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Research Article

THE EFFECT OF OCCUPATIONAL STRESS EXPERIENCED BY NURSES ON MENSTRUATION: A CROSS-SECTIONAL STUDY

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Abstract: *This study was carried out to determine the irregularity of menstruation that may occur due to the work stress of nurses.The study universe was composed of female nurses aged 18-49. By taking the research sample as an example of studies related to the menstrual irregularity of nurses in the literature, it was determined that 196 nurses should be reached with a 5% error margin and 95% confidence interval, and 264 nurses were reached. The data were collected face-to-face and online using the Introductory Information Form, the Menstrual Symptom Scale (MSS), and the Work Stress Scale (WSS) as data collection tools. The data were evaluated by number, average percentage, Pearson or Spearman correlation, Student's t-test, and One-way analysis of variance in a statistical program.The mean age of the nurses participating in the study is 33.31±7.73. 57.6% of nurses are married, 60.6% are undergraduate graduates, 42.8% are working in a university hospital, 32.3% have been working for 11-20 years, 53.8% are working ≤40 hours weekly, and 56.8% of them work in a shift system. The mean duration of menstruation of the participants was 6.13±1.91 days. 65.6% of them thought that their menstruation was regular, 54.9% had their first menstruation between the ages of 9-13, and 79.2% had a menstruation interval of 21-35 days. A moderately significant relationship was found between the WSS total and all sub-factors and the MSS total score averages. Furthermore, a low-level positive and significant correlation was found between the MSS score, the WSS total score, and the WSS Job Role Mismatch sub-factor score.As a result, it was determined that there is a positive significant relationship between work stress and menstruation status. The implementation of practices that will reduce work stress by health managers will also be able to reduce the complaints of nurses about menstruation.*

Keywords*: Menstruation, Nurse, Work Stress.*

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1. Introduction

Nursing has a heavy workload due to many factors arising from the work environment. The reasons such as increased workload, lack of staff, emotional stress experienced due to patients' problems, long working hours, and working in a shift system make working conditions difficult in the nursing profession [1, 2]. It is stated that stressful and shift work causes reproductive health problems such as irregular menstrual cycle, dysmenorrhea, subfertility, hormonal disorder, spontaneous abortion, the threat of premature birth, and low birth weight babies [3].

The intense and stressful workplace has been associated with negative effects in terms of reproductive health. The menstrual cycle is provided by the cyclical secretion of hormones such as luteinizing hormone, follicle-stimulating hormone, estrogen, and progesterone regulated by the hypothalamus-pituitary-ovary [4]. Menstrual cycle characteristics have been associated with factors

such as age, endocrine problems, age at menarche, parity, body mass index, physical activity, and stress [5]. Stress caused by work can disrupt the hormonal balance and cause menstrual complaints [6]. It is known that menstrual problems such as dysmenorrhea are affected by work-related stress [7]. Nursing Health Studies have reported that irregular menstrual cycle varies between 11% and 19% among nurses [8, 9]. A study in Korea determined that the rate of nurses with menstrual irregularity was 21%, and these nurses reported more complaints such as distress, depression, stress, fatigue, anxiety, and sleep problems (10). A study with Taiwanese nurses revealed that 72.3% of nurses experienced work stress associated with irregular and prolonged menstrual bleeding [11].

Although there is a relationship between the type and severity of stress and women who experience menstruation problems, it is difficult to determine a threshold at which stress interferes with the normal cycle. The individual response to an abnormality in body function increases due to psycho-biological characteristics. On the other hand, shift work can often change the menstrual pattern, disrupting the circadian rhythm. Specifically, it has been suggested that night work negatively affects menstruation, which can affect fertility. A cross-sectional study conducted with 71,077 nurses in the USA showed a relationship between shift work and a short or prolonged menstrual cycle [8]. A study conducted with Taiwanese nurses showed that nurses who work night shifts have shorter menstrual cycles than nurses who do not work at night [12]. For all these reasons, our study was conducted to determine the irregularity of menstruation nurses may experience due to work stress.

2. Materials and Methods

2.1. Purpose and Type of Research

This study was carried out in a descriptive and cross-sectional type to determine the irregularity of menstruation that may develop due to the work stress experienced by nurses.

2.2. Universe and Sample of the Research

The universe of the research was composed of female nurses living in Turkey. The study was conducted between 30 May - 30 September 2022.

While creating the research sample, the menstrual irregularity of the nurses in the literature was taken as an example[8]. The formula ($n= N\ t^2\ p\ q\ /\ d^2\ (N-1) + t^2\ p\ q$) was used, and it was determined that 196 nurses should be reached with a 5% margin of error and 95% confidence interval. In this study, data were collected face-to-face and online, as the maximum level of diversity was aimed at.

2.3. Sampling inclusion criteria

- Being between the ages of 18 and 49
- Being a female nurse
- Working as a nurse
- Not being in the menopausal period

2.4. Data Collection Tools

The Introductory Information Form examines demographic data, and the Menstrual Symptom Scale (MSS) and Work Stress Scale (WSS) were used as data collection tools. The data of the study were collected face-to-face and online with the nurses working in the hospital environment.The answering time for research questionnaires was an average of 5 to 10 minutes.

2.4.1 The introductory information form

The introductory information form consists of 15 questions developed by researchers to determine the socio-demographic status of young people [2,8,9].

2.4.2 Work Stress Scale

In order to determine the work stress level of oncology nurses, the scale developed by Rizzo et al. in 1981 and adapted to Turkish by Güngör (1997) was used [13, 14]. The scale consists of 17 items with a five-point Likert-type scoring**.** The Job Stress Scale consists of 3 sub-dimensions as 'job role uncertainty' (Cronbach alpha=0.87), 'job role mismatch' (Cronbach alpha=0.81), and 'job role burden' (Cronbach alpha=0.61). In this study, the 'job role uncertainty is designated as (Cronbach alpha=0.82), 'job role mismatch'(Cronbach alpha=0.83), and 'job role burden' (Cronbach alpha=0.60). The total Cronbach value for the study is 0.77 .This study shows that the scale with Cronbach's Alpha value is moderately reliable.

2.4.3 The Menstruation Symptom Scale (MSS)

The Menstruation Symptom Scale (MSS) was developed by Chesney and Tasto 1975 to assess menstrual pain and symptoms [15]. The validity of the study in Turkish was made by Güvenç et al. in 2014. MSS is a five-point Likert-type scale consisting of 24 items. The MSS score is calculated by the total score average of the items in the scale. An increase in the average score indicates an increase in the severity of menstrual symptoms. The original scale has three sub-dimensions 'Negative Effects/Somatic Complaints,' 'Menstrual Pain,' and 'Abdominal Pain.'An increase in the average score for the sub-dimensions indicates an increase in the severity of menstrual symptoms related to that sub-dimension. Cronbach's Alpha value of the scale is 0.86 [16]. In this study, the Cronbach Alpha value of the scale was found to be 0.90.

2.5. Analysis of the Data

The data were evaluated by entering the Statistical Package for the Social Sciences(SPSS 21.0) package program. The data were evaluated by number, average percentage, Pearson or spearman correlation, student's t-test, and one-way analysis of variance.

In our study, the variables were normally distributed, and the normality of the distribution was examined by the Skewness-Kurtosis test. Levene's test evaluated that the variances were homogeneous.

2.6. Ethical Aspect of the Study

The ethics committee approved the study with the number 240 on 09.06.2022. After the explanation was made to the participants, their consent was taken on the written and online questionnaires.

2.7. Limitations of the Study

- Inability to perform the study face-to-face,
- Lack of motivation of the nurses to fill out work forms,
- Extension of the data collection period in order to provide access to nurses working in different regions of our country,

2.8. Strengths of the Study

- Accessing the number of samples representing the universe,
- Access to nurses from different regions of the country,
- Access to nurses working in both private and public health institutions.

3. Findings

A total of 264 nurses, with a mean age of 33.3 years, completed the research.It was determined that the difference between the education status of the nurses and the total mean score of the MSS and the age, duration of working in the profession, weekly working hours, and working style, and the total score of the WSS were found to be statistically significant (p<.05) (Table 1).

Table 1. Work Stress Scale and The Menstruation Symptom Scale score averages according to some descriptive characteristics of nurses (n=264)

Features	Number / Percentage		WSS		MSS	
	n	%	$\bar{X} \pm SD$	Test/p	$\bar{X} \pm SD$	Test/p
Age						
20-25	59	22.3	49.20±8.06[a]		3.64±0.66	
26-30	60	22.7	49.37±8.47 [a]	F=2.364	3.59±0.72	F=.801
31-35	46	17.4	48.11±10.23	p=**.049***	3.58±0.83	p=.526
36-40	32	12.2	46.06±9.61		3.48±0.81	
41 and over	67	25.4	45.57±7.32 [b]		3.42±0.74	
Marital Status						
Married	152	57.6	47.60±8.82	t= -.323	3.49±0.77	t=-1.257
Single	112	42.4	47.95±8.52	p=.747	3.61±0.69	p= .210
Education Status						
High School or Associate D.	79	29.9	47.60±8.24	F=.806	3.68±0.77	F=3.765
Bachelor's Degree	160	60.6	47.50±9.01	p=.448	3.45±0.70 [b]	p= **.024***
Graduate	25	9.5	49.84±7.81		3.74±0.84[a]	
Having Children						
Yes	135	51.1	48.31±0.59	t=1.082	3.61±0.69	t=1.427
No	129	48.9	47.16±8.77	p= .28	3.48±0.79	p= .16
Institution Where She Works						
University Hospital	113	42.8	46.88±8.71		3.51±0.80	
The Ministry of Health	102	38.6	49.25±7.92	F=1.714	3.49±0.68	F=2.355
Private Hospitals	10	3.8	45.80±7.53	p=.165	4.09±0.40	p=.072
TSH	39	14.8	46.85±10.38		3.64±0.74	
Unit Where She Works						
Internal Medicine Services	99	37.5	48.64±8.82		3.52±0.75	
Surgical Services	29	11.0	47.69±7.60	F=1.336	3.34±0.70	F= .973
Intensive Care	87	33.0	47.94±8.09	p=.263	3.60±0.73	p=.406
Administrative/Polyclinic	49	18.6	45.63±9.82		3.60±0.75	
Duration of Work in the Profession (years)						
1-5	70	26.5	49.59±7.36 [a]		3.56±0.66	
6-10	59	22.3	49.66±9.56 [a]	F=4.095	3.56±0.77	F=1.021
11-20	85	32.3	46.14±9.25 [b]	p=**.007***	3.61±0.79	p=.384
21 and over	50	18.9	45.64±7.42 [b]		3.39±0.73	
Weekly Working Hours						
40 and under	142	53.8	46.08±8.42	t=-3.439	3.50±0.74	t=-.983
45 and over	122	46.2	49.69±8.60	p=**.001***	3.59±0.74	p=.326
Mode Of Study						
Non-Shift	114	43.2	46.17±9.03	F=-2.606	3.57±0.79	t= .544
Shift	150	56.8	48.95±8.24	p=**.010***	3.52±0.70	p=.587

X: Mean, SD: Standard Deviation, F: One Way Anova, t: Student T, *p<0.05, **p<0.01.
[a-b]: Groups where the difference isindicated

It was determined that the difference between the nurses' menstrual pattern and the total mean scores of MSS and WSS was statistically significant (p<.05) (Table 2).

Table 2. Total Work Stress Scale and The Menstruation Symptom Scalemean scores of the nurses according to the characteristics of menstruation (n=264)

Features	Number / Percentage		WSS		MSS	
	n	%	$\bar{X} \pm SD$	Test/p	$\bar{X} \pm SD$	Test/p
Menstrual Pattern						
Regular	173	65.6	46.67±8.67 [a]	F=4.733 p= **.010***	3.47±0.72[a]	F=3.567 p= **.030***
Irregular	55	20.8	51.17±8.19 [b]		3.54±0.95	
Undecided	36	13.6	48.89±8.43		3.77±0.61[b]	
The Age of the First Menstruation						
age of 9-13	145	54.9	48.30±9.05	t=1.152	3.50±0.77	t= -.869
age 14 and over	119	45.1	47.07±8.19	p=.250	3.59±0.59	p=.386
Menstrual Pattern Range						
every 21-35 days	209	79.2	47.48±8.91	F=.461	3.52±0.73	F=.759
shorter than 21 days	29	11.0	48.83±7.77	p=.631	3.70±0.82	p=.469
longer than 35 days	26	9.8	48.65±7.83		3.53±0.78	

X: Mean, SD: Standard Deviation, F: One Way Anova, t: Student T, *p<0.05 **p<0.01.
[a-b]: Groups where the difference is indicated

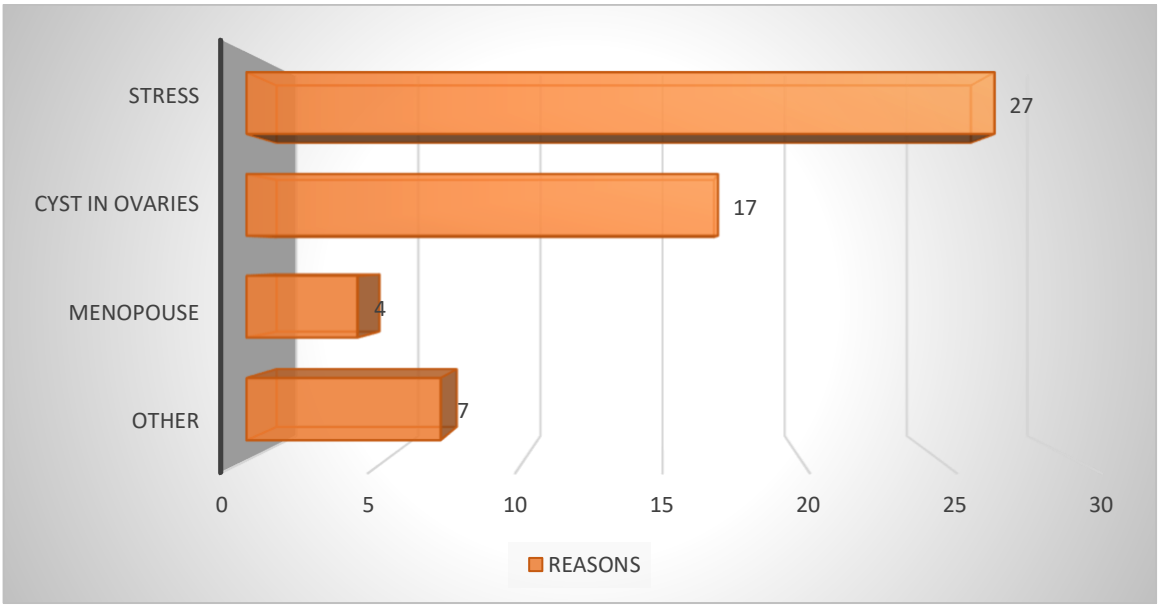

Figure 1. Reasons for Menstrual Irregularity Considered by Nurses (n: 55)

It was determined that the nurses' WSS scored 47.75±8.68, and MSS scored a total of 3.54±0.74.A weak positive significant relationship was found between the total WSS and MSS score and the participants' WSS Job Role Mismatch sub-factor score (p<0.05, Table 3).

Table 3. The Relationship between the Work Stress Scale Total and Sub-Factors Score and the TheMenstruation Symptom ScaleTotal Scores

	$\bar{X} \pm SD$	Test/p	WSS Total Score	WSS Job Role Uncertainty	WSS Job Role Mismatch	WSS Job Role Burden	MSS Total Points
WSS Total Score	47.75±8.68		___				
IS Job Role Uncertainty	13.93±5.16	r	.684**	___			
		p	**.000**				
WSS Job Role Mismatch	26.47±7.19	r	.789**	.175**			
		p	**.000**	**.004**	___		
WSS Job Role Burden	7.35±2.64	r	-.195**	-.183**	-.471**		
		p	**.001**	**.003**	**.000**	___	
MSS Total Score	3.54±0.74	r	.169**	.110	.155*	-.082	
		p	**.006**	.074	**.011**	.184	___

r=Pearson correlation coefficient, *p< 0.05. **p< 0.01

4. Discussion

According to the results of our study, it has been determined that the work stress experienced by nurses affects menstrual symptoms at a low level. It has been determined that the excess weekly working hours and shift work increase job stress. The relationship between intense work pace and shift work with menstrual function is supported by studies [17,18]. The essence of the nursing profession and workload can lead to problems associated with menstrual symptoms in female nurses and decrease work performance. Work stress seen in nurses is reported to be associated with hyperprolactinemia, which can cause fertility disruption and infertility [19].

It has been determined that 65.6% of the nurses participating in our study have regular menstrual cycles. A similar study determined that 66.7% of nurses have regular menstrual cycles [18]. On the other hand, a significant part of the participating nurses had menstrual problems. Although menstrual problems negatively affect the daily life of women, they cause a decrease in the ability to perform professional tasks and their quality of life [7]. One systematic review study reported that the annual cost of treating menstrual symptoms is 12-36 billion dollar's[20]. When it is considered a health expenditure, it is clear that there is an economic burden that cannot be underestimated. For this reason, it will be more economical to provide counseling services to nurses to determine the causes of menstrual problems and ways to solve them.

It was determined that the scores of the nurses who experienced menstrual irregularity were significantly higher than the WSS and MSS scores. It is known that menstrual symptoms are work-related and stress-related. Nursing care is among the professions that require strength due to both its physical and emotional effects. Night shifts and physically challenging work schedules increase emotional stress and cause menstrual irregularity. The general pressure on nurses results in a change in menstrual symptoms. Sharing menstrual symptoms is also still considered a social taboo. Women's fear of appearing weak causes them to hesitate to express their menstrual disorders or ask for help [21, 22]. In the study by Yu et al., nurses reported that they could not see sufficient support from their colleagues regarding the menstrual symptoms they experienced and therefore did not share the problems [7].

It was determined that among the nurses participating in the study, those with ten or fewer working years experienced higher levels of job stress. Nurses working in intensive care and outpatient clinics reported higher work stress and menstrual problems. A study conducted on American nurses stated that units that cause high-stress increase work stress and pose a risk for longer cycles [23]. It is known that prolonged and shift work causes many problems. Similarly, to the literature, it has been revealed that intensive-paced work areas increase stress more in the nurses participating in our study.

It has been determined that almost half of the nurses participating in the study work more than 40 hours a week, which increases work stress but does not affect menstruation. A weak positive relationship was found between weekly working hours and shift work and work stress. Long working hours were associated with menstrual irregularity and short cycles in the study by Lawson et al. [9]. Taiwanese nurses have reported that working hours cause menstrual irregularity, amenorrhea, and long cycles [12]. Another study reported that variability in weekly working hours has effects such as menstrual irregularity, amenorrhea, and long cycle [24]. Shift work is reported to have effects that alter menstrual patterns. In our study, there was no significant difference between shift workers and non-shift workers regarding menstrual symptoms. However, it has been found that shift workers experience more work stress. It has been determined that the shift work model in Italian nurses is associated with short cycle rates compared to nurses working fixed shifts [23].

In this study, it was determined that nurses experienced moderate stress on the Work Stress Scale. In a study conducted by Tuna and Baykal with oncology nurses, it was reported that they experienced a similar moderate level of work stress [25]. In the studies of Özen Bekar and Gökoğlan, it was determined that the mean WSS scores of new nurses were at a moderate level [26]. It is observed that the work stress of nurses is similar in different studies. Although similar and particular problems affect work stress, it can be said that nurses experience work stress under all circumstances. Solutions should be developed by determining the causes of nurses' stress.

The study determined that the nurses scored a total of 3.54±0.74 points on the menstrual symptom scale, with average scores. In the studies of Solt Kırca and Özgün with working and student women, it was reported that the total MSS score was 3.37± 0.45 [27]. The study conducted by Güvenç et al. with nursing students determined that they scored a total of 2.65 ± 0.79 points [16]. It was determined that the total MSS score of immigrant university students was 1,28 ± 0,364[28]. It has been determined that the nurses participating in our study have higher scores compared to student nurses and working or young immigrant women. It can be said that the nursing profession causes menstrual problems more in women.

5. Conclusions and recommendations

In this study, it was determined that the stress experienced by nurses affects menstrual symptoms at a low level, and it was found that weekly working hours and shift work are among the factors that increase stress. In light of this information, it can be recommended to take the necessary precautions in the unit where they work, make remedial arrangements regarding fair wages, patient/nurse ratios, and working hours, and organize stress management training to minimize the work stress of nurses and the menstrual symptoms experienced accordingly. There is a need for different studies to make the work stress experienced by nurses, their results, and menstrual effects visible and provide guidance for a solution.

Ethical statement:

For conducting the study, ethical approval was obtained from the Clinical Research Ethics Committee of Dicle University on June 09, 2022 (Number: 240), written institutional permission from the university hospital, Where the study was conducted and written and verbal consents from nurses who agreed to participate in the study. The research was carried out in accordance with the principles of the Helsinki Declaration.

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Each author's contribution to the paper:

Concept – M.A.Ş., E.Y.A.;
Design- M.A.Ş., E.Y.A.;
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