstruation was 1.114 times higher than that of the nurses who had regular menstruation. The depression rate of nurses who did not have regular menstruation was 1.119 times higher than that of the nurses who had regular menstruation.

Discussion

The COVID-19 pandemic has had a negative effect on many people's mental health in Turkey and around the world (Özdin & Özdin, 2020). Studies have shown that healthcare workers—especially female healthcare workers—experience more mental health problems such as anxiety and depression than non-healthcare workers (Al-Hanawi et al., 2020; AlAteeq et al., 2020; Shanafelt et al., 2020; Zhang et al., 2020). In this study, the nurses' mean anxiety subscale score was 10.05 ± 4.37, and 53.3% of them were at risk for anxiety. A study of the general population in Turkey during the pandemic found that the participants' mean anxiety subscale score was 6.8 ± 4.2 and that 45.1% of them were at risk for anxiety (Özdin & Özdin, 2020). Qasem Surrati et al. found that healthcare workers' mean HADS anxiety subscale score was 8.43 ± 4.6 and that 35.6% of them were at risk for severe anxiety (Qasem Surrati et al., 2020).

Depression has also been an important mental health issue during the COVID-19 pandemic. A study reported that 47.1% of nurses have suffered from depression during the COVID-19 pandemic (Zheng et al., 2021). In the current study, the nurses' mean depression subscale score was 8.38 ± 4.19, and 66.3% of them were at risk for depression. A study of the general population in Turkey during the pandemic found that the participants' mean depression subscale score was 6.7 ± 4.2 and that 23.6% of them were at risk for depression. The same study also found that women were mostly affected by COVID-19 psychologically (Özdin & Özdin, 2020). Another study found that healthcare workers' mean HADS depression subscale score was 7.6 ± 4.7 and that 27.9% of them were at risk for depression (Qasem Surrati et al., 2020). The mean scores and rates of anxiety and depression in this study were higher than those of the studies in the literature. This difference may have resulted from the fact that the sample of this study was entirely composed of female nurses.

Psychological factors such as anxiety and depression can cause menstrual irregularities (Strine et al. 2005). This study found that 58.6% of the nurses had experienced menstrual irregularities in the last 6 months. Menstrual irregularity is a common gynecological problem that affects women of all ages, societies, and professions. Studies conducted in women from

Table 4.
The Nurses' Mean Anxiety and Depression Subscales Scores and Their Menstrual Cycles

		Anxiety			Depression		
Variables	***n***	**$\bar{X}$ ± SD**	**t/F Value**	***p***	**$\bar{X}$± SD**	**t/F Value**	***p***
Regular menstruation in the last 6 months							
Yes	216	8.89 ± 4.27	t=–5.181	.000*	7.29 ± 3.93	t=–5.093	.000*
No	306	10.86 ± 4.27			9.15 ± 4.20		

*$p < .05$.
Note: SD = standard deviation.

Table 5.
Binary Logistic Regression Analysis Results for the Effect of the Nurses' Anxiety and Depression on Their Menstrual Cycles

Subscale of HADS	β Coefficient	Standard Error	Wald Statistics	df	*p*	Exp (β)	R^2
Stable	–.720	.231	9.742	1	.002	.487	.049
Anxiety	.108	.022	24.507	1	.000*	1.114	
Stable	–.571	.206	7.684	1	.006	.565	.048
Depression	.112	.023	23.719	1	.000*	1.119	

$p < .05$.
Note: HADS = Hospital Anxiety Depression Scale.

different cultures, professions, and social status have found that rates of menstrual irregularities range from 5% to 42% (Amu & Bamidele, 2014; Fil & Adın, 2019; Harlow & Campbell, 2004; Nohara et al., 2011). Kwak et al. (2019) carried out a study with general female population between the ages of 19 and 54 in South Korea and found that the prevalence of menstrual irregularities was 14.2% (Kwak et al., 2019). A study conducted in Turkey with 20- to 40-year-old women in the general population reported a menstrual irregularity rate of 19% (Fil & Adın, 2019). Unlike the rates in the studies conducted in the general female population, the study conducted by Jiang et al. (2019) in China to examine menstrual cycles of female nurses found that 41% of the nurses had menstrual irregularities (Jiang et al., 2019). In this study, the prevalence of menstrual irregularity was higher than other studies in the literature. This may stem from mental health problems such as anxiety and depression experienced by healthcare professionals during the COVID-19 pandemic.

Zheng et al. (2020) conducted a study with 2 COVID-19-positive women and reported that sex hormones could play an important role in COVID-19 infections. Another study conducted with 237 women of reproductive age who were diagnosed with COVID-19 found that the amount and duration of menstrual bleeding increased in one-fifth of the participants (Li et al., 2021). This study compared the nurses' mean anxiety and depression sub-dimension scores on the HAD scale and their menstrual patterns in the last 6 months. This study found that the mean anxiety score of the nurses with regular menstruation was 8.89 ± 4.19, and the mean anxiety score of the nurses with menstrual irregularities was 10.86 ± 4.27. The mean depression score of the nurses with regular menstruation was 7.29 ± 3.97, and the mean depression score of the nurses with menstrual irregularity was 9.15 ± 4.20. There was also a statistically significant difference between the nurses who had menstrual irregularities and the nurses who did not. Of the nurses who had menstrual irregularities in the last 6 months, 59.8% were at risk for anxiety and 72.9% were at risk for depression.

Bae et al. (2018) found that high perceived stress caused menstrual irregularity. The logistic regression performed in this study indicated that women who did not have regular menstruation had 1.114 times higher anxiety and 1.119 times higher depression.

Conclusion and Recommendations

This study found that the COVID-19 pandemic negatively affected the mental health of the female nurses by increasing their anxiety and depression levels and that this negatively affected their menstrual cycles. Since the characteristics of menstruation cycles can be affected by psychological changes, an approach that includes the evaluation of women's menstrual status characteristics should be part of the management of the pandemic. Such an approach should also evaluate the readiness levels of reproductive health services in extraordinary situations such as pandemics. Psychological support programs should be created to protect and improve female nurses' mental and reproductive health, and plans should be made to improve the support that is currently available. Female nurses' anxiety levels, depression levels, and menstrual health should be reevaluated in the post-pandemic period to determine the causal links more precisely and to compare results.

Ethics Committee Approval: This study has received the Ege University of Medicine Faculty ethics commitee approval (dated and numbered June 22, 2020-E.180220).

Informed Consent: Consent from the participants and permission to use the scale used in the study were obtained.

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