Premenstrual Syndrome and Psychological Changes in Women During the Covid-19 Pandemic
Covid-19 Pandemisi Sürecinde Kadınlarda Premenstrual Sendrom ve Psikolojik Değişimler

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Article Information	ABSTRACT
Received: 24.05.2023 *Accepted*: 31.10.2023	**Aim:** Premenstrual syndrome is an important problem affecting women's health. This study aimed to examine premenstrual syndrome and psychological changes in women during the COVID-19 pandemic and to evaluate the relationship between premenstrual syndrome and psychological changes. **Subjects and Method:** The study, designed as a descriptive type, was conducted with 910 women in the 18-49 age group. "Premenstrual Syndrome Scale" and "Depression Anxiety Stress Scale-21" were used as data collection tools in the study. Frequency, percentage, t test in independent groups, ANOVA test and correlation analysis were used in the analysis of the data. **Results:** Premenstrual syndrome was detected in 68.8% of women, depression in 63.8%, anxiety in 75.8%, and stress in 39.3%. In the correlation analysis conducted on the relationship between women's premenstrual syndrome scores and depression, anxiety and stress scores, a positive significant relationship was found (p<0.001). **Conclusion:** It was concluded that increasing depression, anxiety and stress levels in women increased premenstrual symptoms. It is thought that premenstrual syndrome symptoms are exacerbated by the increase in women's depression, anxiety and stress mood changes during the pandemic period. **Keywords:** Anxiety, COVID-19, depression, premenstrual syndrome, stress
Makale Bilgisi	**ÖZ**
Geliş Tarihi: 24.05.2023 *Kabul Tarihi*: 31.10.2023	**Amaç:** Premenstrual sendrom kadın sağlığını etkileyen önemli bir sorundur**.** Bu çalışmada kadınlarda COVID-19 pandemisinde premenstrual sendrom ve psikolojik değişimlerin incelenmesi ve premenstrual sendrom ile psikolojik değişimler arasındaki ilişkinin değerlendirilmesi amaçlanmıştır. **Örneklem ve Yöntem:** Tanımlayıcı tipte tasarlanan çalışma 18-49 yaş grubunda yer alan 910 kadın ile gerçekleştirilmiştir. Araştırmada veri toplama aracı olarak, "Premenstrual Sendrom Ölçeği" ve "Depresyon Anksiyete Stres Ölçeği-21" kullanılmıştır. Verilerin analizinde frekans, yüzde, bağımsız gruplarda t test, ANOVA testi, korelasyon analizi kullanılmıştır. **Bulgular:** Kadınların %68.8'inde premenstrual sendrom, %63.8'inde depresyon, %75.8'inde anksiyete ve %39.3'ünde stres saptanmıştır. Kadınların premenstrual sendrom puanları ile depresyon, anksiyete ve stres puanları arasındaki ilişkiye yönelik yapılan korelasyon analizinde pozitif yönde anlamlı bir ilişki bulunmuştur (p<0.001). **Sonuç:** Kadınlarda artan depresyon, anksiyete ve stres düzeylerinin premenstrual semptomları arttırdığı sonucuna varılmıştır. Pandemi sürecinde kadınların depresyon, anksiyete ve stres duygu durumu değişikliklerinin artmasıyla premenstrual sendrom semptomlarının şiddetlendiği düşünülmektedir. **Anahtar Kelimeler:** Anksiyete, COVID-19, depresyon, premenstrual sendrom, stres

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Introduction

Premenstrual syndrome (PMS) is a problem that can occur with physical, psychological, and behavioral changes in the luteal phase of the menstrual cycle in women of reproductive age, and the symptoms disappear spontaneously within a few days after the onset of menstruation. Studies show that 90% of women at reproductive age suffer from a broad perspective of symptoms, of which approximately 20-40% are PMS and 2-8% are Premenstrual Dysphoric Disorder (Chumpalova et al., 2020). The worldwide prevalence of PMS is reported as 47.8% (Geta et al., 2020). Studies conducted in our country (Turkey) have reported that the prevalence of PMS varies between 66% (Erbil & Yücesoy, 2023). During the pandemic, communities have been removed from their jobs and streets, and they have been asked to stay at home in order to prevent contamination in our country as well as all over the world. This has had significant effects on people's lives, physical and psychological health (Pieh et al., 2020). In a study conducted in Italy on the impact of the pandemic on mental health, it was reported that 17.3% of the participants experienced depression, 20.8% experienced anxiety, and 21.8% experienced high stress and insomnia (Rossi et al., 2020). Restrictions are known to cause psychosocial problems, especially for those considered vulnerable. It is stated that being a woman is also an important risk factor in terms of post-traumatic stress, symptoms and the emergence of depressive symptoms (Ostacoli et al., 2020).

There are also studies stating that women experience more depression, anxiety and stress than men (Khalaf et al., 2020; Mautong et al., 2021). In many articles, it is stated that gender is an important risk factor, and women are more affected by the pandemic period and they experience various psychological symptoms at higher levels (Pieh et al., 2020). A study found that the anxiety level of women was significantly higher than that of men (Erdoğdu et al., 2020). In a study conducted with married women in the literature, it was stated that 35% of women experienced stress, 20% experienced anxiety, and 44% experienced depression ranging from mild to extremely severe (Sagar et al., 2022). During the quarantine, women who have increased responsibilities in matters such as housework, online business life, and child care were more affected by the epidemic both physically and emotionally than men (Vazquez Vazquez et al., 2020). In addition, significant changes in women's daily activities such as social life, work life, nutrition and exercise have the potential to cause negative effects on women's menstrual cycle and symptoms (Rad et al., 2018; Robertson et al., 2021). Considering that stress, anxiety and depression symptoms increase when this situation is combined with the confusion caused by the pandemic, it is thought that premenstrual symptoms and PMS prevalence in women will also increase. We could not find any study in the literature that evaluated the PMS and the psychological changes during the pandemic in women. In this study, it was aimed to evaluate the PMS and psychological changes in women during the pandemic, and to examine the relationship between PMS and psychological changes.

1. What is the incidence of premenstrual syndrome in women during the Covid 19 pandemic?
2. What is the mood of depression, anxiety and stress in women during the Covid 19 epidemic?
3. Is there a relationship between premenstrual syndrome and depression, anxiety and stress in women during the Covid 19 pandemic?

Subjects and Method

Study Design, Sample and Procedure

This is a descriptive study. The required sample size was determined as 384 with 95% confidence interval and ±5% sampling error for the study. Beyond that, since the large sample size provides more valuable data in comparing subgroups, the study was conducted with 910 women reached between April and May 2021. Inclusion criteria for the study were determined as

being over the age of 18, still having a menstrual cycle, not having any previously diagnosed psychiatric disease (according to the participant statement), being able to read and understand Turkish, and agreeing to participate in the study. Data collection forms were delivered to the participants electronically with Google forms by e-mail, WhatsApp, and Instagram. Before answering the questions, the informed consent form was presented to the individuals, information was given about the study and the approvals of the participants were procured. The necessary information statement for the participants was added to the first part of the survey and the participants were asked to tick the consent option for voluntary participation. The questionnaires sent online were requested to be returned within one day.

Data collection tools

"Personal Information Form", "Premenstrual Syndrome Scale" and "Depression Anxiety Stress Scale" prepared by the researchers were used to collect the data.

Personal information form

There are a total of 21 questions about sociodemographic and menstruation characteristics of women in the form composed by the researchers by reviewing literature (Akmalı et al., 2020; Albsoul-Younes et al., 2018; Ozeren et al., 2013; Yesildere et al., 2019).

Premenstrual Syndrome Scale (PMSS)

PMSS is a 44-item and five-point Likert-type scale developed by Gencdogan (2006) to evaluate the severity of premenstrual symptoms of women. The scale consists of 9 sub-dimensions; anxiety, depressive affect, irritability, fatigue, depressive thoughts, appetite changes, pain, bloating, and sleep changes. The lowest possible score from the scale is 44 while the highest is 220. There are no reverse items in the scale. It is recommended that those with a total PMSS score above 110 (50%) be considered PMS positive. An increase in the total score obtained from the scale is considered as an increase in the intensity of PMS symptoms. While the Cronbach alpha reliability coefficient of the scale is 0.75 (Gencdogan, 2006) it was determined as 0.97 in our study.

Depression Anxiety Stress Scale (DAS-21)

This is a 21-item short form developed by Sarıçam (2018) of the 42-item scale developed by Lovibond and Lovibond (1995). The scale items, which have a total of seven items for depression, anxiety and stress factors are answered by evaluating their status in the last week. Scoring 5 points or more from the depression sub-dimension, 4 points or more from anxiety, and 8 points or more from stress indicates that there is a related problem. DAS-21 Scale is a 4-point Likert type scale. There are no reverse items in the scale.In the clinical sample, the Cronbach's alpha reliability coefficient was found to be .87 for the depression subscale, 0.85 for the anxiety subscale, and 0.81 for the stress subscale (Sarıçam, 2018). In our study those were 0.87, 0.87, and 0.89, respectively.

Data Analysis

SPSS package program version 22 was used in the analysis of the data. Univariate analyzes were used to determine the characteristics of the sample (frequency, percentage, mean, standard deviation) (Table 1). Student's t test and one-way analysis of variance (ANOVA) were used to compare PMSS scale scores, DAS-21 scores and sociodemographic characteristics. The Student t test was used to determine the relationship between PMS incidence and depression anxiety stress scores. Correlation analysis was used to determine the relationship between PMSS score averages and DAS-21 mean

scores. The level of statistical significance was accepted as α = 0.05.

Ethical Approval

Eskisehir Osmangazi University Ethics Committee approved this study protocol (Date: 04/21 Number: E-25403353-050.99-183154). Since the data was collected online, the necessary information statement for the participants was added to the first part of the survey. Participants were asked to tick the consent option for voluntary participation.

Results

The mean age of the participants participating in the study was 28.7±8.83, 40.9% were in the 18-24 age group, 67.5% had undergraduate education, 59.5% had medium income, 56.6% were single and 51.4% were unemployed. 17.5% of women smoke and 12.2% use alcohol (Table 1). When Table 1 is examined, the mean age of first menstruation of women is 13.1±1.26, mean period length is 28.1±5.49 days, mean menstrual bleeding time is 6.09±1.56 days, and 75.6% of them have regular menstruation. 66.2% of women feel worse than usual before menstruation, and 58.2% of them have a family history of complaints before menstruation. In addition, 77% of women stated that they experienced painful menstruation, 22.6% stated that their pain increased during the pandemic, and 29.8% stated that there was a change in the menstrual cycle. (Table 1).

Table 1. Women's Socio-Demographic and Menstrual Cycle Characteristics

Characteristics		n (910)	%
Age (Year) Overall (X̄±SD) 28.7±8.83	18-24	372	40.9
	25-34	289	31.8
	35-44	197	21.6
	45-49	52	5.7
Educational status	Primary school	54	5.9
	High school	111	12.2
	Undergraduate	614	67.5
	Postgraduate	131	14.4
Income status	Income exceeds expenses	205	22.5
	Income equals expenses	541	59.5
	Income less than expenses	164	18.0
Marital status	Married	395	43.4
	Single	515	56.6
Employment status	Employed	442	48.6
	Unemployed	468	51.4
Smoking	Smoker	159	17.5
	Non-smoker	751	82.5
Alcohol consumption	Yes	115	12.6
	Not	795	87.4
Age at first menstruation Overall (X̄±SD) 13.1±1.26	12 and under	265	29.1
	13	331	36.4
	14 and over	314	34.5

Table 1. (cont.) Women's Socio-Demographic and Menstrual Cycle Characteristics

Characteristics		n (910)	%
Menstrual cycle (days) Overall (X̄±SD) 28.1±5.49	<28 days	302	33.2
	28 days	265	29.1
	>28 days	343	37.7
Bleeding period (days) Overall (X̄±SD) 6.09±1.56	<7 days	560	61.5
	7 days and over	350	38.5
Menstrual pattern	Regular	688	75.6
	Irregular	222	24.4

The prevalence of depression mood was found to be 63.8%, the prevalence of anxiety mood was 75.8%, and the prevalence of stress mood was 39.3%. The mean premenstrual syndrome score of the women was 131.3±40.7. The mean depression score of the women was 7.04±5.14, the mean anxiety score was 7.78±4.95, and the mean stress score was 7.01±5.46 (Table 2).

Table 2. Prevalence of Premenstrual Syndrome, Depression, Anxiety and Stress in Women

(X̄±SD)	Yes/No	n (%)
Premenstrual Syndrome Overall (X̄±SD) 131.3±40.7	Yes	626 (%68.8)
	No	284 (%31.2)
Depression Overall (X̄±SD) 7.0±5.1	Yes	581 (%63.8)
	No	329 (%36.2)
Anxiety Overall (X̄±SD) 7.78±4.9	Yes	690 (%75.8)
	No	220 (%24.2)
Stress Overall (X̄±SD) 7.01±5.4	Yes	358 (%39.3)
	No	552 (%60.2)

There is a statistically significant difference between the depression, anxiety and stress mean scores of women with premenstrual syndrome and women without premenstrual syndrome. The average depression, anxiety and stress scores of women with premenstrual syndrome are higher than those of women without premenstrual syndrome ($p < 0.001$) (Table 3).

Table 3. Difference Between PMS Mean Scores and Depression, Anxiety, Stress Mean Scores of Women with and without Premenstrual Syndrome

DAS-21	Status of Premenstrual Syndrome			
	With PMS n (626)	Without PMS n (284)	t	p
Depression (X̄±SD)	8.82±4.89	3.11±3.08	-18.103	**<0.001**
Anxiety (X̄±SD)	9.18±4.75	3.75±2.94	-17.758	**<0.001**
Stress (X̄±SD)	8.88±5.23	2.87±3.20	-17.887	**<0.001**

PMS: Premenstrual Syndrome, p= Significance Level, t= Independent Sample T Test

A statistically significant positive correlation was found between the mean scores of the women in PMSS and the mean scores of DAS-21 ($p < 0.001$) (Table 4).

Table 4. The Relationship Between Women's PMSS Scores and DAS-21 Scores

		DAS-21		
		Depression	Anxiety	Stress
PMSS	r	0.721	0.726	0.712
	p	<0.001**	<0.001**	<0.001**

PMSS: Premenstrual Syndrome Scale, DAS-21: Depression Anxiety Stress Scale, p= Significance Level, r= Correlation Coefficient

Discussion

The aim of this study is to determine the prevalence of PMS, depression, anxiety and stress mood in women during the COVID-19 epidemic and to examine the relationship between PMS and psychological changes.

In our study to examine the changes related to PMS seen in women during this pandemic period, the prevalence of PMS in women was found to be 68% (Table 3). When the literature is examined, it has been seen that this result is quite high compared to the results of the previous studies before the pandemic. According to a study, approximately 20-40% of women of reproductive age worldwide experience PMS (Chumpalova et al., 2020). In a meta-analysis study the worldwide prevalence of PMS was 47.8% before the pandemic (Direkvand Moghadam et al., 2014). PMS prevalence was 47.1% in a study conducted in Saudi Arabia (Bakhsh et al., 2020), 29% in Jordan (Albsoul-Younes et al., 2018), and 48.75% in Turkey (Yesildere Saglam & Basar, 2019).

Socialization of people has been significantly restricted with the measures taken to prevent the epidemic (e.g., quarantine, social isolation) in Turkey as well as in the World (Demir et al., 2021). Lack of information about COVID-19, misinformation in the media, lack of treatment, travel restrictions, economic deterioration, strict isolation measures and highly alarming death rates have been shown to have profound effects on the mental health of individuals and leading depression, anxiety and stress (Banerjee, 2020; Lima et al., 2020). In this study, the prevalence of depression in women was 63.8%, the prevalence of anxiety was 75.8%, and the prevalence of stress was 39.3% (Table 2). The changes caused by the pandemic in the lifestyle behaviors of individuals create uncertainty for the future, but especially dragged women into emotional distress (Cao et al., 2020).There are also studies stating that women experience more depression, anxiety and stress than men (Khalaf et al., 2020; Mautong et al., 2021). In a study from Tunusia about social isolation and women's mental health during pandemic, it was determined that 57.3% of women had extremely severe anxiety and depressive symptoms, and 53.1% had extreme stress symptoms (Sediri et al., 2020). A study conducted before the pandemic identified depression in 3.7%, anxiety in 7.7%, and stress in 9.5% of the general population (Mirzaei et al., 2019). As can be seen from the studies, the pandemic process had a significant negative impact on women.

In our study conducted during the COVID-19 epidemic, the prevalence of PMS, depression, anxiety and stress mood was quite high in women.

Depression, anxiety and stress mood levels of women experiencing premenstrual syndrome were found to be high (Table 3). Stressful events affect female reproductive physiology; It causes menstrual disorders by affecting at different levels, including the endocrine system, autonomic nervous system and immune system. Although the relationship of epidemics and pandemics with menstruation is not clear, it is known that menstrual problems increase in extraordinary situations such as earthquakes and wars (Aolymat, 2021). Global epidemics not only affect physical health, but also pose a significant risk for mental health (Bao et al., 2020). The pandemic can bring along acute and permanent psychosocial stressors that will

adversely affect the mental health of women, who are also at great risk due to their gender. The relationship between psychological problems and menstrual cycle was also discussed before the pandemic. In this study, depression, anxiety and stress levels of women with irregular menstruation were found to be quite high due to the effect of pandemic conditions. This situation is considered to be due negative effects of the pandemic on their mental health by exposing them to various stressors (e.g., insufficient sleeping, increased psychologic and physical stress). Long-term exposure to these stressors is also thought to be an important factor in increasing menstrual disorders (Banerjee, 2020; Lima et al., 2020). Although the prevalence of PMS varies around the world, it can be affected by genetics, nutrition, place of residence, habits, lifestyle differences and diversity of measurement tools (Hashim et al., 2019). The negative effects of the pandemic on people's lifestyles, habits and psychology are also known (Bao et al., 2020). As a very large vulnerable group during the pandemic women experience a different adaptation process due to uncertainty, social isolation, and changes in daily routines. It is thought that the psychosocial problems experienced in this period have an increasing effect on the prevalence of PMS by affecting the hormonal cycles of women.

The emergence and rapid spread of the Coronavirus disease 2019 has also been evaluated by the World Health Organization (WHO) as a public health problem and emergency of international importance (Yue et al., 2021). The United Nations Population Fund (UNFPA) also underlined that COVID-19 has a devastating effect on women's sexual and reproductive health (Cousins, 2020). It is known that women are more prone to mood changes due to cyclical hormonal fluctuations. Fluctuations in ovarian hormones throughout the menstrual cycle have long been thought to be an important factor determining women's mood (Schwartz et al., 2012). Menstruation is a process that can be affected by psychological stress and lifestyle changes. Stressful events cause menstrual disorders by affecting female reproductive physiology at different levels, including the endocrine system, autonomic nervous system and immune system (Aolymat, 2021). Since the onset of the pandemic, women have been experiencing changes in menstrual symptoms, including menstrual pattern, bleeding duration and quantity, an increase in dysmenorrhea, and PMS (Sharp et al., 2022).

Yuksel and Ozgor (2020) reported that menstrual disorders increased during the pandemic (Yuksel & Ozgor, 2020). The reason for the high levels of depression, anxiety and stress in women participating in the study is thought to be the pandemic It is thought that changes in women's roles such as motherhood, housewife and spouse roles as well as labor force participation within the scope of pandemic measures and home quarantine practices, changes in dietary habits, decrease in physical activity, social isolation, and decrease in social support are effective in this situation (Holmes et al., 2020). In future studies to be conducted after the pandemic ends, this hypothesis can be evaluated more precisely by evaluating whether the menstrual cycle parameters will return to their former order and determining their relationship with depression, anxiety, and stress.

Limitations

This study is limited by its cross-sectional nature. Due to the cross-sectional nature of the study, it may not be sufficient to conclude that these effects occurred about the entire pandemic. Another point to be considered is the possibility that individuals do not prefer to explain their private matters to others because of cultural and moral reasons. Despite these limitations, this study is important because no other study investigating PMS and psychological symptoms in women during the pandemic period in Turkey was found. It provides valuable information about the effects of pandemic on early PMS and the psychological changes it creates. In addition, the large sample size, which includes women from both rural and urban areas of Turkey, is the strength of the research.

Conclusion and Recommendations

In the study, the prevalence of PMS in women in the pandemic was found to be quite high. During the pandemic, changes in women's menstrual characteristics are too high to be ignored. The stress caused by the pandemic causes changes in the menstrual cycle. The increase in women's depression, anxiety and stress levels was associated with an increase in PMS levels. These results highlight the need for interventions during any pandemic to improve women's psychological health for their future physical and reproductive health. Considering the various restrictions and uncertainties that occur in global pandemics, it is important to be aware of the psychological effects of stressful environments faced by women and their possible long-term effects on fertility and to take necessary precautions. It is necessary to create emergency action plans to protect and improve women's physical and psychological health throughout the country during pandemics and disasters, and to take necessary precautions by relevant ministries to carry them out in emergency situations. It will be important for psychosocial support practices for women to be made accessible to every individual in society by relevant health institutions and to be offered as a cost free service.

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