Premenstrual Symptom Severity, Dysmenorrhea, and School Performance in Medical Students

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ÖZET:
Tıp Fakültesi öğrencilerinde premenstrüel belirti şiddeti, dismenore ve okul performansı

Giriş: Premenstrüel sendrom özellikle genç erişkinlerde sık görülen ve işlevsellik kaybına neden olabilen önemli bir mizaç bozukluğudur. Biz bu çalışmada tıp fakültesi öğrencilerinde adet öncesinde meydana gelen davranışsal, duygusal ve fiziksel değişiklik şiddetinin ve dismenorenin işlevselliğe ve özellikle de okul işlevselliğine olan etkisini kesitsel olarak değerlendirmeyi amaçladık.
Yöntem: Bu çalışma Erzurum Atatürk Üniversitesi Tıp fakültesinin okumakta olan bütün sınıflardaki toplam 584 kız öğrenci arasından tüm sınıflardan eşit sayıda olacak şekilde rastgele seçilmiş 236 öğrenci ile yürütüldü. Katılımcılar premenstrüel değerlendirme formu ve sosyodemografik özellikleri, adet döneminin özelliklerini, diyet ve egzersiz alışkanlıklarını ve işlevselliği değerlendiren çalışmamız için hazırlanmış bir form ile değerlendirildi.
Sonuçlar: Katılımcıların %32.2 sinde (n=76) premenstruel belirti yoktu, %41.9 (n=99) hafif düzeyde, %20.3 (n=48) orta derecede ve %5.5 (n=13) ağır premenstrüel belirtilere sahipti. Karbonhidrat içeriği yüksek, abur cubur niteliğinde yiyecek tüketimi yüksek premenstrüel belirti skorlarıyla ilişkiliydi (x=18.475, p=0.030). Katılımcıların %67'sinde dismenore vardı ve dismenore şiddetli premenstrüel belirtilerle ve düşük okul performansı ile anlamlı bir ilişkiye sahipti (x=14.471, p=0.002).
Tartışma: Premenstrüel dönemdeki davranışsal, duygusal ve fiziksel değişiklikler özellikle de ağrılı adet görme hem devamlılık hem de sınav performansı ile değerlendirilen okul performansını olumsuz etkilemektedir. Ağrı kontrolü ve diyet önerileri, özellikle de abur cubur niteliğindeki yüksek karbonhidrat içerikli, paketli gıda tüketimini azaltılması tedavide önemli yer tutabilir.

Anahtar sözcükler: premenstrüel semptomlar, dismenore, okul performansı

Journal of Mood Disorders 2012;2(4):143-52

ABSTRACT:
Premenstrual symptom severity, dysmenorrhea, and school performance in medical students

Objective: Premenstrual syndrome (PMS) represents a significant public health problem for women and it is particularly common in younger age groups. This study aimed to estimate the prevalence, severity, and determinants of PMS and dysmenorrhea and their effects on school performance in medical students.
Method: In this study (performed at Ataturk University School of Medicine in Erzurum, Turkey), 236 students were randomly selected from 554 female medical students. The participants who agreed to participate in the study completed the Premenstrual Assessment Form (PAF), a sociodemographic form, and a questionnaire assessing school performance and other functionality areas.
Results: PMS symptom severity was as follows: 32.2% (n=76) exhibited no symptoms, but mild, moderate, and severe symptom severity were 41.9% (n=99), 20.3% (n=48), and 5.5% (n=13), respectively. Higher levels of carbohydrate and junk food consumption were related with higher premenstrual symptom scores (x=18.475, p=0.030). Of all participants, 67% had dysmenorrhea, which was significantly related with severe premenstrual symptoms (x=14.471, p=0.002) and poorer school performance.
Conclusions: Diet recommendations (e.g., eating less junk food and carbohydrates) could help young women by reducing symptoms. Because dysmenorrhea seems to be strongly related with severe premenstrual symptoms and poorer educational performance, treatment strategies (even those merely aimed at pain control) could help to improve the class attendance and exam performance of female medical students.

Key words: premenstrual symptoms, dysmenorrhea, school performance

Journal of Mood Disorders 2012;2(4):143-52

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Kabul tarihi / Date of acceptance: 12 Eylül 2012 / September 12, 2012

INTRODUCTION

One of the most important biological rhythms is menstruation, which occurs cyclically and reflects reproductive ability in mammals. In humans, every 28±7 days, the endometrium desquamates as a result of hormonal changes. From menarche to menopause, women have a long reproductive lifespan (average 36 years) (1). This period includes an average of 400 menstrual cycles that may or may not cause difficulty (2).

Up to 80% of women report one or more physical, psychological, or behavioral symptoms during the luteal phase of their menstrual cycle without experiencing substantial disruption in their daily functioning (3). Premenstrual syndrome (PMS) is a commonly used term for a group of emotional, behavioral, and physical symptoms that occur for several days before menstrual bleeding and calm during the menstrual period (4). The symptoms present a cyclic and recurrent character, which are variable in quality and intensity. A severe form of PMS is classified as premenstrual dysphoric disorder (PMDD), according to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (5). The diagnosis of PMDD requires the prospective assessment of at least two consecutive menstrual periods.

According to the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), the diagnosis of PMS requires the presence of one premenstrual symptom from a list of symptoms. These include mild psychological discomfort, feelings of bloating and weight gain, breast tenderness, swelling of the hands and feet, various aches and pains, poor concentration, sleep disturbances, and changes in appetite. These are restricted to the luteal phase of the menstrual cycle and relieved with the start of menstrual flow (6). Although there is a consensus that PMS encompasses various premenstrual symptoms, it is still unclear whether an essential number of symptoms for diagnosis exist and whether some symptoms are more important than others.

Epidemiologically, PMS occurs in 20–32% of premenopausal women; the more severe symptoms of PMDD affect about 3–8% of premenopausal women (7). This disorder is particularly common in the younger age groups and therefore represents a significant public health problem in young women (8, 9). The prevalence of PMDD varies substantially across studies, likely because of the different definitions for PMDD. Initially, PMS and PMDD appeared to be limited to women in Western cultures, but more recent studies have demonstrated that symptoms suggesting PMS and PMDD occur at similar rates globally (9-12). The most common premenstrual symptoms in the Turkish population have been shown to include fatigue, anxiety, general physical disturbances, social isolation, and atypical depressive features (13). Various biological and psychological causes have been proposed as causes of PMS, including abnormal serotonin function, the absence of progesterone, altered endorphin modulation of gonadotropin secretion, lack of exercise, smoking, alcohol use, poor dietary habits, and caffeine consumption (13). Prostaglandins, the hormones that cause muscle contractions and decrease blood flow and oxygen to the uterus, are thought to be the cause of dysmenorrhea (14). About half of the adolescents and young adults experience menstrual discomfort, and consequently this condition can lead to the impairment of school or work performance (15,16).

This cross-sectional study was conducted to examine the patterns of menstrual cycles and related problems, and school performance during the menstrual period in medical students. For the sake of reliability, we conducted this study on medical students, as it was assumed that they would have a greater awareness of the presence and severity of their physical, psychological, and behavioral symptoms.

METHOD

Participants

The present study was conducted at Atatürk University School of Medicine in Erzurum, Turkey. In total, 236 students were randomly selected from 554 female medical students at the university. Exclusion criteria included a) suffering from a metabolic disease or psychiatric disorder that requires treatment with psychotropic medication,b) using hormonal contraceptives, and c)using other prescribed medicines (e.g., antidepressants, antipsychotics, and mood stabilizers). The students were approached during their lecture period (after obtaining permission from both their coordinator and class teachers) and were asked to complete the questionnaire under the close supervision of the authors.

Instruments

The participants who accepted to participate in the study completed the Premenstrual Assessment Form (PAF), a sociodemographic and menstruation information form, and a questionnaire that was prepared for this study assessing school performance and other functionality areas. The sociodemographic and menstruation information form consisted of questions on a number of

Table 1: The subscales of the PAF

The subscales of PAF*	Questions
Low Mood	19, 22, 38, 48, 49, 51, 57, 66, 78, 89
Endogenous Depressive Features	8, 23, 40, 64, 82
Instability	1, 46, 47
Atypical Depressive Features	1, 5, 27, 46, 80, 81
Hysteroid Features	25, 37, 41, 47, 86
Hostility/Anger	26, 50, 55, 56, 60, 67
Social Withdrawal	23, 72, 74, 78
Anxiety	4, 7, 14, 44
Organic Mental Discomfort	3, 11, 12, 24, 31, 32
General Physical Discomfort	10, 53, 62
Signs of Water Retention	9, 58, 59, 62, 71, 75
Autonomic Physical Changes	13, 20, 29, 39, 40, 58, 84
Fatigue	2, 6, 15, 52
Impaired Social Functioning	21, 33, 54, 72, 74, 76, 77, 79, 83, 92, 93
Miscellaneous Behavior/Mood Changes	16, 17, 28, 34, 43, 45, 61, 63, 64, 69, 73, 87, 88, 90
Miscellaneous Physical Changes	18, 65, 70, 91, 94, 95

*Premenstrual Assessment Form

demographic variables, exercise levels, nutritional habits, smoking, the presence of dysmenorrhea, duration of menstruation, regularity of menstruation, age at menarche, and family history of PMS. Body Mass Index (BMI) was calculated using self-reported data on height and weight. The PAF, a retrospective self-report questionnaire, consists of 95 questions (composite scores on 18 factors) regarding changes in mood, behavior, and physical symptoms for the previous three menstrual cycles (17). Dereboy et al. (13) published the Turkish reliability and validity study of the instrument in 1994. Total PAF scores were divided into the number of questions for each participant. According to the results, symptom severity was assessed as follows: values under 1.7 were regarded as "no PMS," from 1.7 to 2.8 "mild PMS," from 2.8 to 3.7 "moderate PMS," and over 3.7 as "severe PMS." The subscales of the PAF summarized at Table 1.

Five-point Likert scale questions were used for the retrospective assessment of social, personal, and school performance based on the last two premenstrual periods. School performance was evaluated with two domains: (1) class attendance and/or concentration difficulties during class and (2) exam performance and/or exam attendance.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. Demographic data analyses were subjected to the mean procedure for descriptive statistics. Numeric variables were analyzed using independent t-tests and one-way ANOVAs. Categorical variables were analyzed using Chi-square and Fisher's exact tests. The Chi-square test was used to compare the scales, and different severities of PMS were used. Pearson's correlation analysis was used to determine the direction (i.e., negative or positive) of the relationship between the severity of PMS symptoms and other variables.

RESULTS

The mean age of the participants was 21.49±2.3 years, the mean age of menarche was 13.01±1.6 years, and the mean duration of menstrual bleeding was 6.2±1.2 days. Of all participants, 74% (n=151) had a family history of PMS, and 35% (n=84) had irregular menstrual periods.

The participants' sociodemographic data are summarized in Table 2. Symptom severity levels of the participants were as follows: 32.2% (n=76) exhibited no premenstrual symptoms, while 41.9% (n=99) exhibited mild, 20.3% (n=48) exhibited moderate, and 5.5% (n=13) exhibited severe PMS symptoms. There was no relationship between sociodemographic variables and premenstrual symptom severity except as it was related to nutritional habits (i.e., higher levels of carbohydrate and junk food consumption were related with higher premenstrual symptom scores)

(x=18.475, p=0.030). Although 5.2% of participants who suffered from severe PMS had regular and balanced diet habits, 12.2% of the high junk food and carbohydrate consumers suffered from severe PMS (Table 3).

Of all participants, 67% (n=159) suffered from dysmenorrhea. In terms of menstrual features, dysmenorrhea was significantly related with severe premenstrual symptoms (x=14.471, p=0.002). Of the participants who had severe PMS, 92% also had dysmenorrhea. Only 7.7% of the participants with severe PMS did not also suffer from dysmenorrhea. The results indicated that PMS severity gradually increased with the presence of dysmenorrhea. Moreover, there were moderate negative correlation between most of the

Table 2: Socio-demographical characteristics of the study participants		
Socio-demographic variables	n	%
Distribution according to classes		
1	36	15.5
2	41	17.6
3	36	15.3
4	61	26.2
5	28	12.5
6	31	13.3
Residence		
live with family	73	30.9
live with housemate	68	28.8
live in dormitory	87	36.9
live alone	8	3.4
Informing about menstruation before first period		
Yes	206	87.3
No	30	12.7
Regularity of menstruation		
Regular	84	35.6
Irregular	152	64.4
Dysmenorrhea		
Presence	159	67.4
Absence	77	32.6
Physical exercise level		
1- 3 hour /week	14	5.9
Less than 1 hour /week	6	2.5
Irregular	116	49.2
Never	100	42.4
Nutritional habits		
Regular and balanced diet	96	40.7
High carbohydrate and junk foods	49	20.8
Low carbohydrate, high vegetables	57	24.2
Irregular	34	14.4
Smoking		
Life-long non smoker	226	95.8
Cessation to smoking	0	0
Smoker	10	4.2
Caffeine consumption		
≥ 3 cup	144	61.0
1-3 cup	84	35.6
<1 cup	8	3.4
Family history of PMS		
mother	40	16.9
sister	83	35.2
aunt	22	9.3
cousin	36	15.3

Table 3: Assessment of socio-demographic characteristics and symptom severity						
	Non-PMS* n=76 No. (%)	Mild-PMS n=99 No. (%)	Moderate-PMS n=48 No. (%)	Severe-PMS n=13 No. (%)	Statistics	P
Age (mean ± SD)	21.1±2.9	21.5±1.9	22.0±2.3	21.0±1.5	f=1.743	0.159
BMI (mean ± SD)	21.4±2.5	21.6±2.3	22.1±2.7	20.6±1.9	f=1.772	0.153
Age at menarche (years) (mean ± SD)	12.9±1.8	13.1±1.1	12.9±1.2	12.0±3.6	f=1.450	0.229
Duration of menstruation bleeding (days) (mean ± SD)	6.3±1.2	6.0±1.3	6.4±1.1	6.6±1.2	f=1.982	0.117
Regularity of menstruation					χ^2=7.240	0.065
Regular	34(40.5)	26(31.0)	18(21.4)	6(7.1)		
Irregular	42(27.6)	73(48.0)	30(19.7)	7(4.6)		
Dysmenorrhea					χ^2=14.471	0.002*
Present	40(25.2)	69(43.4)	38(23.9)	12(7.5)		
Absent	36(46.8)	30(39.0)	10(13.0)	1(1.3)		
Physical exercise level					χ^2=11.560	0.239
1- 3 hour /week	3(21.4)	8(57.1)	3(21.4)	0(.0)		
Less than 1 hour /week	0 (.0)	4(66.7)	1(16.7)	1(16.7)		
Irregular	32(27.6)	53(45.8)	25(21.6)	6(6.4)		
Never	41(41.0)	34(34.0)	19(19.0)	6(6.0)		
Nutritional habits					χ^2=18.475	0.030*
Regular and balanced diet	38(39.6)	42(43.8)	11(11.5)	5(5.2)		
High carbohydrate and junk foods	14(28.6)	19(38.8)	10(20.4)	6(12.2)		
High vegetables	14(24.6)	26(45.6)	15(26.3)	2(3.5)		
Irregular	10(29.4)	12(35.3)	12(35.3)	0(.0)		

*Premenstrual Syndrome

subscale scores and dysmenorrheal: Low Mood (r=-0.224, p=0.001), Endogenous Depressive Features (r=-0.315, p=0.000), Atypical Depressive Features (r=-0.259, p=0.000), Hostility/Anger (r=-0.253, p=0.000), Social Withdrawal (r=-0.235, p=0.000), Anxiety (r=-0.261, p=0.000) , Organic Mental Discomfort (r=-0.264, p=0.000), General Physical Discomfort (r=-0.266, p=0.000), Signs of Water Retention (r=-0.218, p=0.001), Autonomic Physical Changes (r=-0.304, p=0.000), Fatigue (r=-0.273, p=0.000), Impaired Social Functioning (r=-0.288, p=0.000), Miscellaneous Behavior/Mood Changes (r=-0.236, p=0.001), and Miscellaneous Physical Changes (r=-0.338, p=0.000).

The data on assessment of functionalities during last two menstrual periods were shown at table 4.

Impairments in all functionality areas, except self-care functionality, were significantly related with severity of PMS. In particular, poorer school attendance and exam performance were related with severe premenstrual symptoms (Table 5).

Of the participants who had severe PMS, 61.5% had significantly poorer class attendance, concentration during class, and exam performance. Social functionality was seriously affected in 46.2% of dysmenorrhea sufferers and 3.9% of the participants who did not suffer from dysmenorrhea. Although academic and social functionality areas were affected by the presence of dysmenorrhea, self-care functionality appeared to be unaffected. The PAF subscale scores and their relationships with premenstrual symptom severity were summarized in Table 6.

According to the post-hoc analysis, the Atypical Depressive Features, Hostility, Increased Well-being, Impulsiveness, and General Physical Discomfort subscale scores were not related with the severity of PMS. The Anxiety and Signs of Water Retention subscale scores were related with the severity of PMS at the p<0.05 level. All other subscale scores were related with the severity of PMS at the p<0.001 level. The presence of dysmenorrhea was significantly correlated with poorer school performance (Tables 7 and 8).

Table 4: Assessment of social, personal and school functionality during last two premenstrual periods

Functionality areas	n	%
Social /Family relationships		
Unaffected	52	22.0
Slightly affected	104	44.1
Moderately affected	47	19.9
Significantly affected	29	12.3
Seriously affected	4	1.7
Self-care		
Unaffected	82	34.7
Slightly affected	91	36.8
Moderately affected	36	15.3
Significantly affected	20	8.5
Seriously affected	7	3.0
School attendance		
Unaffected	94	39.8
Slightly affected	70	29.7
Moderately affected	29	12.3
Significantly affected	27	11.4
Seriously affected	16	6.8
Exam attendance and assessments of exam performance		
Unaffected	73	30.9
Slightly affected	80	33.9
Moderately affected	46	19.5
Significantly affected	33	14.0
Seriously affected	4	1.7

Table 5: Functionality and premenstrual symptom severity

Functionality area	Non-PMS* n=76 No. (%)	Mild-PMS n=99 No. (%)	Moderate-PMS n=48 No. (%)	Severe-PMS n=13 No. (%)	Statistics	P
Social /Family relationships						
Unaffected/Slightly affected	64(84.2)	69(69.7)	21(43.8)	2(15.4)	χ^2=40.137	0.000
Moderately affected	9(18.2)	18(18.2)	15(31.3)	5(38.5)		
Significantly/ Seriously affected	3(3.9)	12(12.1)	12(25.0)	6(46.2)		
Class attendance and/or concentration difficulties during the class						
Unaffected/Slightly affected	72(94.7)	70(70.7)	19(39.6)	3(23.1)	χ^2=71.147	0.000
Moderately affected	3(3.9)	17(17.2)	7(14.6)	2(15.4)		
Significantly/ Seriously affected	1(1.3)	12(12.1)	22(45.8)	8(61.5)		
Exam attendance and exam performance						
Unaffected/Slightly affected	66(86.8)	67(67.7)	18(37.5)	2(15.4)	χ^2=63.712	0.000
Moderately affected	9(11.8)	22(22.2)	12(25.0)	3(23.1)		
Significantly/ Seriously affected	1(1.3)	10(10.1)	18(37.5)	8(61.5)		

*Premenstrual Syndrome

Class attendance and/or concentration difficulties during class and exam attendance and exam performance worsened with the presence of dysmenorrhea. Of the participants who had dysmenorrhea, 94.6% had seriously impaired attendance and poor exam performance (this ratio was 5.4% in the participants who did not have dysmenorrhea). Similarly, class attendance and/or concentration difficulties were significantly affected in 93.0% of participants who had dysmenorrhea and 7.0% of the participants who did not have dysmenorrhea.

Table 6: Association between mean subscale scores of PAF and premenstrual symptom severity

Subscales of PAF	Non-PMS* n=76 (mean±SD)	Mild-PMS n=99 (mean±SD)	Moderate-PMS n=48 (mean±SD)	Severe-PMS n=13 (mean±SD)	Statistics	P
Low mood	13.7±3.37	23.03±6.92	36.6±7.37	44.6±6.29	f=191.99	0.000
Endogenous Depressive Features	6.81 ±1.80	10.13±2.67	15.79±4.38	22.23±3.63	f=159.51	0.000
Instability	4.97±1.85	8.34±2.74	12.22±2.73	15.07±2.81	f=116.39	0.000
Atypical Depressive Features	11.76±3.87	18.21±4.48	25.54±4.04	28.15±3.13	f=136.41	0.000
Hysteroid Features	6.14±1.39	10.98±3.27	16.54±4.66	20.38±3.54	f=144.03	0.000
Hostility/Anger	11.76±3.87	18.21±4.48	25.54±4.04	28.15±3.13	f=136.41	0.000
Social Withdrawal	5.84±1.87	9.41±3.23	14.64±4.73	21.30±3.01	f=127.51	0.000
Anxiety	6.80±2.14	10.91±2.96	16.20±3.12	18.30±2.42	f=148.53	0.000
Increased Well-being	4.78±1.32	5.93±2.32	7.47±3.69	8.15±5.08	f=13.29	0.000
Impulsiveness	4.94±1.20	7.88±3.28	12.12±4.10	13.84±2.57	f=74.52	0.000
Organic Mental Discomfort	7.69±2.02	12.21±4.05	18.43±5.72	23.92±5.36	f=104.51	0.000
General Physical Discomfort	5.26±2.08	7.72±2.55	11.83±3.85	13.46±2.14	f=75.16	0.000
Sign of water retention	9.48±2.80	14.54±4.64	20.08±5.23	23.46±3.95	f=82.28	0.000
Autonomic Physical Changes	9.55±2.28	13.13±3.68	19.68±4.15	27.61±4.23	f=155.64	0.000
Fatigue	7.61±3.11	11.86±3.37	17.66±3.72	20.92±2.56	f=120.74	0.000
Impaired Social Functioning	13.60±2.77	22.87±5.57	36.56±8.18	51.07±5.86	f=273.69	0.000
Miscellaneous Behavior/mood	16.48±2.57	24.45±4.65	33.95±5.98	44.84±4.29	f=248.06	0.000
Miscellaneous Physical changes	8.80±2.19	11.95±3.23	16.75±4.43	20.38±3.27	f=86.83	0.000

*Premenstrual Syndrome

Table 7: Association between dysmenorrhea and exam attendance and exam performance

| | Dysmenorrhea | | | |
	Presence n=159 No. (%)	Absence n=77 No. (%)	χ^2	p
Exam attendance and exam performance				
Unaffected/Slightly affected	84(54.9)	69(45.1)	31.324	0.000
Moderately affected	40(87.0)	6(13.0)		
Significantly/ Seriously affected	35(94.6)	2(5.4)		

Table 8: Association between dysmenorrhea and class attendance and/or concentration difficulties during the class

| | Dysmenorrhea | | | |
	Presence n=159 No. (%)	Absence n=77 No. (%)	χ^2	p
Class attendance and/or concentration difficulties during the class				
Unaffected/Slightly affected	96(58.5)	68(41.5)	20.576	0.000
Moderately affected	23(79.3)	6(20.7)		
Significantly/ Seriously affected	40(93.0)	3(7.0)		

DISCUSSION

In this study, 32.2% (n=76) of the participants exhibited no premenstrual symptoms, while 41.9% (n=99) exhibited mild, 20.3% (n=48) exhibited moderate, and 5.5% (n=13) exhibited severe PMS symptoms. The rate of severe PMS has been reported as between 4.9% and 16.2% (18). In a study conducted with 310 Australian women aged 18-45, the rate of severe PMS was found to be 11% (19). In another study conducted with 21-35-year-old women, it was found that 8% of the women had severe, and 14% had moderate PMS (20). Dereboy et al. found prevalence rates

of 10% and 27% for severe and moderate PMS, respectively, in Turkish university students (13). Nisar et al. reported that 59.5% of medical students in Pakistan had mild, 29.2% had moderate, and 11.2% had severe PMS (21). The variability of PMS severity in the literature may be due to the fact that the studies were conducted with different age groups and populations with different sociocultural backgrounds.

Of the participants in the current study, 67% (n=159) had dysmenorrhea, which was significantly related with severe premenstrual symptoms and higher scores on almost all PAF subscales. Although some studies have reported no relation between dysmenorrhea and PMS (22, 23), a positive relationship has been reported in most of the studies conducted with young adults (24-26) and adolescents (27-29). Steiner et al. also reported that the prevalence of dysmenorrhea was high, particularly in those with severe PMS or PMDD; the prevalence of dysmenorrhea was 63.7% in those with no/mild PMS, 81.7% in those with severe PMS, and 73.8% in adolescents with PMDD (30). Similar results were found in our study. Biochemical changes in severe PMS and dysmenorrhea may correspond with each other, and reduced prostaglandin levels may relieve both of them. Moreover, the treatment of dysmenorrhea may help to reduce premenstrual symptoms and related difficulties in school performance in young women.

According to our results, higher level of carbohydrate and junk food consumption was related to higher premenstrual symptom scores, although the relationship between dysmenorrhea and nutritional habits was not significant. Studies have shown significant reductions in menstrual pain and premenstrual symptoms with increased fruit and vegetable intake (31-33). Diet habits related with the high consumption of vegetables may be related with lower levels of estradiol, which may lead to the reduced premenstrual symptomatology.

Recent studies have shown that there is a relation between coffee consumption and the severity of PMS (27, 34), as caffeine is a stimulant and increases stress, irritability, and emotionality (35). In one study, it was shown that the frequency of PMS increases with the amount of caffeine consumption, but the finding was not statistically significant. In this study, no relationship between caffeine consumption and the severity of PMS was found (36).

In our study, BMI was normal in 76.3%, low in 11.0%, and high in 11.9% of the participants, and two of the participants (0.8%) were overweight. There was no significant relationship between BMI and premenstrual symptoms. However, in other studies, the PMS rate has been demonstrated to increase as BMI rises (34, 36-38).

Although some researchers have not been able to show a significant relationship between PMS frequency and impaired quality of life (36), PMS, which is very common in the community, affects female adolescents' family relationships, social lives, business affairs, productivity, self-confidence, course attendance, success, and life quality (39). A relationship between severe premenstrual symptoms and impaired life quality in young adults has been demonstrated (40). We reviewed studies on the effects of premenstrual symptoms on educational performance, especially in medical schools, and found that more severe premenstrual symptoms are related with a reduction in educational performance (21). Issa et al. reported that scores of an impairment in general health questionnaire were not significantly related with the presence of PMDD (41). Balaha et al. reported that the more frequent limitations in severe PMS were related to activities such as concentration in class, college attendance, going out of the home, daily chores, and homework tasks (42). In this study, impairment in all functionality areas was significantly correlated with higher PAF scores. In particular, poorer school attendance and exam performance were related with severe premenstrual symptomatology more than self-care functionality. The presence of dysmenorrhea was significantly correlated with poorer school performance, including class attendance and/or concentration difficulties during class and exam performance/exam attendance. This is significant, as academic performance is an important performance domain that may affect other areas of functionality.

Regarding limitations of the present study, first, our participants were randomly selected from one medical school, making it difficult to generalize the results. Second, we used a retrospective self-rating scale for assessing premenstrual symptomatology, and we assessed school and general performance using five-point Likert scales, as we assumed that using an instrument that was brief and required less effort would encourage participation.

CONCLUSIONS

Premenstrual symptoms are one of the most common problem area among young women that adversely affect their academic performance and emotional status, so strategies should be developed for early detection and management of PMS in young women. Students should receive professional support in order to overcome the problems associated with PMS. Relieving the problems of young people suffering from PMS and the coping strategies are expected to assist in the elimination of such problems. Students should be informed by medical staff about PMS and coping strategies. Even simple recommendations about diet regulation (e.g., eating less junk food and carbohydrates) may help young women to reduce symptoms. Because dysmenorrhea seems to be strongly related with severe premenstrual symptoms and poorer educational performance, treatment strategies (even those merely aimed at pain control) could help to improve the class attendance and exam performance of female medical students.

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