ORIGINAL ARTICLE

Evaluation of premenstrual syndrome and quality of life in university students

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Abstract

Objective: To determine the frequency of premenstrual syndrome, review associated factors and evaluate quality of life in university students.

Methods: The cross-sectional study was conducted at Sakarya University, Turkey, between October 25, 2012, and April 25, 2013. Premenstrual Syndrome Scale was used based on Diagnostic and Statistical Manual III and IV (revised) for the evaluation of premenstrual syndrome. Short Form-36 was used to evaluate quality of life. Chi-square test, Mann-Whitney U test and logistic regression analysis were used to analyse the data.

Results: The median age of the 1008 students in the study was 21 (range:17-25). Frequency of premenstrual syndrome was found to be lower in overweight/obese students ($p<0.05$). Average scores of students with PMS were lower in all domains of quality of life ($p<0.05$ for each domain).

Conclusion: As an important health problem among university students, premenstrual syndrome adversely affects quality of life.

Keywords: University students, Premenstrual Syndrome, SF-36 quality of life questionnaire, Turkey. (JPMA 64: 915; 2014)

Introduction

Premenstrual syndrome (PMS) is characterised by a wide variety of emotional and physical symptoms and behavioural changes, occurring before the menstruation phase of menstrual cycle and subsiding after the beginning of the menstrual period and it is classified as a physical disease in 10th revision list of international classification of disease (ICD).[1,2] Hormonal values, neurotransmitters, diet, stress and lifestyle have been implicated although underlying mechanism is not clear.[3]

Known risk factors for PMS are hormonal imbalance, thyroid dysfunction, hypoglycaemia, fluid retention, genetic factors, stress and psychological factors.[4,5] Symptoms widely associated with PMS include physical symptoms such as bloating, breast swelling and tenderness, headache, weight gain, nausea and sweating, and psychological symptoms such as restlessness, irritability and anger.[6]

While there are some investigators suggesting that PMS symptoms start after menarche, particularly in the 30s, but some studies demonstrated that premenstrual complaints have an onset mostly between the adolescence and the 20s.[7,8] PMS is observed in about 80% of women and clinically severe cases have been defined in approximately 5% of women.[9,10] PMS is an important public health problem, most commonly seen in young women with a frequency ranging between 5% and 76%.[11] It was noted that the prevalence of PMS in adolescent girls in the United States of America is 70-90%. In the community studies performed in Turkey, a prevalence of PMS was found between 17.2% and 67.5% in the women in the age group of 15-25.[12]

Quality of life (QOL) can be defined as a subjective feeling that the individual's life is changing entirely for the better and may also be described as how the individual perceives his/her state within the culture and value system. Health-related QOL is a tool with increasing acceptability to determine the functional impact of a disease.[13] When the problems faced by young women are examined in literature, the most common problems observed are related to menstruation. A study conducted in the US indicated that 51.5% of young women have menstrual problems. Dysmenorrhea and PMS are the most commonly observed menstrual problems.[12] Severe symptoms which may adversely affect working and social life and require treatment may be observed in 5-10% of women of childbearing age.[13] Premenstrual complaints have been causing a decrease in labour productivity and quality of work life, economical losses, and increase in accident potential. It is also an important women's health problem that needs to be addressed in the early stage because of the fact that it adversely affects self-confidence, social relations, school attendance - if they are students - and QOL of young women.[12,14] It is crucial to inform young women about PMS, to provide support about methods of management and to ensure that it is assessed with a multidisciplinary understanding by healthcare professionals through peer education and education of wider populations.[12,14]

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This study was conducted to determine frequency of PMS, to review some factors that are believed to be associated with it, and to assess QOL among female university students.

Subjects and Methods

The cross-sectional study was conducted at the Sakarya University, Turkey, between October 25, 2012, and April 25, 2013.

The number of female students in the university in 2012-13 academic year was 11,608. The sample size for was calculated to be 978 students (incidence of the condition 50%, margin of error 3%, confidence level 95%).[9,10,12] After the departments were selected by casting lots, 1008 students from all classes constituted the study group. Participation was voluntary. Questionnaires were handed out to the students in classrooms and collected after they had been filled up.

The questionnaire was prepared based on literature in line with the study objective.[15-17] It included questions on socio-demographic characteristics (age, areas where they had spent most of their lives, area of residence, family income, educational background and employment status of parents, personality type), some menstruation-related characteristics (age at menarche, duration of menstrual cycle, duration of menstrual flow, use of drugs for menstrual regulation, presence of dysmenorrhea and family history of PMS), some habits and medical characteristics (smoking, consumption of tea, coffee, cola, chocolate, milk, salt and fatty food, being overweight/obese and regular exercise), PMS rating scale and Short Form-36 (SF-36) health-related QOL questionnaire.

Before data collection, approval was obtained from the institutional review board after which appointments were made for suitable days and timeslots. After the students were informed about the subject and objective of the study, informed verbal consent was obtained from those who agreed to take part in the study. The questionnaires were completed by the students under supervision. Each interview lasted for about 25-30 minutes. The rules stated in the Helsinki Declaration were complied with during data collection.

Premenstrual Syndrome Scale (PSS) was used based on Diagnostic and Statistical Manual III (DSM-III) and IV (revised)(DSM IV-R) for the evaluation of PMS.[18] The scale consists of 44 items, 5 of which are Likert type. The scores range between 44 and 220 and those with a score of 133 and above are considered to have PMS.

SF-36 Health-related QOL questionnaire was used to assess quality of life. SF-36 was developed in 1992[19] and its reliability and safety study in Turkey was conducted in 1999.[20] The questionnaire consists of 36 items and assesses QOL in 8 domains (physical functioning, physical role functioning, social role functioning, emotional role functioning, mental health, vitality, bodily pain, and general health perceptions). Domain scores of the questionnaire range between 0 and 100 and higher scores represent a better quality of life.

Students who smoked at least one cigarette per day were defined as smokers, whereas non-smokers were defined as individuals who had never smoked or who had not smoked in the preceding 6 months.[21] If an adolescent had pain in the abdominal, groin and lumbar region on the day before the menstrual period and/or the first day of menstrual period, it was considered to be dysmenorrhea.[22]

Having menstruation with equal intervals was defined as regular menstruation. If an adolescent experienced menstrual bleeding with equal intervals between 21 and 35 days, it was evaluated as regular menstruation (normal); if the menstruation interval was less than 21 days, it was considered to be short; if the menstruation interval was more than 35 days, it was considered to be long. Menstruation of less than 2 days was accepted as short, between 2 and 6 days as normal, and more than 6 days as long.[23-25]

Family income was assessed by the students as poor, average and high based on their own perceptions. The students whose parents were actively engaged in a revenue-generating business were defined as "employed".

History of PMS in mother and/or sister was considered to have a positive family history of PMS.

In our study, students who consumed on a daily basis 4 cups (75cc x 4) of tea or more were defined as "consuming tea", 3 cups (150 cc x 3) of coffee or more as "consuming coffee", 1 glass (200 cc x 1) of cola or more as "consuming cola", and 2 bars (150 cc x 3) of chocolate or more as "consuming chocolate".

Following the completion of the questionnaires and inventory, their body mass indexes (BMIs) were calculated by measuring their heights and weights. Those with BMI25kg/m2 and over were evaluated as overweight or obese.[13] Each student's body weight was measured with domestic scales and height with a meter rule.

Obtained data was assessed with SPSS 20.0. Chi-squared test, Mann-Whitney U test and Logistic Regression

Analysis (Forward Stepwise: Wald) were used for analyses.

Logistic regression analysis technique was applied to select the group of variables (where they live, personality type, history of PMS in family, dysmenorrhea, smoking, consumption of coffee and chocolate, salted foods, consumption of oily foods, overweight/obesity and history of regular exercise) associated with PMS and between variables. Multiple logistic regression was on the cut-off p value of 0.05 or 0.10. Odds ratio (OR) and 95% confidence intervals (CI) were reported to interpret the final model. Adjustment of confounders and interactions were also done. Goodness of fit of model was checked by Hosmer and Lemeshow Test. Statistical significance limit was accepted as $p<0.05$.

Results

The median age of 1008 students in the study was 21

Table-1: Socio-demographic characteristics.

Some socio-demographics	Premenstrual syndrome			Statistical analysis
	No (%)[a]	Yes (%)[a]	Total (%)[b]	X^2 *; p
Settlement (where most of student's life was spent)				
District-village	230 (58.8)	161 (41.2)	391 (38.8)	6.543; 0.011**
Centrum	412 (66.8)	205 (33.2)	617 (61.2)	
Where they stay				
Dormitory	451 (62.0)	276 (38.0)	727 (72.1)	3.404; 0.176
With their family	80 (66.1)	41 (33.9)	121 (12.0)	
House-apart	111 (69.4)	49 (30.6)	160 (15.9)	
Family income status				
Poor	13 (48.1)	14 (51.9)	27 (2.7)	4.056; 0.182
Average	501 (65.0)	270 (35.0)	771 (76.5)	
High	128 (61.0)	82 (39.0)	210 (20.8)	
Mother's educational level				
Primary school or lower	368 (63.9)	208 (36.1)	576 (57.1)	1.592; 0.132
Secondary school	146 (60.8)	94 (39.2)	240 (23.8)	
High school or above	128 (66.7)	64 (33.3)	192 (19.0)	
Father's educational level				
Primary school or lower	212 (64.6)	116 (35.4)	328 (32.5)	0.360; 0.451
Secondary school	146 (64.3)	81 (35.7)	227 (22.5)	
High school or above	284 (62.7)	169 (37.3)	453 (44.9)	
Employment status of mother				
Unemployed	592 (63.8)	336 (36.2)	928 (92.1)	0.053; 0.835
Employed	50 (62.5)	30 (37.5)	80 (7.9)	
Employment status of father				
Unemployed	159 (63.9)	90 (36.1)	249 (24.7)	0.004; 0.817
Employed	483 (63.6)	276 (36.4)	759 (75.3)	
Personality type				
Introverted	70 (60.3)	46 (39.7)	116 (11.5)	23.900; 0.000***
Extraverted	165 (68.5)	76 (31.5)	241 (23.9)	
Aggressive-angry	20 (35.1)	37 (64.9)	57 (5.7)	
Rational-strict	186 (66.2)	95 (33.8)	281 (27.9)	
Emotional	201 (64.2)	112 (35.8)	313 (31.1)	
Smoking				
No	597 (65.0)	321 (35.0)	918 (91.1)	8.009; 0.005**
Yes	45 (50.0)	45 (50.0)	90 (8.9)	
Overweight/obese				
No	575 (62.4)	346 (37.6)	921 (91.4)	7.306; 0.007**
Yes	67 (77.0)	20 (23.0)	87 (8.6)	
Regular physical exercise				
No	413 (66.6)	207 (33.4)	620 (61.5)	5.949; 0.015**
Yes	229 (59.0)	159 (41.0)	388 (38.5)	
Total	642 (63.7)	366 (36.3)	1008 (100.0)	

[a]Percent for the row. [b]Percent for the column. *Chi-square tests used to assess significance at .05 or less, ** $p<0.05$, *** $p<0.001$.

Table-2: Menstrual characteristics.

Some Characteristics	Premenstrual syndrome			Test value
	No (%)[a]	Yes (%)[a]	Total (%)[b]	X^2 *; p
Age at menarche (year)				
≤12	151 (62.1)	92 (37.9)	243 (24.1)	3.441; 0.328
13	226 (67.7)	108 (32.3)	334 (33.1)	
14	176 (61.5)	110 (38.5)	286 (28.4)	
≥15	89 (61.4)	56 (38.6)	145 (14.4)	
Duration of menstrual cycle (days)				
Short	69 (66.3)	35 (33.7)	104 (10.3)	3.760; 0.153
Normal	512 (64.5)	282 (35.5)	794 (78.8)	
Long	61 (55.5)	49 (44.59	110 (10.9)	
Duration of menstrual flow (days)				
Short	47 (54.0)	40 (46.0)	87 (8.6)	3.982; 0.137
Normal	532 (64.4)	294 (35.6)	826 (81.9)	
Long	63 (66.3)	32 (33.7)	95 (9.4)	
Use of drug for menstrual regulation				
No	627 (63.7)	357 (36.3)	984 (97.6)	0.000; 1.000
Yes	15 (62.5)	9 (37.5)	24 (2.4)	
Dysmenorrhea				
No	216 (73.0)	80 (27.0)	296 (29.4)	15.614; 0.000**
Yes	426 (59.8)	286 (40.2)	712 (70.6)	
Family history				
No	419 (71.0)	171 (29.0)	590 (58.5)	33.024; 0.000**
Yes	223 (53.3)	195 (46.7)	418 (41.5)	
Total	642 (63.7)	366 (36.3)	1008 (100.0)	

[a]Percent for the row. [b]Percent for the column. *Chi-2 tests used to assess significance at .05 or less, ** p<0.001.

Table-3: Average Short Form-36 scores.

Domains	Short Form-36 score Premenstrual syndrome		Test value z; p value
	No(n=642) Median (min-max)	Yes(n=366) Median (min-max)	
Physical functioning	90.0 (0-100)	80.0 (0-100)	5.602; 0.000*
Role-physical	100.0 (0-100)	50.0 (0-100)	8.639; 0.000*
Bodily pain	62.0 (0-100)	42.0 (0-100)	10.876; 0.000*
General health perception	65.0 (0-100)	57.0 (5-100)	6.961; 0.000*
Vitality	53.9 (0-100)	46.2 (0-100)	6.761; 0.000*
Social functioning	75.0 (0-100)	62.5 (0-100)	7.081; 0.000*
Role-emotional	66.7 (0-100)	33.3 (0-100)	7.412; 0.000*
Mental health	61.9 (19-100)	52.4 (0-81)	10.082; 0.000*

*p<0.001, statistically significant.

years (range: 17-25). Median age of students with PMS was 21 (range: 18-25) and median age of those without PMS was 21 (range: 17-25). Based on the score of Mann-Whitney U test (z), median age of students with PMS was higher than those without PMS (z=2.024; p=0.043). Number of students staying in dormitories was 727 (72.1%); 771 (76.5%) had average family income . Number of smokers was 90(8.9%). BMI of students ranged between 14.53 and 35.16 kg/m^2. Number of overweight/obese students was 87(8.6%). Frequency of PMS was 366(36.3%) (Table-1).

The age at menarche of the students varied between 9 and 18 with a mean of 13.33±1.23 years. The length of menstrual cycle varied between 15 and 90 days with a mean of 28.69±5.85 days whereas the duration of menstrual flow was between 2 to 11 days with an average of 6.12±1.35 days. Dysmenorrhea was found in 712(70.6%) students (Table-2).

Average scores obtained by students with PMS from all domains of SF-36 were lower than those by students without PMS (p<0.05 for each domain) (Table-3).

Data was also subjected to logistic regression analysis and its results were analysed separately (Table-4).

Table-4: Results of Logistic Regression Model (step 9).

Variables	β	SE[a]	p	OR[b]	95% CI[c]
Where they live (reference: centrum)					
District-village	0.330	0.147	0.024*	1.391	1.044-1.854
Personality type (reference: extroverted)					
Rational-strict	0.339	0.205	0.098	1.403	0.940-2.096
Emotional	0.399	0.201	0.047*	1.491	1.006-2.210
Introverted	0.597	0.263	0.023*	1.817	1.086-3.041
Aggressive-angry	1.668	0.340	0.000**	5.301	2.721-10.324
History of PMS in family (reference: N/A)					
Yes	0.784	0.144	0.000**	2.191	1.652-2.906
Dysmenorrhea (reference: N/A)					
Yes	0.448	0.164	0.006*	1.565	1.134-2.159
Consumption of coffee (reference: N/A)					
Yes	0.612	0.195	0.002*	1.844	1.258-2.702
Consumption of chocolate (reference: N/A)					
Yes	0.625	0.153	0.000**	1.868	1.383-2.523
Salting foods (reference: N/A)					
Yes	0.657	0.165	0.000**	1.928	1.395-2.664
Habit of consuming oily foods (reference: N/A)					
Yes	0.895	0.237	0.000**	2.446	1.537-3.895
Regular exercise (reference: N/A)					
Yes	0.536	0.148	0.000**	1.710	1.279-2.286
Constant	-2.518	0.246	0.000**	-	-

SE[a]: Standard error. OR[B]: Odd's ratio. CI[C]: Confidence interval. *p<0.05,**p<0.001.
***Final Step (step 9) Chi-square=7.555; p=0.478.

Discussion

PMS is a condition which affects women of childbearing age in psychological, behavioural and somatic terms. Some studies conducted in various countries reported that the frequency of PMS ranged from 23.8% to 75.4%.[26,27] In Turkey, the frequency of PMS ranged between 17.2% and 67.5%.[9,12,28,29] It was found to be 36.3% in our study. The reasons of different results may include the conduct of the studies on different populations and the use of different research methods.

It may be suggested that socio-economic status of those living in districts and villages is low and stress factors increase correspondingly. There are studies indicating that stress increases the frequency of PMS. Daily stress was reported to be associated with fluid retention and performance problems.[4] In our study, the frequency of PMS was determined to be higher in students who had spent most of their lives in districts and villages compared to those living in centrum (p<0.05). Irritability and depressive feeling are the most common symptoms of PMS.[30] Several investigators suggest that anxiety, panic disorder, depression and personality disorder have been more commonly reported among women with PMS.[31,32] Muderris et al. suggested that PMS symptoms were more severe in adolescents with depressive symptoms.[33] In our study, the frequency PMS was higher in students with angry-aggressive personality compared to other students (p<0.05). Aggressive-angry personality increases frequency of PMS 5.301 times (p<0.0001).

PMS is present with dysmenorrhea in many women and premenstrual symptoms are replaced with dysmenorrhea with the onset of menstruation.[34] The study of Demir et al. supports these results and there is a positive relation with dysmenorrhea and PMS.[28] Similarly, various studies reported that the frequency of PMS was higher in those having history of dysmenorrhea.[1,28,35] In our study, the frequency of PMS was found to be higher in students with dysmenorrhea (p<0.05). Frequency of PMS is 1.565 times higher in those with a history of dysmenorrhea (p<0.005).

There are several studies indicating that PMS complaints were more commonly reported in women with history of PMS.[35-37] Kisa et al. reported that more than half of young women with a history of PMS in their mothers had PMS.[35] Similar results have been reported in other studies.[28,38,39]

The frequency of PMS was higher in students with a history of PMS in our study (p<0.05). Frequency of PMS is 2.191 times higher in those with a history of PMS in the family (p<0.0001).

Increased smoking is associated with higher frequency of PMS.[28,40] In this study, the frequency of PMS was found to be higher in smokers (p<0.05). Similar results have been reported in some studies.[28,40,41] Erbil et al. indicated that there was no relation between smoking and the frequency of PMS.[5]

Craving for carbohydrate is one of the most frequent symptoms of PMS. However, it is recommended that women should abstain from foods containing caffeine such as chocolate as well as drinks such as tea and coffee for a healthy diet in this period.[42] Recent studies have shown that there is a relation between coffee consumption and the severity of PMS,[43,44] as caffeine is a stimulant and increases stress, irritability and emotionality.[45,46] Nagata et al. reported that there was a relation between high carbohydrate foods and PMS symptoms.[1] Gunes et al. indicated that PMS complaints had decreased when chocolate and calorie-rich foods were limited.[47] Studies have shown significant reductions in menstrual pain and premenstrual symptoms with increased fruit and vegetable intake.[48,49] 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.[45] In this study, the frequency of PMS was higher in those consuming coffee, chocolate, excessive salt and fatty foods (p<0.05 for each). Frequency of PMS is 1.844 times higher in those consuming coffee (p<0.005); 1.868 times higher in those consuming chocolate (p<0.0001);1.928 times higher in those salting their food (p<0.0001); and 2.446 times higher in those with a habit of consuming oily foods (p<0.0001).

High BMI is one of the known risk factors for PMS. Masho et al. reported that risk of PMS is three-fold in obese women compared to non-obese ones.[41] Our study indicated that the frequency of PMS is lower in overweight/obese students (p<0.05).

Regular exercise has shown to reduce breast tenderness, premenstrual depression and stress, which was associated with energy consumed.[50] Demir et al. reported that regular exercise reduced PMS complaints and provided emotional recovery.[28] Lustyk et al. recommended exercise to reduce stress in PMS.[51] However, the frequency of PMS was determined to be higher in regular exercisers in our study (p<0.05). One of the reasons of this difference may be the fact that although exercise has positive effects on PMS, as shown in the literature, women might not exercise regularly enough to produce these effects. Frequency of PMS is higher in those having regular exercise (OR: 1.710; p<0.0001).

PMS is an important health problem that affects women's quality of life adversely. Although it is not a life-threatening factor, PMS affects quality of life and productivity of women, causes reduction in labour productivity and therefore economic losses, and adversely affects self-confidence, social relation and school attendance particularly among adolescent girls.[14,26] While Hardie et al. (1997) reported that PMS increases absenteeism at work among women, Ince (2001) suggested that PMS results in higher absenteeism in school among adolescents.[52,53] In our study, health-related quality of life in all domains of SF-36 questionnaire was found to be significantly lower in the students with PMS compared to those without PMS (p<0.05 for each domain). Kircan et al. (2012) reported that in an assessment made with quality of life scale, physical role, emotional role, mental health and vitality results as well as general health perceptions were determined to be lower in young women with PMS.[54]

Conclusion

As an important health problem among university students, PMS adversely affects quality of life. It may be advantageous to refer people with suspected PMS to advanced healthcare facilities for final diagnosis and treatment and to provide information on healthy diet.

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