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Nazan Karaoğlu
Özden Taşgın
Selcuk University
Karamanoğlu Mehmet Bey University
drnkaraoglu@yahoo.com.tr
Konya-Turkiye

PREMENSTRUAL SYNDROME IN PHYSICALLY ACTIVE AND INACTIVE UNIVERSITY STUDENTS

ABSTRACT

Although the evidence continues to point to the benefits of exercise for those who experience premenstrual syndrome (PMS), there are a limited number of studies about premenstrual syndrome in physically active women in Turkey. This study aims to define premenstrual syndrome on a group of physically active university students with comparison of physically inactive students of the same age group. Menarche age of the study population was 13.86±1.68 years. The PMS was detected in 81(53.3%) of all students, in 40 (52.6%) of physical education students and 41 (53.9%) of non-physical education students. The PMS percentage of groups were not different (p=0.87). Nervousness were significantly high in physical education students with irregular menses (p=0.04). Menarche age made no significant difference in PMS levels in all students (p>0.05) and physical education students except sleep changes (p=0.00). Contrary to some previous studies exercise seems to be ineffective in this study population in respect to PMS.

Keywords: Premenstrual Syndrome, Physical Activity, University Students, PMS

FİZİKSEL OLARAK AKTİF VE İNAKTİF ÜNİVERSİTE ÖĞRENCİLERİNDE PREMENSTRÜEL SENDROM

ÖZET

Kanıtlar premenstrüel sendrom yaşayanların egzersizden fayda görebilecekleri yönünde olmasına karşın Türkiye'de fiziksel olarak aktif kadınlarda PMS ile ilgili çok az çalışma vardır. Bu çalışmanın amacı beden eğitimi öğrencisi olan öğrencilerle aynı yaş grubundaki fiziksel olarak aktif olmayan öğrencilerdeki Premenstrüel sendromu tanımlamaktır. Çalışma grubunun menarş yaşı 13.86±1.68 yıldı. Premenstrüel sendrom tüm öğrencilerin 81'inde (%53,3), beden eğitimi öğrencilerinin 40'ında (%52.6) ve kontrol grubunun 41'inde (%53.9) saptandı. Gruplar arasında premenstrüel sendrom görülme yüzdesi farklı değildi (p=0.87). Düzensiz adetleri olan beden eğitimi öğrencilerinde sinirlilik anlamlı olarak yüksekti((p=0.04). Beden eğitimi öğrencilerinde menarş yaşı uyku düzensizliği dışında fark oluşturmamıştı (p>0.05). **Sonuç:** Daha önce yapılan bazı çalışmaların aksine bu çalışma grubunda premenstrüel sendrom için egzersiz etkili gibi görünmemektedir.

Anahtar Kelimeler: Premenstrüel Sendrom, Fiziksel Aktivite, Üniversite Öğrencileri, PMS

1. INTRODUCTION (GİRİŞ)

Regular menstrual cycles reflect women's reproductive health and many women experience premenstrual syndrome (PMS) symptoms in their reproductive years, either do not perceive these symptoms as either distressing or perceive as debilitating [1, 2, and 3]. Some authors defines premenstrual phase of the menstrual cycle as "a cacophony of mind and body" [3]. PMS includes a broad group of emotional, behavioral and physical symptoms that occur for several days to several weeks before menses and subside following beginning of menses [1, 3 4, 5, and 6]. Mood and behavioral symptoms, including irritability, tension, depressed mood, tearfulness, and mood swings, are the most distressing, but somatic complaints, such as breast tenderness and bloating, can also be problematic [2 and 4].

Reported PMS prevalence is between 6.1% and 96.6% [2, 3, 7, 8, 9, 10, and 11]. Deuster et al. referred to the increase in PMS prevalence in the twenties to the mid-thirties [9]. There are no hormone or laboratory tests that indicate a PMS diagnosis [1].
Menstrual cycle-related symptoms can have a profound impact on a woman’s quality of life and personal relationships. They are also associated with considerable use of healthcare resources; time lost from work, and decreased productivity [5, 12, and 13]. Even though the symptoms are mild, 5–8% have moderate to severe symptoms that are associated with substantial distress or functional impairment [4]. Robinson and Swindle pointed out that there was a consistent and strong relationship of PMS symptom levels to interference in all domains of a woman’s life [14]. Rızk et al. reported a moderate but significant negative impact of PMS on the quality of life of affected girls, particularly school performance, social interactions, lifestyle, and emotional well-being [10]. As many as 80% of women with PMS report at least one week per month of reduced work productivity as a result of premenstrual symptoms; furthermore, women with PMS have higher levels of absenteeism as a result of their symptoms than women without PMS [6 ve 12].

Although the evidence continues to point to the benefits of exercise for those who experience PMS, while less strenuous forms of non-competitive exercise appear most effective, the type of exercise, its duration, and length and in turn the reasons for improvement in symptoms still await clarification [15]. According to a previous study the prevalence of dysmenorrhea was twofold lower in athletes than in the control group [16]. To sum up, this study aims to define PMS on a group of physically active university students with comparison of physically inactive students of the same age group.

2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

There are a limited number of studies about PMS in physically active women in Turkey. Besides, there is conflict between studies of the literature about the effect of physical activity in PMS. Detecting and preventing PMS is important especially in physically active sport woman for the performance and quality of life. This study may be a pilot study for the more detailed studies about physical activity and PMS.

3. MATERIAL-METHODS (MATERYAL-METOT)

In this case control study 76 physical education students of Karamanoğlu Mehmet Bey University and 76 non-physical education students of Selcuk University as controls were required to complete an anonymous questionnaire about PMS. While physical education students were all sports woman non-physical education students were all physically inactive ones who had not even an interest in making a

physical activity. According to selection criteria single woman between the ages of 17 to 30 were all welcome. The questionnaire was consisting of questions about socio-demographic variables, questions about menstrual cycle and PMS Scale of Gençdogan [17]. This is a five point Likert scale which is consisting of 9 subscales. Subscales are detecting depressive feelings, anxiety, fatigue, nervousness, depressive thoughts, pain, appetite changes, sleep changes and bloating via 44 items. Minimum points and maximum points can be 44 to 220, respectively. If the PMS Scale score of the participant was higher than fifty percent of the maximum point it was defined as PMS. Cronbach Alfa Coefficients was 0.75 [17]. Participants were informed about the objectives of the study and informed consent was obtained from each participant. Privacy of the students was guaranteed by the implementing author throughout the study who was monitoring and providing assistance during the filling stage of the questionnaire. Study was conducted under the permission of local administration unit. Descriptive statistics included means and standard deviations for continuous variables and percentages for categorical variables. Comparisons of the groups were made by Students-t test and Mann Whitney U test according to homogeneity of variances. Categorical variables tested by Pearson Chi-Square test. All tests were two tailed, and a *P* value less than 0.05 was considered significant. The data from the surveys were tabulated and analyzed using SPSS Package program.

4. FINDINGS AND DISCUSSIONS (BULGULAR VE TARTIŞMALAR)

The mean age of the university students was 21.07±2.07 years (range from 17 to 25 years). Menarche age of the study population was 13.86 ±1.68 years. Table 1 shows the characteristics of students. The PMS was detected in 81(53.3%) of all students, in 40 (52.6%) of physical education students and 41 (53.9%) of non-physical education students. The PMS percentage of groups were not different according to Pearson Chi-Square test (p=0.87).

Table 1. The main characteristics of students.
(Tablo 1. Öğrencilerin genel özellikleri)

	Physical Education Students	Non-physical Education Students	TOTAL
Mean age (year)	20.39±2.25	21.75±1.63	21.07±2.07
Menarche age	13.69±1.47	14.02±1.86	13.86±1.68
Menstrual Cycle			
Regular	49(64.5%)	48(63.2%)	97(63.8%)
Irregular	27(35.5%)	28(36.8%)	55(36.2%)
Mean sport beginning age	11.85±3.73		
Mean age in professional sports	14.18±3.14		

There was not a significant difference between physical education and other university students taking depressive feelings into account (t=0.47, p=0.63). Level of anxiety, fatigue, nervousness, depressive thoughts and bloating were not significant between two groups (p>0.05). Table 2 represents the comparison of physical education students and the non-physical education students' PMS scores.

Table 2. The comparison of physical education students and the non-physical students PMS levels according to PMS Scale
(Tablo 2. Beden eğitimi öğrencileri ile beden eğitimi öğrencisi olmayan öğrencilerin PMS düzeylerinin PMS Skalasına gore karşılaştırlması)

PMS SCALE	n	Mean	Standard Deviation	t	p
Depressive feelings					
Physical education students	76	17.71	6.92	0.47	0.63
Non-physical education students	76	17.21	6.03		
Anxiety					
Physical education students	76	14.00	6.21	0.46	0.64
Non-physical education students	76	13.56	5.14		
Fatigue					
Physical education students	76	17.36	6.14	0.95	0.26
Non-physical education students	76	16.27	5.86		
Nervousness					
Physical education students	76	16.06	4.80	1.54	0.12
Non-physical education students	76	14.84	4.97		
Depressive thoughts					
Physical education students	76	15.85	6.57	0.17	0.85
Non-physical education students	76	15.68	5.11		
Pain					
Physical education students	76	8.82	3.51	2.59	0.01
Non-physical education students	76	7.50	2.75		
Appetite changes					
Physical education students	76	9.47	3.75	2.11	0.03
Non-physical education students	76	8.19	3.70		
Sleep changes					
Physical education students	76	8.52	3.82	3.26	0.00
Non-physical education students	76	6.77	2.67		
Bloating					
Physical education	76	9.03	3.91	-	0.55
Non-physical education students	76	9.43	4.37	0.58	
TOTAL					
Physical education					
Non-physical education students	76	116.86	32.35	1.56	0.12
	76	109.48	25.48		

While nervousness (35.5%), appetite changes (32.2%) and fatigue (30.9%) were the first three mostly seen symptoms in physical education students, appetite change (31.6%), nervousness (25.7%) and fatigue, depressive feelings and bloating (23.7%) were the first three in non-physical education students. There were a significant difference in nervousness, pain and sleep changes between two groups ($p<0.05$). In table 3 percentages of PMS symptoms in total and in subscales with comparison of two groups according to Pearson Chi-Square test are shown.

Table 3. PMS symptoms in total and in subscales with comparison of two groups according to Pearson Chi-Square test
(Tablo 3. İki grubun PMS semptomlarının toplam ve alt ölçeklerde Pearson Ki-kare testi ile karşılaştırması)

PMS SCALE	PHYSICAL EDUCATION STUDENTS		NON-PHYSICAL EDUCATION STUDENTS			TOTAL			
	Normal N %	Symptom (+) N %	Normal N %	Symptom(+) N %	P	Normal N %		Symptom (+) N %	
Depressive feelings	43 28.3	33 21.7	40 26.3	36 23.7	0.62	83	54.6	69	45.4
Anxiety	55 36.2	21 13.8	62 40.8	14 9.2	0.17	117	77.0	35	23.0
Fatigue	29 19.1	47 30.9	40 26.3	62 40.8	0.07	69	45.4	83	54.6
Nervousness	22 14.5	54 53.5	37 24.3	39 25.7	0.01	59	38.8	93	61.2
Depressive thoughts	49 32.2	27 17.8	55 36.2	21 13.8	0.29	104	68.4	48	31.6
Pain	34 22.4	42 27.6	52 34.2	24 15.8	0.00	86	56.6	66	43.4
Appetite changes	27 17.8	49 32.2	28 18.4	48 31.6	0.86	55	36.2	97	63.8
Sleep changes	33 21.7	43 28.3	57 37.5	19 12.5	0.00	90	59.2	62	40.8
Bloating	36 23.7	40 26.3	40 26.3	36 23.7	0.51	76	50.0	76	50.0
TOTAL	36 23.7	40 26.3	35 23.0	41 27.0	0.87	71	46.7	81	53.3

Menarche age made no significant difference in PMS levels in all students (p=0.00) and physical education students except sleep changes (p=0.00). Nervousness were significantly high in physical education students with irregular menses (p=0.04). Table 4 shows the differences in PMS scale scores according to menarche age and menstrual regularity in physical education students.

Table 4. The PMS scale scores according to menarche age and menstrual regularity in physical education students
(Tablo 4. Beden eğitimi öğrencilerinin menarş yaşı ve adet düzenine göre PMS Skalası puanları)

	PHYSICAL EDUCATION STUDENTS						
PMS SCALE	MENARCHE AGE			MENSTRUEL CYCLE			
	11-14 N=59	15 and over N=17	P	Regular N=49	Irregular N=27	P	TOTAL N=76
Depressive feelings	17.98±7.16	16.76±6.11	0.52	16.55±5.75	19.81±8.36	0.07	17.71±6.92
Anxiety	14.27±6.35	13.05±5.77	0.48	13.93±5.82	14.11±6.97	0.90	14.00±6.21
Fatigue	17.86±5.45	15.82±8.11	0.35	17.04±6.43	17.96±5.65	0.53	17.36±6.14
Nervousness	16.33±4.35	15.11±6.19	0.45	15.24±4.85	17.55±4.43	0.04	16.06±4.80
Depressive thoughts	16.35±6.33	14.11±7.25	0.21	15.06±6.31	17.29±6.89	0.15	15.85±6.57
Pain	9.20±3.33	7.52±3.92	0.08	9.00±3.27	8.51±3.96	0.57	8.82±3.51
Appetite changes	9.49±3.53	9.41±4.54	0.93	9.87±3.46	8.74±4.18	0.20	9.47±3.75
Sleep changes	9.16±3.72	6.29±3.40	0.00	8.20±3.82	9.11±3.82	0.32	8.52±3.82
Bloating	9.32±3.87	8.05±3.99	0.24	8.93±3.93	9.22±3.92	0.76	9.03±3.91
TOTAL	119.94±30.09	106.17±38.32	0.12	113.85±30.45	122.33±35.49	0.27	116.86±33.35

While there was not a difference in PMS Scale scores according to menarche age in non-physical education students ($p>0.05$), there was a significant difference in anxiety, fatigue and nervousness levels according to menstrual regularity in non-physical education students ($p<0.05$). Table 5 shows t-test results of non-physical education students' PMS Scale scores according to menarche age and menstrual regularity.

PMS appears to be most severe in the twenties to the mid-thirties with a higher risk for women of higher socioeconomic level, better schooling level with white skin color [2 and 9]. The study population of the study we reported constitutes the most effected group about PMS.

Table 5. The PMS scale scores according to menarche age and menstrual regularity in non-physical education students
(Tablo 5. Beden eğitimi öğrencisi olmayan öğrencilerin menarş yaşı ve adet düzenine gore PMS Skalası puanları)

	NON-PHYSICAL EDUCATION STUDENTS						
PMS SCALE	MENARCHE AGE			MENSTRUEL CYCLE			
	11-14 N=54	15 and over N=22	P	Regular N=48	Irregular N=28	P	TOTAL N=76
Depressive feelings	17.27±5.62	17.04±7.08	0.88	17.43±5.81	16.82±6.48	0.67	17.21±6.03
Anxiety	14.01±4.93	12.45±5.56	0.23	14.95±4.52	11.17±5.33	0.00	13.56±5.14
Fatigue	16.51±6.05	15.68±5.44	0.57	15.06±5.17	18.35±6.46	0.01	16.27±5.86
Nervousness	14.44±4.51	15.81±5.95	0.33	13.79±4.30	16.64±5.57	0.02	14.84±4.97
Depressive thoughts	15.27±4.77	16.68±5.85	0.28	15.77±4.69	15.53±5.85	0.84	15.68±5.11
Pain	7.29±2.54	8.00±3.23	0.31	7.79±2.55	7.00±3.05	0.23	7.50±2.75
Appetite changes	8.42±3.69	7.63±3.74	0.40	8.54±3.98	7.60±3.14	0.29	8.19±3.70
Sleep changes	6.90±2.67	6.45±2.70	0.50	6.79±2.72	6.75±2.61	0.94	6.77±2.67
Bloating	9.11±4.47	10.22±4.10	0.31	9.04±4.15	10.10±4.72	0.32	9.43±4.37
TOTAL	109.27±23.07	110.00±31.24	0.91	109.18±22.29	110.00±30.64	0.89	110.89±30.79

Studies report a wide range of PMS prevalence which is between 6.1% and 96.6% [2, 3, 7, 8, 9, 10, and 11]. Some authors note that 96.6% of women experienced at least one premenstrual symptom during the last six months [11]. But some authors claim that although the self-reported prevalence is 60.3%, the obtained prevalence of PMS is 25.2% [2]. In this study we detected PMS in 52.6% (40/76) of physical education students and 53.9% (41/76) of non-physical education students. This result may be due to the scale we used which may be is a more objective assessment way than a self report. As some authors mentioned about before there have been anecdotal accounts and unsystematic reports in the past suggesting that women who exercise experience fewer premenstrual symptoms than sedentary women [11]. Our results also present an unexpected trend for the influence of physical activity and PMS.

The most common symptoms of PMS are reported as feeling irritable and restless (72%), anxiety (67.3%), feeling fullness, discomfort or pain in the abdomen (66.6%), lack of energy or easily fatigued (66.6%), and fatigue in the legs (65.5%) in a previous study in Turkey [7]. Another study noted the principal premenstrual symptoms as irritability, abdominal discomfort, nervousness, headache, fatigue, breast pain and all of these symptoms prevalence as over 50% [2]. Some authors suggest that irritability, nervousness and tension are the core elements of the premenstrual syndrome [8]. In the study we presented nervousness (35.5%), appetite changes (32.2%) and fatigue (30.9%) were the first three mostly seen symptoms in physical education students. In non-physical education students the first three

symptoms were appetite change (31.6%), nervousness (25.7%), and depressive feelings, fatigue and bloating (23.7%). The significant difference in nervousness, pain and sleep changes in favor of physical education students we detected seems to be in contrast to previous studies about the positive affect of sports [16, 18, and 19].

In a previous study painful menstruation was significantly higher in control group than athletes and regular physical exercise was suggested to be one of the possible ways of eliminating unpleasant pain phenomenon that affects most girls [16]. Similarly, in a study with dancers and controls pain was mostly reported symptom in controls [18]. Bayram noted that the changes due to PMS and pain are less often seen among the sportswomen than the sedentary women [19]. In a prospective study, exercise reduced the global premenstrual distress (PD) symptom score, including the water retention and pain scales and authors suggested that an exercise program may benefit women with progesterone-related premenstrual affect disturbance [20]. In contrast to these studies we found pain in a significantly higher percentage in physical education student group than non-physical education students ($p=0.00$). Some studies took attention to the need in defining the extent and intensity of exercise to understand the benefits of exercise in enhancing moods [21].

In a study authors reported that a larger proportion of women who were physically active had high premenstrual symptom scores compared to those women who were sedentary [11]. Deuster et al. also found that women with PMS were 2.9 times more likely to be physically active than women without PMS [9].

Women with significant emotional⁄behavioral premenstrual symptoms were reported to have an increased subjective sleepiness and lower alertness during the late-luteal phase of the cycle compared with women with minimal symptoms [22]. In the study we presented with a similar result the total PMS Scale score were higher in physical education students and the sleep changes were significant in favor of this group ($p=0.00$).

Studies showed that there is a strong correlation between PMS symptom severity and impairment of social and work performance resulting in missed workdays and interference in all life domains of the sufferer [12, 14, and 23]. In a previous study a large percentage of the specialist physical education students reported a derogatory effect of menstruation on their sports performance, though the problems reported were minor ones. Authors also noted that these effects upon performance appear to be more psychological than physiological [24]. In another study with moderately active university students authors detected no significant variation in muscle strength and muscle endurance during the menstrual cycle [25].

Results indicate that PMS leads to substantial impairment in normal daily activities and occupational productivity and significantly increased work absenteeism [12]. Besides in a study authors claimed that the impairment and lowered quality of life for PMDD is similar to that of dysthymic disorder and is not much lower than major depressive disorder [13]. However, as some authors noted the degree of severity in PMS is subjectively described by the sufferer and therefore the assessment is heavily influenced by the individual’s personality, perception, tolerance [6].

This study has some limitations. First of all, self-report bias may have had an influence on the results. In second, this study was carried out on a limited part of university students which probably only partially reflects the problems of the whole university students.

5. CONCLUSION AND SUGGESTIONS (SONUÇ VE ÖNERİLER)

In conclusion, the results of this study showed that PMS Scores of physically active and inactive students were not significantly different in this study population. Besides higher PMS Scores of physical education students may point a need to be more careful about the negative effects of PMS in quality of life and performance especially in sports sciences. Detecting and preventing PMS may enhance the success of the sports women.

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