



Comparison of Mood, Physical Symptoms, Cognitive Failure and Life Satisfaction in Women with Premenstrual Dysphoric Disorder, Premenstrual Syndrome and No/Mild Premenstrual Syndrome: A Controlled Study

Premenstrüel Disforik Bozukluk, Premenstrüel Sendrom ve Hafif Premenstrüel Sendromu Olan/Olmayan Kadınlarda Duygudurum, Fiziksel Belirtiler, Bilişsel Durum ve Yaşam Doyumunun Karşılaştırılması: Kontrollü Bir Çalışma

Selma ERCAN DOĞU¹, Gamze EKİCİ², Berkay EKİCİ³

¹University of Health Sciences Turkey, Hamidiye Faculty of Health Sciences, Department of Occupational Therapy, Istanbul, Turkey

²Hacettepe University Faculty of Health Sciences, Department of Occupational Therapy, Ankara, Turkey

³Ufuk University Faculty of Medicine, Department of Cardiology, Ankara, Turkey

ABSTRACT

Objective: This study aimed to compare the mood, physical symptoms, cognitive failure, and life satisfaction in women with premenstrual dysphoric disorder (PMDD), premenstrual syndrome (PMS), and No/Mild PMS (No/Mild PMS).

Methods: Totally 195 women participated in this study. The participants were divided into three groups according to the scores they received from premenstrual symptom screening tool, premenstrual symptom screening tool, beck depression inventory, beck anxiety inventory, cognitive failures questionnaire, and satisfaction with life scale were applied to all participants.

Results: The study findings demonstrated that there was a significant difference between the groups in terms of the mean scores of anxiety, depression, cognitive failure, and life satisfaction ($p<0.05$). Women with PMDD group had significantly higher anxiety, depression, and life satisfaction scores than women with PMS and No/Mild PMS ($p<0.05$). There was a significant difference between the groups in terms of CFQ ($p<0.05$); however, the difference between groups was not significant in post-hoc comparisons.

ÖZ

Amaç: Bu çalışma, premenstrüel disforik bozukluk (PMDB), premenstrüel sendrom (PMS) ve hafif PMS Olan/Olmayan (PMS Yok/Hafif PMS) kadınlarda duygudurum, fiziksel belirtiler, bilişsel durum ve yaşam doyumunu karşılaştırmayı amaçlamıştır.

Yöntemler: Çalışmaya toplam 195 kadın katılmıştır. Katılımcılar premenstrüel belirti tarama aracından aldıkları puanlara göre üç gruba ayrıldı. Tüm katılımcılara premenstrüel belirti tarama aracı, beck depresyon envanteri, beck anksiyete envanteri, bilişsel durum ölçeği ve yaşamdan memnuniyet ölçeği uygulandı.

Bulgular: Araştırma bulguları, anksiyete, depresyon, bilişsel durum ve yaşam doyumunu puan ortalamaları açısından gruplar arasında anlamlı bir fark olduğunu göstermiştir ($p<0,05$). PMDB grubundaki kadınların anksiyete, depresyon ve yaşam doyumunu puanları, PMS'li ve PMS'siz/Hafif PMS'li kadınlara göre anlamlı düzeyde daha yüksekti ($p<0,05$). CFQ açısından gruplar arasında anlamlı fark vardı ($p<0,05$); ancak post-hoc karşılaştırmalarda gruplar arasındaki fark anlamlı değildi.

Address for Correspondence: Selma ERCAN DOĞU, University of Health Sciences Turkey, Hamidiye Faculty of Health Sciences, Department of Occupational Therapy, Istanbul, Turkey

E-mail: selmaer@yahoo.com **ORCID ID:** orcid.org/0000-0003-3276-8041

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Conclusion: Women with PMDD had higher anxiety, depression, and physical symptoms and lower life satisfaction than women with PMS and No/Mild PMS. The results suggest that health professionals should be sensitive to the emotional and cognitive sides of PMDD/PMS. Holistic intervention programs may be developed considering current study findings.

Keywords: Premenstrual syndrome, premenstrual dysphoric disorder, depression, anxiety, cognitive failure, life satisfaction

Sonuç: PMDD'li kadınlar, PMS'li ve PMS'siz/hafif PMS'li kadınlara göre daha yüksek anksiyete, depresyon ve fiziksel semptomlara ve daha düşük yaşam doyumuna sahipti. Sonuçlar, sağlık profesyonellerinin PMDD/PMS'nin duygusal ve bilişsel yönlerine duyarlı olması gerektiğini göstermektedir. Mevcut araştırma bulguları dikkate alınarak bütüncül müdahale programları geliştirilebilir.

Anahtar Sözcükler: Premenstrüel sendrom, premenstrüel disforik bozukluk, depresyon, anksiyete, bilişsel durum, yaşam memnuniyeti

Introduction

The etiology of premenstrual syndrome is unknown, although this syndrome is linked to the menstrual cycle. Premenstrual syndrome (PMS) is defined as physical, psychological, and behavioral symptoms that occur two weeks before a woman's monthly period. It is diagnosed as PMS when symptoms are severe enough to disrupt daily activities and negatively affect well-being (1). Psychological symptoms such as sadness, irritability, tension, or anxiety and physical symptoms such as bloating and breast tenderness are seen before menstruation and lost with the follicular phase (2). The American College of Obstetricians and Gynecologists estimates that 85% of menstruating women have at least one PMS symptom as part of their monthly cycle. Most of these women have mild symptoms that do not require treatment (3). Others (about 3% to 8%) have a more severe form of PMS, called premenstrual dysphoric disorder (PMDD) (4). PMDD is characterized by prominent symptoms such as irritability, anger, tension, mood swings, and dysphoria (1). PMDD leads to serious functional impairment and decrease in women's quality of life (QOL) (4).

Women with PMS/PMDD reported that they experienced more anxiety and depression in the premenstrual period (5-7) and this depressive mood returned to normal in the post-menstrual period (8). Authors stated that women with PMS/PMDD were more diagnosed as having depression and anxiety disorder (9), attempted more suicide (10) and had more communication problems with others (11) due to mood swings. That's why it is of utmost importance to assess the mood of women with PMS/PMDD.

Women suffering from PMS/PMDD also report cognitive difficulties in addition to psychological symptoms. According to Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), the lack of concentration is addressed in emotional symptoms in the diagnostic criterion of PMS/PMDD (12). Some researchers have found impairments in cognitive performance regarding concentration, attention, and memory in PMS/PMDD (13,14). Impairment in cognitive performance measured by neuropsychological tests was associated with PMS/PMDD (15-17). Studies provided evidence that women with PMS/PMDD had lower concentration and lower performance in cognitive tasks in the menstrual period than other times (15,16). There was a difference in the luteal and follicular phase in terms of cognitive performance; after menstruation, these problems disappeared (15,17). Therefore, PMS can be interpreted as

a temperamental disorder that may affect some aspects of a woman's cognition (18).

Cognitive failures include perceptual, attentional, memory, and action-related mental errors or everyday slips. Some examples of cognitive failure include forgetting an appointment and the names of people, losing things in public places, failure to notice street signs and failure to remember daily plans, shopping list, taking the drugs, telephone numbers, addresses, and important events (19). Women with PMS reported temporary cognitive difficulties such as distractibility, forgetfulness, or poor concentration (20). In other words, these cognitive difficulties experienced by women with PMS/PMDD may be at the level of daily errors. The previous studies provide at least two possible explanations why more cognitive failure may occur during the premenstrual period. These are fluctuating levels of estrogen and progesterone hormones during menstruation (17). Second, cognitive failure has been reported as a personality trait in PMS (13). Previous studies indicated cognitive impairments in PMS and PMDD. Reed et al. (15) showed that women with PMDD performed worse on cognitive tasks than women without PMDD in their luteal phase. Similarly, Yen et al. (16) demonstrated that the working memory deficit was more severe in women with PMDD than women without PMDD in the luteal phase. Kumari and Corr (21) showed that women with PMS had fewer correct answers and more errors. Also, they responded less carefully. Slyepchenko et al. (14) stated that women with moderate to severe PMS experienced subtle working memory and selective attention difficulties. To our knowledge, there were limited studies investigating cognitive failure in premenstrual disorders. Cognitive failure was investigated in samples such as mothers involved in child care (22), multiple sclerosis (23), university students (24) and patients with hypertension (25). Only one study examined cognitive impairment during pregnancy and demonstrated higher cognitive failure scores in women who suffered from PMS before pregnancy. The authors argued that women participating in the study were more susceptible to hormonal change (26). Hence, hormonal changes may lead to cognitive failure in PMS/PMDD. However, a review stated that studies remained unclear to show the effect of the menstrual cycle on cognitive functioning and direct effect of hormonal dysregulation impacting cognition (27). Therefore, one aim of the current study was to evaluate whether there was a difference in terms of cognitive failure among women with PMDD, PMS, and No/Mild PMS.

The PMS has troublesome effects on women's overall life and impacts their occupational and social roles (28). Life satisfaction is a subjective definition of QOL (29) and is defined as cognitive judgments of one's life satisfaction and well-being. The psychological, cognitive, and physical symptoms of PMS/PMDD may cause a decrease in women's life satisfaction. There is ample evidence that women with PMS/PMDD have impaired QOL (28,30,31); however, there is no study comparing the three groups in terms of life satisfaction in the literature. Karimiankakolaki et al. (31) only compared three groups, women with PMDD, PMS, and the general population in terms of QOL. Therefore, the study aimed to compare the mood, physical symptoms, cognitive failure, and life satisfaction in women with PMDD, PMS, and No/Mild PMS groups.

Methods

Participants

A total of 212 volunteer women between the ages of 18-40, who were admitted to the Occupational Therapy Department of Hacettepe University, and whose menstrual cycle continued, participated in the study. Participants were eligible for the study if they met the following inclusion criteria: having regular menstrual periods (21-40 days), being over 18 years old, being a volunteer, and never treated for PMS. Exclusion criteria were determined as being pregnant, taking any hormone medication, having a psychiatric disorder, and having any known health problem except premenstrual symptoms. Seventeen women were excluded from the study because of the irregular cycles (i.e. more than 35 days in length), missing data and some other medical problems (depression, gynecologic disorder etc). Eventually, 195 eligible women who were 24.04 ± 7.45 years old and graduated from the university were included.

This study protocol was conducted in line with the Declaration of Helsinki. It was approved by the Hacettepe University Non-Invasive Clinical Research Ethics Committee (number: 2016/10/date: 10.05.2016). All women received written and oral information before assessment. All participants gave their informed written consent for participation.

Procedures and Data Collection

Demographic and clinical characteristics such as age, body mass index (BMI), and cycle length were collected using a patient information form filled out by all participants. Premenstrual Symptom Screening Tool (PSST), satisfaction with life scale (SWLS), Beck anxiety inventory (BAI), Beck depression inventory (BDI), visual analog scale for physical symptoms and cognitive failures questionnaire (CFQ) were applied to all participants face to face and checked out by researchers. The participants were divided into three groups, PMDD, having moderate to severe symptoms of PMS, or mild to no symptoms of PMS according to the scores they received from PSST. PSST is suggested as a screening tool to identify women who suffer from severe PMS/PMDD and specific criteria are defined for the three groups by Steiner et al. (32). The scale was used to screen for females with moderate to severe premenstrual symptoms, which was defined

as (A) presence of at least 1 of the first 4 of the 14 symptoms, (B) presence of at least 4 of any 14 symptoms, and (C) a score of 3 or 4 (ie, moderate to severe, respectively) on at least 1 of the 5 items for assessing functional impairment. The first group consisted of 66 (32.7%) women who fully met the DSM-5 PMDD criteria. To meet these criteria, women had to report at least one of the four core symptoms (irritability, dysphoria, tension, lability of mood) as severe and at least 4 additional symptoms (for a total of 5) as moderate to severe. They also had to report that their symptoms interfered severely with their ability to function in at least one of the five domains (work efficiency, productivity, social life, home responsibilities, relationship at work, or relationships at home for defined, so that it could be identified as PMDD. The second group consisted of 83 women (41.1%). These women reported at least one of the four core symptoms as moderate to severe and at least four additional symptoms as moderate to severe, and their symptoms interfered moderately to severely with their ability to function in at least one of the five domains. This group was evaluated as moderate to severe PMS (Premenstrual Syndrome). Forty six women (22.8%) in the third group did not meet any of the above criteria and were evaluated as the group with mild or no symptoms (32).

Instruments

Premenstrual Symptom Screening Tool (PSST): PSST was developed by Steiner et al. (32) to assess PMDD, moderate to severe PMS, and No/Mild PMS. The PSST evaluates severity of each of 14 symptoms on a scale from 1 (absence of symptom) to 4 (extremely severe symptom) according to experience of premenstrual symptoms. Five 4-point items were also used to assess impairment of function in work, relationships with coworkers and family, social life activity and home responsibility. It is on a 4-point rating (not at all, mild, moderate, severe). The Turkish version of PSST was formed by Özdel et al. (33). PSST is a reliable and valid instrument in Turkish culture. Internal consistency is excellent (Cronbach $\alpha=0.928$) for the items of the tool.

Satisfaction with Life Scale (SWLS): SWLS is an inventory that measures global life satisfaction using five statements about the QOL. It was developed by Diener et al. (34). Participants are asked to indicate their level of agreement with the statements on a 7-point Likert-type scale (1= strongly disagree to 7= strongly agree). According to the SWLS, higher scores indicate greater life satisfaction. The total scores of participants on the SWLS range from 5 to 35. The Turkish version of the scale was formed by Durak et al. (35). SWLS is a reliable and valid instrument in Turkish culture. As a result of validity and reliability studies in two different sample groups, SWLS showed high internal consistency in the elderly (0.86). SWLS demonstrated a high internal consistency in the correctional officers' sample (0.81). Confirmatory Factor Analysis revealed that the scale consisted of a single factor in all three samples, and the fit indices were sufficient. The concurrent validity and discriminant validity of the scale were sufficient. In terms of co-validity, a significant correlation was observed between the total score obtained from the scale and life satisfaction and the variables belonging to

similar structures (for example, self-esteem, positive mood, etc.). The alpha reliability for the present sample was 0.77.

Beck Depression Inventory (BDI): BDI was developed by Beck et al. (36) to assess depressive symptoms using 21 items rated on a 4-point Likert-type scale. According to the BDI, higher scores indicate higher levels of depression. The total score ranges from 0 to 63, with a cut-off score of 17. Validity and reliability studies were performed for the Turkish form by Hisli (37). In a psychiatric sample of 63 patients, the correlation coefficient between the MMPI-D scale and the BDI was found to be $r=0.63$. In university students ($N=259$); two half-test correlations were reported as $r=0.74$ and internal consistency coefficient (Cronbach Alpha) as 0.80.

Beck Anxiety Inventory (BAI): It is a self-report inventory developed by Beck et al. (38) to assess the severity of anxiety symptoms using 21 items. The items are rated on a 4-point scale ranging from 0 (not at all) to 3 (severely). The total score ranges from 0 to 63. According to the BAI, higher scores indicate higher levels of anxiety. Validity and reliability studies were performed for the Turkish form by Ulusoy et al. (39). They determined the Cronbach Alpha internal consistency coefficient as 0.928. The item-total test correlation coefficients ranged between 0.45 and 0.72, and the test-retest reliability coefficient was 0.57.

Visual Analog Scale for Physical Symptoms: Physical symptoms in PMS include breast tenderness, headache, joint pain, muscle pain, bloating, and weight gain. Physical symptoms were scored from 0 to 10 points using visual analog scale in our study.

Cognitive Failures Questionnaire (CFQ): CFQ is a self-report questionnaire measuring everyday cognitive errors. The questionnaire was developed by Broadbent et al. (40) to assess the frequency of lapses in three areas; perception, memory, and motor function. CFQ consists of 25 items, and the subjects answer the items on a 5-point Likert-type scale ranging from 0 (never) to 4 (very often). Scores for the CFQ can range from 0 to 100. A high score indicates an increased tendency to cognitive failure. The Turkish version of the questionnaire was formed by Ekici et al. (41). CFQ is a reliable and valid instrument in Turkish culture. Cronbach's alpha coefficients and ICC's at time 1 and time 2 were as follows: 0.90 [confidence interval (CI) 95%; 0.85-0.94]; 0.93 (CI 95%; 0.89-0.96).

Statistical Analysis

Data analysis was performed using SPSS 17 (SPSS Inc., Chicago, USA) and included frequency distribution and descriptive analysis for overall mean scores. First, the Kolmogorov-Smirnov test was applied to check normal distribution. As the data did not meet normal distribution assumptions, the Kruskal-Wallis test was used to compare the scores. Kruskal-Wallis and Mann-Whitney U test were applied to analyze the change for inter-group comparisons. The level of significance was 0.05. A three-fold comparison with the Bonferroni corrected Kruskal-Wallis test was made where p was considered significantly less than 0.017. To determine inter-group differences, the means were compared using Mann-Whitney U test according to Bonferroni Correction as $p<0.017$.

Results

Sample Characteristics

The mean age was 26.71 ± 8.29 in the PMDD group, 21.92 ± 5.24 in the PMS group, and 23.82 ± 8.00 in the No/Mild PMS group. The mean BMI was 22.48 ± 2.88 in PMDD group, 21.49 ± 3.34 in PMS group, and 22.61 ± 4.52 in No/Mild PMS group. Participants were considered overweight or obese if their BMI was > 25 . The mean cycle duration was 27.09 ± 3.82 in PMDD group, 27.96 ± 3.26 in PMS group, and 28.43 ± 2.97 in No/Mild PMS group. The three groups were analyzed in terms of age, BMI, and cycle length (Table 1). The groups were homogenous concerning BMI and cycle length; however, they were not homogenous for age ($p>0.05$). The demographic and cycle length details of the participants are depicted in Table 1.

Physical Symptom, Mood, Cognitive Failure and Life Satisfaction

The women with PMDD had significantly higher physical symptoms (breast tenderness, headache, joint pain, muscle pain) and weight gain scores compared to women with PMS and No/Mild PMS ($p<0.05$). The women with PMS reported higher breast tenderness, headache, joint pain, muscle pain, weight gain scores than the women with No/MildPMS ($p<0.05$). The mean bloating scores in the PMDD group were higher than the PMS No/Mild group ($p<0.05$). The inter-group comparison of physical symptoms severity related to PSST of the participants is depicted in Table 2.

Table 1. Demographic data and cycle length of the study population (n=195)

	No/Mild PMS Group I (n=46) Mean \pm SD	PMS Group II (n=83) Mean \pm SD	PMDD Group III (n=66) Mean \pm SD	P~	I versus II [^]	I versus III [^]	II versus III [^]
Age (yrs)	23.82 \pm 8.00	21.92 \pm 5.24	26.71 \pm 8.29	0.001*		0.002*	0.001*
BMI (kg/m ²)	22.61 \pm 4.52	21.49 \pm 3.34	22.48 \pm 2.88	0.059			
Cycle length (day)	28.43 \pm 2.97	27.96 \pm 3.26	27.09 \pm 3.82	0.063			

~Kruskal-Wallis test, [^]Post-hoc Mann-Whitney U test: * $P<0.05$ statistically significant; According to Bonferroni Correction $\bullet p<0.017$; BMI: Body mass index, PMDD: Premenstrual dysphoric disorder, PMS: Premenstrual syndrome, No/Mild PMS: No/Mild premenstrual syndrome

Table 2. Inter-group comparison of DSM-5 physical symptoms severity related with PSST by diagnostic group (n=195)

VAS (0-10 cm)	No/Mild PMS		PMS		PMDD		P~	I versus II^	I versus III^	II versus III^	η ²
	Group I		Group II		Group III						
	(n=46)		(n=83)		(n=66)						
	Med	IQR	Med	IQR	Med	IQR					
Breast tenderness	2.00	7.00	5.00	6.00	6.00	5.00	0.001*	0.004*	0.001*		0.064
Headache	0.00	2.12	2.00	4.00	4.00	5.38	0.001*	0.005*	0.001*	0.001*	0.165
Joint pain	1.00	5.00	4.00	4.80	5.00	4.25	0.001*		0.001*	0.002*	0.120
Muscle pain	3.00	6.00	5.00	5.10	6.00	3.78	0.001*		0.001*	0.002*	0.092
Bloating	4.00	7.80	5.00	6.00	6.97	5.25	0.004*		0.002*		0.055
Weight gain (kg)	0.00	1.00	0.00	1.00	1.00	1.00	0.011*		0.012*	0.012*	0.053

~Kruskal-Wallis test, ^Post-hoc Mann-Whitney U test: *P<0.05 statistically significant; According to Bonferroni Correction *p<0.017; PMDD: Premenstrual dysphoric disorder, PMS: Premenstrual syndrome, No/Mild PMS: No/Mild premenstrual syndrome

Table 3. Inter-group comparison of anxiety, depression, life satisfaction and cognitive failure scores (n=195)

	No/Mild PMS		PMS		PMDD		P~	I versus II^	I versus III^	II versus III^	η ²
	Group I		Group II		Group III						
	(n=46)		(n=83)		(n=66)						
	Med	IQR	Med	IQR	Med	IQR					
BAI	9.00	9.25	15.00	11.00	19	24.25	0.001*	0.001*	0.001*	0.002*	0.175
BDI	7.00	7.25	11.00	9.00	19	12.25	0.001*	0.001*	0.001*	0.001*	0.229
SWLS	26.50	8.25	21.00	07.00	18.00	8.00	0.001*	0.001*	0.001*	0.001*	0.040
CFQ	38.50	24.25	42.00	22.00	47.00	19.25	0.026*				0.182

~Kruskal-Wallis test, ^Post-hoc Mann-Whitney U test: *P<0.05 statistically significant; According to Bonferroni Correction *p<0.017; BAI: Beck anxiety inventory, BDI: Beck depression inventory, SWLS: Satisfaction with life scale, CFQ: Cognitive failure questionnaire, PMDD: Premenstrual dysphoric disorder, PMS: Premenstrual syndrome

There was a significant difference between the groups in terms of anxiety, depression, cognitive failure, and life satisfaction (p<0.05). Women with PMDD had significantly higher anxiety, depression, and lower life satisfaction scores than women with PMS and No/Mild PMS (p<0.05). Women with PMS had significantly higher anxiety, depression, and lower life satisfaction scores than the PMS No/Mild group (p<0.05). There was a significant difference between the groups in terms of CFQ (p<0.05); however, the difference between groups was not significant in post hoc comparisons. Although not statistically significant, women with PMDD were found to have higher median cognitive failure scores 47.00 (19.25) than women with PMS 42.00 (22.00) and women without PMS/Mild PMS 38.50 (24.25). Inter-group comparison of anxiety, depression, life satisfaction, and cognitive failure scores is depicted in Table 3.

Discussion

Women in PMDD, PMS, and No/Mild PMS were analyzed in terms of mood, physical symptoms, cognitive failure, and life satisfaction in this research. The results of the current study demonstrated that women with PMDD (1) had higher depression and anxiety; (2) had higher physical symptoms; (3) had lower satisfaction with life than women with PMS and No/Mild PMS. Although not significant, cognitive failure scores were higher in

the PMDD group. Also, women with PMS experienced more significant changes in depression, anxiety, physical symptoms, and life satisfaction than women with No/Mild PMS.

In our study, physical symptoms were higher in women with PMDD women than women with PMS and No/Mild PMS. Women with PMS also reported more physical symptoms than women with No/Mild PMS. Our study findings showed that both women with PMDD and PMS experienced almost all physical symptoms. Similarly, Steiner et al. (32) showed that physical symptoms were observed in 84.8% of the women with moderate to severe PMS and 88.5% of the women with PMDD. Furthermore, our findings demonstrated that weight gain was higher in the women with PMDD and PMS. Reed et al. (15) showed that women with PMDD desired and ate more foods, especially carbohydrates, during the luteal phase compared to the follicular phase. Our data showed that women with PMDD and PMS experienced more physical symptoms and weight gain than women with No/Mild PMS. Therefore, strategies to control physical symptoms and weight may help to improve women's QOL. Psychoeducation and awareness programs have been shown to reduce symptoms and increase coping skills in women with PMS. Bastani and Hashemi (42) showed that a web-based lifestyle education on female students with PMS led to improvements in overall health and a decline in the severity

of PMS symptoms. Similarly, after the education program, young adolescent girls reported a decrease in PMS symptoms (43). Therefore, educational programs may be beneficial for the management of PMS symptoms by providing information about PMS/PMDD and supporting women coping better with menstrual-related problems.

Our study findings showed that mood measures related to anxiety and depression were significantly higher in women with PMDD than women with PMS and No/Mild PMS. Also, women with PMS had higher depressive and anxiety symptoms than women with No/Mild PMS. The results of our study confirmed previous studies documenting mood changes in women with PMS and PMDD (6,13). Similarly, the women with PMDD had higher depression and anxiety scores than the women with PMS (7,44). KarimianKakolaki et al. (31) found that women with PMDD and PMS had lower mean scores in the aspect of emotional problems. Also, Halbreich et al. (45) reported that the impairments in women with PMDD were almost the same in women with depression. Depression and anxiety scores can be high due to mood swings and dysphoria in the premenstrual term. Women with PMS are more pessimistic, have a sense of more failure, dissatisfaction, guilt, self-dislike, and indecision during the luteal phase compared to the follicular phase (46). In this case, the risk of being depressed or anxious in the premenstrual period may increase. Our study findings emphasize the importance of assessment of depression and anxiety in both women with PMS and PMDD. Therefore, collaborating with mental health professionals and providing people with skills to cope with depression and anxiety can improve their QOL.

This study also evaluated whether there were any differences in cognitive failure among the three groups. The difference between the groups was not statistically significant; however, cognitive failure mean scores of women with PMDD were higher than the other two groups. On the other hand, impairment in cognitive functions of women in the premenstrual period has been mentioned in the literature. Researchers revealed that women had more accidents, and worse work and academic performance during the menstrual period (47,48). Steiner et al. (32) showed that women with PMDD reported decreased interest in work, home, social life, and difficulty concentrating than the PMS group. Shehadeh and Hamdan-Mansour (49) reported that PMDD symptoms impaired students' academic performance. Therefore, premenstrual changes may cause more cognitive errors in the premenstrual period. Although it was not found significant in our study, we recommend that the cognitive difficulties that negatively affected the QOL of women should be investigated in future studies. As Le et al. (27) emphasized that cognitive research findings were lack of consistent findings and were in its infancy, so our findings demonstrated that more detailed studies about cognitive impairment in PMS/PMDD were needed in clinical and larger samples.

In the present study, women with PMDD had lower life satisfaction than women with PMS and No/Mild PMS; women with PMS had lower life satisfaction than women with No/Mild PMS. To our knowledge, there are no previous studies that

measure life satisfaction in women with PMS/PMDD. Most studies examined the relationship between PMS/PMDD and QOL. These earlier studies found that QOL decreased during the premenstrual phase (28,30,44). Our finding was consistent with the study of Karimiankakolaki et al. (31). Karimiankakolaki et al. (31) compared the QOL in the three groups, women with PMDD, PMS, and overall population. Women with PMDD reported poor health-related QOL. The QoL was considerably lower in women with PMS and PMDD versus the general population. Women with PMS had significantly poorer QOL than women without PMS (4). Also, Iacovides et al. (50) showed the effect of menstrual pain on health-related QOL. Sut and Mestogulları (51) reported that PMS led to a decrease in work-related quality in nurses. PMS/PMDD disrupted the women's QOL and led to impaired social and occupational functioning. From this current study finding, PMS/PMDD requires biopsychosocial perspective and interdisciplinary approach. More comprehensive programs may be needed for women with PMS/PMDD to improve life satisfaction and wellness. In addition, individual differences should be taken into account.

This study still represents one of the first controlled studies to compare three groups, PMDD, PMS, No-Mild PMS, including life satisfaction, mood, physical symptoms, and cognitive failure measures in women. This study is also valuable in addressing cognitive failure in women with PMS/PMDD for the first time. Further studies are needed to gain a clearer understanding of how the menstrual cycle affects cognitive failure. Our findings suggest that CFQ may be useful and functional in evaluating women with PMS/PMDD who complain of cognitive difficulties due to time limitations in clinical settings.

There are several limitations to our study. First, our population consisted of primarily educated women. It might lead to a bias in the results due to high awareness. Second, participants were examined only in the premenstrual period. We could test both the luteal and follicular phases of the menstrual cycle. Evaluating the differences between these cycles in terms of cognitive failure could be significant. Third, PSST was used to differentiate the groups -PMDD, PMS, and No/Mild PMS. Also early studies suggested Daily Record of Severity of Problems and PSST to be used together (52). They concluded that PSST underreported the PMS diagnosis and over-estimated the PMDD diagnosis. Therefore, in our study, PMDD symptoms might be overestimated by the participants. Fourth, these data were based on self-reports and were not validated by physical or psychiatric examination. Finally, the groups were not homogenous concerning age. We don't know if it may affect the results. Therefore, our study results should be evaluated carefully. In literature, it is stated that being in the young age group is a risk factor for PMS (53,54). Younger women may be more affected by premenstrual changes. On the other hand, some studies showed that symptoms of PMS/PMDD increased with age (55,56). The current study findings need to be replicated. In addition, it is important to consider the age-related risk factor in studies in order to increase the QOL of women and to take early precautions.

Conclusion

This study aimed to compare women with PMDD, PMS, and No/Mild PMS in terms of life satisfaction, mood, and cognitive failure. The results revealed that women with PMDD had higher anxiety, depression scores, physical symptoms and lower life satisfaction scores than women with PMS and No/Mild PMS. These results showed that women with PMDD need more psychological support.

In clinical practice, the focus is on symptoms and not psychological and cognitive difficulties that reduce life satisfaction. The results suggest that health professionals should focus on emotional, cognitive and physical symptoms of PMDD/PMS. Holistic intervention programs and psychological counseling services that support women with PMDD/PMS should be integrated into women's health units.

Ethics

Ethics Committee Approval: Hacettepe University Non-Invasive Clinical Research Ethics Committee (number: 2016/10/ date: 10.05.2016).

Informed Consent: All women received written and oral information before assessment. All participants gave their informed written consent for participation.

Peer-review: Externally peer reviewed.

Authorship Contributions

Concept: G.E., Design: G.E., Data Collection or Processing: S.E.D., G.E., Analysis or Interpretation: G.E., B.E., Literature Search: S.E.D., Writing: S.E.D.

Conflict of Interest: No conflict of interest was declared by the authors.

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