Premenstrual syndrome and quality of life in Iranian medical students

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Premenstrual syndrome and quality of life in Iranian medical students

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ABSTRACT

Purpose of study: The purpose of this research was to investigate the prevalence of premenstrual syndrome (PMS) in medical students and to evaluate the hypothesis that PMS may result in a decrease in quality of life.

Methods: In a cross-sectional study, 142 female medical students who study at Urmia University of Medical Sciences were included. The data were compiled using a PMS questionnaire based on the fourth version (DSM-IV) criteria, the questionnaire of "Premenstrual Syndrome Scale" as well as the "World Health Organization's Quality of Life (WHOQOL-BREF)" questionnaire.

Findings: In total, 56 out of 142 (39.4%) female medical students met the DSM-IV criteria for PMS. In the PMS group, more than half of the girls, i.e. 60.6% had mild, 25.1% had moderate and 14.2% had severe PMS. PMS was found to be significantly high in students who have positive history of PMS in their first degree relatives and who have used drugs to relieve PMS symptoms ($P < 0.05$). Life quality score was low in more than half of the medical students, especially in psychological and social components ($P > 0.05$). However, the quality of life score means in mental health ($P = 0.02$) and environmental health ($P = 0.002$) decreases as the PMS score average increases.

Conclusion: The results of premenstrual syndrome prevalence and their severity suggest that PMS is common in medical students and this adversely affects some domains of the quality of life. Improving the life quality of female medical students needs some interventions related to the PMS and also other interventions not related to PMS.

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Introduction

Premenstrual syndrome (PMS) is the name given to a major clinical disorder which constitutes psychosomatic and gynecological paradigms. It occurs in the luteal phase of menstrual cycle and subsides a few days later [1]. PMS is a complex condition that includes various mild-to-severe range of physical and psychological symptoms [2]. Severe psychological manifestation of PMS is known as Premenstrual Dysphoric Disorder (PMDD) which constitutes a minority of PMS cases.

Premenstrual syndrome has been defined using different criteria by different organizations. The three current most common diagnostic methods are as follows: the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), the American College of Obstetricians and Gynecologists (ACOG) and the WHO's International Classification of Diseases (ICD-10). Based on DSM-IV PMDD/PMS criteria, premenstrual symptoms must occur in the last week before menses and remit within a few days of the onset of menses, and symptoms must be severe enough to interfere with work, family and social relationships. At least five of the 11 specified symptoms must be present for a diagnosis of PMS [3].

Premenstrual syndrome is a common disorder in women of reproductive age. Research on the prevalence of PMS has reported different results, based on the diagnostic criteria and research methodology. Up to 80% of women will experience at least one premenstrual symptom [4]. The World Health Organization (WHO) estimates that 199 million women have premenstrual syndrome as of 2010 [5]. There exists much data from Iran regarding the prevalence of PMS using samples of students and other groups of women in Iran. Prevalence of PMS in Iranian adolescent and young girls has been reported ranging from 16% to 78.4% [6–9].

It seems that physical, emotional or both symptoms associated with premenstrual syndrome might negatively affect women's quality of life (QOL). Based on definition introduced by the WHO, quality of life is 'an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns' [10]. Literature review found conflicting results regarding effects of behavioral and physical symptoms of PMS on health-related quality of life [11].

There is a paucity of reliable data on the impact of PMS on health-related quality of life in many developing cultures, especially in Iran.

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To the best of our knowledge, findings of just an Iranian study showed that schoolgirls with premenstrual disorders suffer from poor health-related quality of life [7]. The aim of the study thereafter was to determine the prevalence of PMS in medical students and to investigate the effects of PMS symptoms on their quality of life.

Material and methods

Population and sampling

This is a cross-sectional survey of unmarried female medical students who study in the School of Medicine, Urmia University of Medical Sciences. The study was conducted during May to December 2012 at the Reproductive Health Research Center in Urmia City, Islamic Republic of Iran. All 142 medical students by means of census, from first to fifth grades (85.5% of total female students) who accepted to participate in the study were included.

Data collection procedure

Four structured questionnaires were used and it included the following components:

- Socio-demographic and basic clinical data;
- The Persian version of the "World Health Organization's Quality of Life (WHOQOL-BREF) questionnaire – this has been validated in our local Iranian population [12];
- DSM-IV PMDD/PMS criteria questionnaire, this also has been validated in local Iranian population [13]; and
- Premenstrual Syndrome Scale (PMSS), to determine the severity of PMS.

The WHOQOL-BREF questionnaire consists of 26 questions and is based on a four-domain structure including:

(1) Physical health activities of daily living, dependency on medical substances and medical aids, energy and fatigue, mobility, pain and discomfort, and sleep and rest;
(2) Psychological body image and appearance, negative feelings, positive feelings, self-esteem, spirituality/religion/personal beliefs, and thinking, learning, memory and concentration;
(3) Social and personal relationships, social support, and sexual activity; and
(4) Environmental, including financial resources, freedom, physical safety and security, health and social care.

Summation and calculation of the mean score for each domain has been done. Using the WHOQOL transformation table, we transformed domain scores to a 0- to 100-point scale. According to the mean of these component scores, patients were divided into two groups in each component including: mean score ≥56 for physical component, ≥58 for psychological component, ≥59 for social component, and ≥56 for environmental component, with higher scores indicating a better quality of life.

DSM-IV PMDD/PMS criteria consists of 11 symptoms that participants should have at least five symptoms from the questionnaire and at least one of these symptoms should have been from the four first symptoms (including depressed mood, marked anxiety, marked affective lability, marked irritability, decreased interest in usual activities, sense of difficulty in concentrating, marked lack of energy, change in appetite, hypersomnia or insomnia, sense of being out of control and other physical symptoms, such as breast tenderness or swelling, headaches, joint or muscle pain).

The subjects also were assessed for two prospective menstrual cycles through completing the Premenstrual Syndrome Scale (PMSS), which was used to determine the severity of PMS. It is composed of 44 clauses of the five-point Likert scale. The lowest possible PMSS total score is 44 and the highest score is 220. It is hypothesized that increasing PMSS total score indicates the higher density of PMS symptoms in girls. In addition to having more than five symptoms of the DSM-IV PMDD/PMS criteria, total score averages more than 50% of the highest PMSS (111 and above) means that PMS exists. The total score of PMSS was then converted to a percentage. After that, the PMS ratings were classified as none (≤110), mild (111–148), moderate (149–184) and severe (185–220) in categorical analyses.

The Research Ethics Committee of Urmia University of Medical Sciences approved the study and all students were interviewed after verbal informed consent.

Evaluation of the data

Descriptive statistics were used to depict descriptive features of students. The relation between the dependent variables (PMS Score and WHOQOL-BREF Score) and independent variables (socio-demographic and menstrual features and PMS risk factors such as: body mass index, physical exercise, daily coffee intake and salt intake habit) were analyzed using the Chi-square test, Student t-test and One Way ANOVA test. The prevalence of PMS was estimated with 95% Confidence Interval (CI) according to the method described by Newcombe [14], derived from a procedure outlined by Wilson in 1927 [15]. All statistical analyses were conducted using SPSS ver. 16.0. P-values less than 0.05 were considered significant.

Results

Out of 142 students which were accepted to participate and who completed research questionnaires correctly, 56 (39.4%, CI: 31.8–47.6%) girls met the criteria of DSM-IV PMDD/PMS.

Table 1 shows the distribution of socio-demographic characteristics and its relation with PMS average score in medical students. About 53% of students were ≥24 years of age, and age distribution did not seem to have statistically significant effect on PMS average score ($P > 0.05$). When comparing the students' PMS average score related to their socio-demographic characteristics, only the mothers' education level had a significant effect on PMS average score in their daughters ($P < 0.05$). There was no statistically significant difference between other socio-demographic variables ($P > 0.05$).

As can be seen in Table 2, there are significant differences between higher and lower body mass index, positive history of PMS symptoms in the first-degree relatives and history of taking medication ($P < 0.05$), whereas there are no statistically significant differences between regular physical exercise, coffee intake, higher salt intake habit, menarche after 12 years-old and having regular menstrual cycles and PMS average score ($P > 0.05$).

According to the results of the daily record of the Premenstrual Syndrome Scale, the severity of the PMS in most of the 56 students who met the diagnostic criteria was mild (23.9%, CI: 17.7–31.6%), in 9.9% (CI: 6.0–15.9%) it was moderate and in 5.6% (CI: 2.9–10.7%) it was severe. Reviewing the students' PMS and quality of life score averages showed that PMS score average is 105.9 ± 49.5. The average score of the lower dimensions of the life quality for "physical", "mental", "social" and "environmental" health domain was found as 50.3 ± 11.2, 57.5 ± 12.4, 55.1 ± 19.6 and 55.8 ± 16.7, respectively (Table 3).

Overall 47.9%, 62.7%, 62% and 42.3% of students have low in Physical, Psychological, Social relationships and Environmental domain of quality of life respectively; but there was no statistically significant difference between PMS existence and different domains score means from the lower dimensions of the quality of life ($P > 0.05$) (Table 4). However, the association between effects of PMS severity on some domains of the medical students' quality of life was

Table 1

Socio-demographic characteristics, means and PMS average scores of Urmia medical students, Iran, 2012.

Variables		N (%)	Mean SD	P*
Age	18–20	5 (3.5)	94 ± 49.21	0.21
	21–23	62 (43.7)	98.39 ± 51.18	
	≥24	75 (52.8)	112.91 ± 47.72	
Individual living status	With family	84 (59.2)	104.45 ± 48.59	0.40
	Alone	8 (5.6)	148.5 ± 37.52	
	With friends	50 (35.2)	101.52 ± 50.32	
Income level	Low	8 (5.6)	95.50 ± 18.72	0.77
	Intermediate	98 (69)	105.51 ± 51.55	
	High	36 (25.4)	109.28 ± 48.98	
Mother's education level	Elementary	21 (14.8)	116.86 ± 57.07	**0.00**
	Secondary school	8 (5.6)	142.75 ± 63.11	
	High school	50 (35.2)	87.92 ± 48.00	
	Academic	63 (44.4)	111.84 ± 41.86	
Father's education level	Elementary	18 (12.7)	107.78 ± 60.65	0.70
	Secondary school	9 (6.3)	122.44 ± 47.08	
	High school	28 (19.7)	100 ± 47.12	
	Academic	87 (61.3)	105.70 ± 48.44	
Living area	Center of province	90 (63.40)	107.40 ± 50.96	0.86
	District	50 (35.20)	102.96 ± 48.17	
	Rural	2 (1.40)	112 ± 0	

* P values are calculated using the chi-square test.

Table 2

PMS risk factors and PMS average scores of Urmia medical students, Iran, 2012.

PMS risk factors		N (%)	Mean ± SD	P*
Body mass index	<18	10 (7)	141 ± 53.81	0.01
	19–25	115 (81)	99.93 ± 47.74	
	≥26	17 (12)	125.65 ± 47.77	
Physical exercise (30 minutes a day)	No	121 (85.2)	106.4 ± 50.2	0.76
	Yes	21 (14.8)	102.90 ± 46	
Daily coffee intake	<2 cups/day	122 (85.2)	103.20 ± 43.8	0.11
	≥2 cups/day	20 (14.8)	123.3 ± 51.90	
Frequent salt intake habit	No	83 (58.5)	122.07 ± 51.91	0.78
	Yes	20 (14.2)	97.22 ± 44.90	
History of PMS in the first degree relatives	No	84 (59.2)	86.69 ± 32.14	0.00
	Yes	58 (40.8)	133.72 ± 56.79	
Age at menarche (year)	<12	26 (18.3)	113.08 ± 52.57	0.45
	≥12	116 (81.7)	104.29 ± 48.88	
Regular menstruation	No	39 (27.5)	105.90 ± 48.49	1.00
	Yes	103 (72.5)	105.90 ± 50.11	
Medication for PMS	No	109 (77.1)	101.11 ± 47.68	0.03
	Yes	33 (22.9)	122.31 ± 52.21	

* P values are calculated using the chi-square test.

significant. The quality of life score means in mental health ($P = 0.02$) and environmental health ($P = 0.002$) decreases as PMS score average increases. The results of the ANOVA test showed no significant decrease in the quality of life score means in physical health ($P = 0.74$) and social health ($P = 0.70$) domains (Table 5).

Discussion

This study investigated premenstrual syndrome of a group of female medical students using DSM-IV PMDD/PMS criteria and its effect on health-related quality of life that was determined using the WHOQOL-BREF questionnaire. We found that 39.4% of female medical students met DSM-IV PMDD/PMS criteria for PMS. Overall quality of life, especially in psychological and social domains were low in more than half of the female medical students at the Urmia University of Medical Sciences, Urmia City, Islamic Republic of Iran. Meanwhile, the quality of life score means in mental health and environmental health decrease as PMS score average increase.

Table 3

Premenstrual syndrome averages and quality of life score averages Min, Max, in Urmia medical students, Iran, 2012.

Scales	PMS and quality of life score averages			
	Min	Max	Average	SD
PMS	44	220	105.9	49.5
Quality of life scale				
Physical health	19	81	50.3	11.2
Mental health	31	88	57.5	12.4
Social relations	6	100	55.1	19.6
Environmental	19	100	55.8	16.7

Table 4

Score means and PMS existence based on lower dimensions of the quality of life in Urmia medical students, Iran, 2012.

Lower dimensions of the quality of life	Existence of PMS	Mean	SD	P*
Physical health	Yes	49.04	10.66	0.31
	No	51.05	11.54	
Mental health	Yes	56.88	13.89	0.23
	No	57.91	11.41	
Social relations	Yes	54.02	21.37	0.11
	No	55.77	18.55	
Environmental	Yes	56.04	18.35	0.19
	No	55.73	15.64	

* P values are calculated using t-test.

Table 5
Score means and PMS severity based on lower dimensions of the quality of life in Urmia medical students, Iran, 2012.

Severity of PMS	No PMS	Mild PMS	Moderate PMS	Sever PMS	*P**
Lower dimensions of the quality of life	Mean ± SD				
Physical health	51.05 ± 11.54	48.53 ± 11.67	49.71 ± 8.86	50.00 ± 10.07	0.74
Mental health	57.91 ± 11.41	60.91 ± 13.27	51.36 ± 11.20	49.38 ± 15.76	0.02
Social relations	55.77 ± 18.55	55.50 ± 22.48	49.14 ± 22.03	56.25 ± 15.49	0.70
Environmental	55.73 ± 15.64	62.76 ± 19.57	44.86 ± 11.50	47.00 ± 5.55	0.00

* *P* values are calculated using AN.

It has been estimated that up to 80% of women of reproductive age were suffering from various degrees of at least one symptom of premenstrual syndrome [4]. However, when we apply more rigorous criteria such as DSM-IV PMDD/PMS, the prevalence may be lower, and ranged from 4.9% to 35.5% [4,16]. In addition, it seems that the prevalence of PMS is varying in different populations and age groups. In a study performed by Dennerstein et al. in 2009 on more than 6000 women of reproductive age, PMS prevalence was reported in 37% of European and Latin American women, 43% of Australian women, but less than 20% of women in Asian countries (Pakistan, Hong Kong and Thailand), using the ACOG criteria [17]. The prevalence of PMS in 15- to 49-year-old women was found to be 12.7% in a study performed in Pakistan [18] and 79.0% in Turkey [19]. While there are some published papers on PMS emerging from Iran, it seems that premenstrual syndrome is quite prevalent in young girls. Using the American Psychiatric Association (APA) criteria, Mahmoodi et al. [8] found PMS ratio as 78.4% in the university students, but based on DSM-IV criteria, Delara et al. [7] found PMS in 37.2% of the 14- to 19-year-old adolescents, Bakhshani et al. [6] found PMS prevalence as 16% in a study on female students of the Zahedan University, and Nourjah [20] found PMS prevalence of 16.9% in the study he performed on undergraduate students of Teacher Training University. The prevalence ratio of 39.4% according to the DSM-IV PMDD/PMS criteria in our study is comparable with European, Latin American and Australian women, but higher than expected for Asian women [17] and Iranian university students [6,20]. This figure may be explained by age group differences and the perceptions of PMS symptoms by the students who study at medical school. Furthermore, some limited studies on medical students showed a variation in PMS prevalence, 89.6% in Egypt using ICD-10 criteria [21], 35.6% in Saudi Arabia using the ACOG criteria [22], and 51% in Pakistan according to ICD-10 [23]. We used DSM-IV PMDD/PMS criteria to calculate PMS prevalence in medical students; therefore, our results could not be compared with above-mentioned researches on medical students. Due to the differences in the diagnostic criteria of PMS, target populations, age groups, social and cultural contexts, it is difficult to compare the findings of the various studies.

In the current study, the most common mental and physical manifestations of the syndrome were marked affective lability (56.3%), decreased interest in usual activities (49.3%), marked lack of energy (37.3%), change in appetite (36.6%) and anxiety (13.4%). Most of these were similar to those reported in other studies and no major differences were found between the present study findings and similar investigations done on the university students in Iran and other countries [6,23,24]. The present study identified a pattern not following the typical PMS pattern; anxiety and nervousness is not as common (13.4%) as compared to studies on college students from Turkey (80.7%) [24] and from Iran (45.3%). This may be explained by the fact that medical students are familiar with premenstrual symptoms or the stressful nature of medical academic study.

It is known that physical, emotional or both symptoms associated with premenstrual syndrome affects the physical health and well-being, social relationships and mental health of women; these are different domains of the quality of life. Some studies have shown that at least some domains of the quality of life are significantly low in women who experience premenstrual syndrome, especially in women who experience PMS severely [24,25].

A recent study on Turkish college students showed a significant difference between the high PMS score and lower dimensions of the quality of life at least in the physical and environmental areas [24]. In the same study, the PMS average score of the college students was reported 128.2 ± 33.9. The average score of the lower dimensions of the quality of life was reported as 81.5 ± 4.7 for physical health, 76.6 ± 6.3 for mental health, 73.12 ± 6.7 for social relationships and 68.8 ± 9.34 for environmental health domains, respectively [24]. In our study, PMS average score of the medical students is calculated as 105.9 ± 56.5 and the lower dimensions of the quality of life average scale are calculated as 50.3 ± 11.2 for physical health and 55.8 ± 16.7 for environmental health domains, respectively. In contrast to the results of the above-mentioned study and some other studies, when the relation of PMS existence with quality of life was evaluated, we noticed that PMS existence does not decrease quality of life scores ($P > 0.05$). However, in evaluating the relationship between the severity of PMS and quality of life, we found out that the life quality only in mental and environmental health domains decreases as PMS severity increases. This result is compatible with the results of a Turkish study on medical staff that detected no significant difference between the frequency of PMS and lower dimensions of the life quality [26].

Another important finding of this study is the situation of female medical students regarding their life quality parameters. Health-related quality of life (HRQL) instruments are designed to measure health status from the perspective of the patient, and usually include the following dimensions: physical health activities of daily living, psychological body image and appearance, social and personal relationships, and environmental–financial resources. It was documented that patient-reported outcomes, such as HRQL, can capture more subtle changes in health than are captured by traditional measures such as life expectancy [27].

Our results revealed that overall quality of life was low in most of the female medical students. A majority of the study participants, 62.7% and 62.0% respectively, report low quality of life on the psychological and social relationships domains of the Persian version of the WHOQOL-BREF questionnaire. The psychological domain concerns body image, negative and positive feelings, self-esteem, spirituality/religion/personal beliefs, and thinking, learning, memory and concentration. The social relationships domain concerns social relationships, social support, and sexual activity. These results appear truly representative of the female medical student population at Urmia University of Medical Sciences as a sample of Iranian governmental medical universities, since the study participants constitute more than 85% of all female medical students at the university. Medical students are expected to have a better life quality as confirmed by a recent study which showed that medical students perceive their quality of life much better than other university students [28]. Therefore, more attention should be paid to this important issue and this point should be a potential target area for specific

prevention and treatment in order to achieve better quality of life of medical students in Iran.

The findings of this study should be interpreted taking into account some strengths and limitations. Using medical students as research target group in order to increase accuracy of data, DSM-IV PMDD/PMS as diagnostic criteria, analyzing the severity of PMS and prospective daily diaries in evaluating prevalence of premenstrual syndrome are some of the strengths of this research. Despite encouraging strengths, there are a number of limitations to consider. First, although the study target group is a representative sample of Iranian medical students, they may not represent the general population of women in any age groups and socio-cultural situations in the country. Therefore, particular caution is required in interpreting the results of this study. Second, the students were not screened for other possible differential diagnoses. In a clinical setting it is important to include such screening to make a diagnosis of PMS. Third, a choice of small sample size, which was inevitable in this study, resulted in wide confidence intervals (CI), but it does not mean that decreased precision would be obligatory. For our assumptions (a precision of 5% with 95% two sided confidence), a CI means that the true PMS prevalence is likely to be inside the interval and unlikely to be outside. Relatively wide 95% CI (such as our results) means that we are still 95% certain that the true value will be within this interval, but there are relatively many values in the interval.

Conclusion

Prevalence of premenstrual syndrome based on DSM-IV PMDD/PMS criteria is high among women, severe PMS adversely affects the mental and environmental aspects of life quality, and overall life quality of medical students are low. Improving the life quality of the female medical students need some interventions related to the PMS and also other interventions not related to PMS.

References

[1] Freeman EW. Premenstrual syndrome and premenstrual dysphoric disorder: definitions and diagnosis. Psychoneuroendocrinology 2003;28(3):25–37.

[2] Rapkin AJ, Mikacich JA. Premenstrual syndrome in adolescents: diagnosis and treatment. Pediatr Endocrinol Rev 2006;3(1):132–7.

[3] American Psychiatric Association (APA). Diagnostic and statistical manual of mental disorders. 4th ed. Washington, DC: APA; 1994. p. 714–18.

[4] Wittchen HU, Becker E, Lieb R, Krause P. Prevalence, incidence and stability of premenstrual dysphoric disorder in the community. Psychol Med 2002;32(1):119–32.

[5] Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012;380:2163–96.

[6] Bakhshani NM, Mousavi MN, Khodabandeh G. Prevalence and severity of premenstrual symptoms among Iranian female university students. J Pak Med Assoc 2009;59:205–8.

[7] Delara M, Ghofranipour F, Azadfallah P, Tavafian SS, Kazemnejad A, Montazeri A. Health related quality of life among adolescents with premenstrual disorders: a cross sectional study. Health Qual Life Out 2012;10:1–5.

[8] Mahmoodi Z, Shahpoorian F, Bastani F, Parsay S, Hoseini F, Amini L, et al. The prevalence and severity of premenstrual syndrome (PMS) and its' associated signs and symptoms among college students. Aust J Basic Appl Sci 2010;4:3005–9.

[9] Tatari F, Torkamani F, Shakeri J, Rezaie M, Hosseini M, Amirian M, et al. Evaluation of the frequency of premenstrual dysphoric disorder and premenstrual syndrome in students of girls' high schools of Kermanshah-Iran. Eur Psychiat 2011;26:1688.

[10] Study protocol for the World Health Organization project to develop a Quality of Life assessment instrument (WHOQOL). Qual Life Res 1993;2:153–9.

[11] Rapkin AJ, Winer SA. Premenstrual syndrome and premenstrual dysphoric disorder: quality of life and burden of illness. Expert Rev Pharmacoecon Outcomes Res 2009;9:157–70.

[12] Nedjat S, Montazeri A, Holakouie K, Mohammad K, Majdzadeh R. Psychometric properties of the Iranian interview-administered version of the World Health Organization's Quality of Life Questionnaire (WHOQOL-BREF): a population-based study. BMC Health Serv Res 2008;8:61.

[13] Ahmadi M. The effect of *Hypericum perforutum* on premenstrual syndrome in student girls in Tehran University of Medical Sciences in 2004. Tehran: Tehran University of Medical Sciences; 2004.

[14] Newcombe RG. Two-sided confidence intervals for the single proportion: comparison of seven methods. Stat Med 1998;17:857–72.

[15] Wilson EB. Probable inference, the law of succession, and statistical inference. J Am Stat Assoc 1927;22:209–12.

[16] Sveindottir H, Backstrom T. Prevalence of menstrual cycle symptom cyclicity and premenstrual dysphoric disorder in a random sample of women using and not using oral contraceptives. Acta Obstet Gynecol Scand 2000;79:405–13.

[17] Dennerstein L, Lehert P, Bäckström TC, Heinemann K. Premenstrual symptoms severity, duration and typology: an international cross-sectional study. Menopause Int 2009;15:120–6.

[18] Pal SA, Dennerstein L, Lehert P. Premenstrual symptoms in Pakistani women and their effect on activities of daily life. J Pak Med Assoc 2011;61(8):763–8.

[19] Öztürk S, Tanrıverdi D, Erci B. Premenstrual syndrome and management behaviors in Turkey. Aust J Adv Nurs 2006;28(3):54–60.

[20] Nourjah P. Premenstrual syndrome among Teacher Training University students in Iran. J Obstet Gynecol India 2009;58:49–52.

[21] Bakr I, Ez-Elarab HS. Prevalence of premenstrual syndrome and the effect of its severity on the quality of life among medical students. Egypt J Com Med 2010;28:19–30.

[22] Balaha MH, Abd-El Monem H, Saleh Al Moghannum M, Saab Al Muhaidab N. The phenomenology of premenstrual syndrome in female medical students: a cross sectional study. Pan Afr Med J 2010;5:4.

[23] Nisar N, Zehra N, Haider G, Munir AA, Sohoo NA. Frequency, intensity and impact of premenstrual syndrome in medical students. J Coll Physicians Surg Pak 2008;18:481–4.

[24] Pinar G, Colak M, Oksuz E. Premenstrual Syndrome in Turkish college students and its effects on life quality. Sex Reprod Healthc 2011;2:21–7.

[25] Lustyk MK, Widman L, Paschane A, Ecker E. Stress, quality of life and physical activity in women with varying degrees of premenstrual symptomatology. Women Health 2004;39:35–44.

[26] Demir B, Algul LY, Guven ESG. Analysis of premenstrual syndrome incidence in medical staff and factors affecting premenstrual syndrome incidence. J Turkish Gynaecol Obstet Found 2006;3:262–70.

[27] Kaplan RM. The significance of quality of life in health care. Qual Life Res 2003;12(1):3–16.

[28] Latas M, Milovanovic S, Stojkovic T, Ralic T, Jovanovic S. Gender specifics study of medical students' health-related quality of life. European Psychiatry 2013;28(1):1.