PREMENSTRUAL DISORDERS (PMS AND PMDD) INCIDENCE, AND ITS PREDICTORS IN IRANIAN MEDICAL UNIVERSITY STUDENTS; AN EXPLANATORY CROSS-SECTIONAL STUDY

Sepideh Miraj[1], MD, PhD, Abolfazl Mohammadbeigi[2], PhD, Mohammad Aligol[3], PhD
Maryam Derakhshani[4], MD, PhD, Fatemeh Hassanzadeh[5] BSc, Fatemeh Ramezani, BSc[4]

ABSTRACT

INTRODUCTION: Premenstrual disorders are a wide range of physical, behavioral, and psychological symptoms that emerge before menstruation and in the first initial days of menstruation which repeat in several cycles. This study aimed to evaluate the Premenstrual syndrome (PMS) and Premenstrual dysphoric disorder (PMDD) incidence and its related factors among Iranian medical students.

MATERIALS AND METHODS: In a cross-sectional study, 264 students of Qom University of Medical Sciences were selected by stratified proportional to size and simple random sampling method. Demographic form, Premenstrual Symptoms Screening Tool (PSST), and Daily Record of Severity of Problems (DRSP) questionnaires were used for data collection and evaluation of subjects for PMS and PMMD according to the DSM-IV criteria. Data analysis was conducted using SPSS version 20 (SPSS Inc., Chicago, IL, USA) by Chi-square, independent t-test, and multivariable logistic regression. P-value lower than 0.05 was considered as significant.

RESULTS: The mean age of subjects was 21.05±2.20 years and 38.6%, (CI 95%: 32.6%-44.7%) were diagnosed with PMS; 8%, (CI 95%: 4.9%-11.4%) were labeled withPMMD. Decreased interest in daily activities (60.6%), depressed mood (60.2%), fatigue/lack of energy (52.3%), and difficulty concentrating (51.1%) were the most common PMS symptoms. Bivariate analysis showed that BMI, marital status, chronic disease history, and continuous use of medication had significant relationship with PMS morbidity. Marriage 2.1 (OR=2.1, 95% CI: 1.12-4.42) and stress in the last 3 months (OR=2.38, 95% CI: 1.23-4.63) were the two most important predictors of PMS in medical students based on multivariate logistic regression.

CONCLUSION: Decreasing the student's stress, especially in students with chronic disease history that have continuous medication consumption could be effective factor for controlling the PMS symptoms. Moreover, educational stress and higher familial stress in married students, due to socioeconomic and cultural factors, are the related predictive determinants of PMS. Change in lifestyle by rest taking and enough sleep, as well as counseling could help the affected subjects.

KEYWORDS: Premenstrual disorders, Premenstrual syndrome, gynecologic disorders, students, girls, women

(The Ethiopian Journal of Reproductive Health; 2023; 15;37-46)

1. Department of Obstetrics and Gynecology, Infertility Fellowship, Qom University of Medical Sciences, Qom, Iran
2. Department of Epidemiology and biostatistics, Faculty of Health, Qom University of Medical Sciences, Qom, Iran
3. Department of Public Health, Faculty of Health, Qom University of Medical Sciences, Qom, Iran
4. Department of Anesthesiology, Shahid Beheshti Hospital, Qom University of Medical Sciences, Qom, Iran
5 Student research Committee, Qom University of Medical Sciences, Qom, Iran

INTRODUCTION

Premenstrual syndrome (PMS) is one of the most common gynecologic disorders in the menstrual cycle in women of reproductive age, which causes work absence and a decline in social activity.[1, 2] The prevalence of PMS is varied from 26.1% to 70%. In addition, Premenstrual dysphoric disorder (PMDD) prevalence is 10% to 30% among different regions and ethnicities based on different assessment tools[1-5]. PMDD is severe form of PMS defined by cognitive–affective and physical symptoms in the week before menses and affects millions of women worldwide[6]. The PMS/PMMD symptoms are a wide range of physical, behavioral, and psychological symptoms that emerge before menstruation and in the first initial days of menstruation which repeat in several cycles[7-9]. Body aches, bloating, joint or back pain, and depression feeling anxiety, and panic attacks are the most common physical and psychological symptoms.[2, 10] These symptoms are the cause of many problems, including physical problems,, mental health disorders, and severe functional deficiencies in familial and professional relations, productivity, social and occupational activities of women[2, 7]. All these impairments are related to the reduction of job efficiency and increase in absenteeism, as well as a factor in economic losses[2].

According to recent studies, lower PMS prevalence is related to lower stress and physical exercise[2]. Lifestyle factors such as food intake and physical activity are important factors of PMS/PMDD, especially in young, professional, and urban women.[7, 10] Moreover, cultural factors are probably related factors for symptom expression. Nevertheless, there has been agreement about related demographic and sociocultural factors of PMS. PMS incidence and its severity could be an effective factor in students' relationships, social activities, job efficiency, quality of life, and lower positive academic performance as well as lower frontal rest asymmetry scores[2, 3, 11]. These impairments are associated with reward processing dysfunction, lower productivity, and interference with studies[11]. However, the first step for awareness of PMS incidence and its severity is the first phase of prevention and management of this disorder. Despite its prevalence, relatively little is known about PMS and PMDD in the Iranian population. Therefore, the current study aimed to examine the incidence of premenstrual disorders (PMS and PMDD) and its related factors among Iranian medical students.

MATERIALS AND METHODS:

Study setting and subjects

This was an analytical explanatory cross-sectional study conducted in students of Qom University of Medical Sciences, in one of the central megacities in Iran in 2022. Sample size calculation was based on the results of recent studies and the PMS prevalence was considered as 47.8% [12], type one error equal 5%, and the precision (d=0.06). Therefore, the minimum required sample size was estimated as 260. The study questionnaires were distributed among 280 eligible medical students and finally 264 subjects filled the questionnaires completely.The response rate was 94.28%. Stratified proportional to size method and simple random sampling method were used to select a random sample from female students from different strata. College of students were considered as strata and in each stratum, the eligible subjects were selected based on the simple random sampling method. Eligibility and inclusion criteria were those studying at Qom University of Medical Sciences, age between 19-26 years, having informed consent for participating in the study and regular menstrual period and normal bleeding duration. Pregnancy, abnormal uterine bleeding, continuous usage of medication for depression and blood pressure, and women's hormonal drugs were exclusion criteria.

Data collection and measurements

Data collection was conducted by two different questionnaires including demographic characteristics form and two different scales for PMS and PMDD evaluation. The demographic form contains the age, weight, BMI, marital status,

residential place, educational level, and college, as well as the number of menstrual days.

Premenstrual Symptoms Screening Tool (PSST) and Daily Record of Severity of Problems (DRSP)[13] questionnaires were used for diagnosis and evaluation of subjects for PMS and PMMD according to the DSM-IV criteria[5, 14, 15]. According to the scoring system of the PSST questionnaire, subjects who have at least five symptoms during two menstrual periods from 7 days before the first day of menstrual bleeding and a maximum until 4 days after the starting of menstrual bleeding, are defined and diagnosed as PMS case [5, 14, 15]. PSST includes11 items that were developed by Steiner et al. which was used for diagnosis of the PMS(14). This tool is a valid and reliable tool that was modified for adolescents[15] as a fast and reliable tool for the evaluation of PMS in adolescents. The validity and reliability of these scales was shown in different studies [5, 13]. The reliability coefficient of the PSST questionnaire in this study was estimated as 0.805 (95% CI; 0.767-0.839) and 0.781(0.738-0.819) for DRSP based on Cronbach's Alpha. Each item in the PSST questionnaire is a four-point Likert scale that scored from 0=not at all, 1= mild, 2=moderate, and 3= severe). In addition, the subjects were assigned to three different categories according to the scoring symptom including 1) patients with no or mild/PMS, 2) moderate to severe PMS, and 3) patients with PMDD. The mild/no PMS group did not meet the PMS and PMDD criteria and consists of subjects with subthreshold symptoms[9, 15].

The primary outcome of this study was the occurrence and incidence of PMS and PMDD in study subjects. The score achieved from PSST and DRSP were the effect modifiers that modify the effects of main predictors (e.g. demographic variables). Therefore, the main predictors were demographic variables including age, BMI, marital status, residency area, and continuous use of medication. However, the history of chronic diseases, having stress during the last 3 months, and using traditional ways to reduce symptoms are potential confounders.

Ethical consideration

All subjects were informed about the study subject and verbal informed consent was taken from all of the eligible subjects. In addition, the study protocol was approved by the ethical committee of Qom University of Medical Sciences by IR.MUQ.REC.1400.208 at 2022.01.02.

Statistical analysis

The data was analyzed using SPSS version 20 (SPSS Inc., Chicago, IL, USA) by descriptive and inference analytical methods. The distribution of data in PSST and DRSP questionnaires was checked by Shapiro–Wilk and Kolmogorov–Smirnov test as well as a histogram chart. Due to the confirmation normality of data, the mean (Standard Deviation (SD)) was calculated for continuous variables and categorical variables were presented by frequency and percent. Bivariate analysis for categorical variables to assess the relationship between PMS and related factors was conducted by Chi-square. An independent t-test was used to compare the mean of difference between subjects with and without PMS. For controlling the confounder variables and effect modifiers, multivariable logistic regression was used by Wald forward manner. P-value lower than 0.05 was considered as significant.

Table 1: Demographic quantitative characteristics of students who participated in study

Minimum	Maximum	Mean (SD)	(%)
Age	18.00	33.00	21.05 (2.20)
BMI	15.19	32.74	22.18(3.38
Height	146.00	185.00	163.65(5.29
Weight	42.00	87.00	59.34(9.53)
Semester	1.00	12.00	4.20(2.26)
Number of menstrual days	1.00	10.00	6.56(1.51)

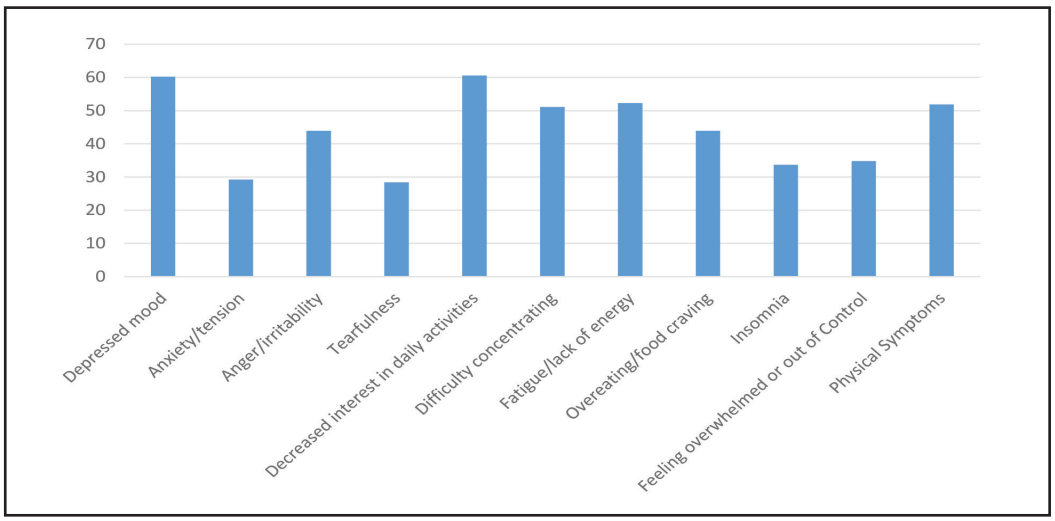

Figure 1. The frequency of PMS symptoms in studied students

RESULTS:

Totally 264 medical students were included. Based on Table 1, the mean age of subjects was 21.05±2.20 years and ranged from 18 to 26 years. According to Table 2, from all assessed students 102 (38.6%, CI 95%: 32.6%-44.7%) were assessed with PMS; 81 subjects (30.6%, CI 95%: 25.4%-36.4%) were moderate and 21 subjects (8%), (CI 95%: 4.9%-11.4%) were labeled as PMMD. Descriptive results in Table 2 showed that 22.3% (59 students) were overweight, 13.6% (36 students) were married, and 38.3% (101 students) lived in university dormitories. The chronic disease history, medication usage and stress during 3 last months were estimated among students as 15.5%, 10.6% and 18.6%, respectively. According to Figure 1, decreased interest in daily activities, depressed mood, fatigue/lack of energy, physical symptoms, and difficulty concentrating were the most common PMS symptoms.

The results of Chi-square test (Table 3) showed that BMI, marital status, chronic disease history, and continuous use of medication have a significant relationship with PMS morbidity. Based on our results in Table 3, PMS occurrence was higher in overweight students in comparison to other BMI

Table 2: Distribution of students based on qualitative demographic factors

Variables		n(%)
PMS morbidity	No	162 (61.4)
	Yes	102(38.6)
PMS Category	No/Mild	162 (61.4)
	Moderate	81(30.6)
	PMMD	21(8.0)
Age category	Lower 21	116(43.9)
	21-24	129(48.9)
	Higher 24	16(6.1)
BMI	lower weight	35(13.3)
	Normal	163(61.7)
	Over weight	59(22.3)
Marital status	Single	224(84.8)
	Married	36(13.6)
Residency	Native	157(59.5)
	non-native	101(38.3)
College	Medical	60(22.7)
	Paramedical	39(14.8)
	Dental	51(19.3)
	Health	55(20.8)
	Nursing & midwifery	53(20.0)
Chronic Disease	yes	41(15.5)
	no	216(81.8)
Continuous use of medication	Yes	28(10.6)
	No	227(86.0)
Stress in the last 3 months	yes	49(18.6)
	No	205(77.7)
The traditional way to reduce symptoms	yes	27(10.2)
	no	226(85.6)

Premenstrual syndrome (PMS), Premenstrual dysphoric disorder (PMDD

Table 3: The association of demographic variables with PMS occurrence in medical students

Variables		Yes, n(%)	No, n(%)	Chi Square	P Value*
Age	Lower 21	42(36.2)	74(63.8)	1.23	0.548
	21-24	51(39.5)	78(60.5)		
	Higher 24	8(50.0)	8(50.0)		
BMI	lower weight	9(25.7)	26(74.3)	6.88	0.032
	Normal	63(36.8)	108(63.2)		
	Over weight	30(51.7)	28(48.3)		
Marital status	Single	80(35.7)	144(64.3)	6.68	0.010
	Married	21(58.3)	15(14.7)		
Residency	Native	64(40.8)	93(59.2)	0.440	0.507
	non-native	37(36.6)	64(63.4)		
Chronic disease history	Yes	22(53.7)	19(46.3)	4.21	0.040
	No	79(36.6)	137(63.4)		
Continuous use of medication	Yes	16(57.1)	12(42.9)	4.44	0.035
	No	83(36.6)	144(63.4)		
Stress in the last 3 months	Yes	27(55.1)	22(44.9)	6.64	0.010
	No	72(35.1)	133(64.9)		

*Based on Chi Square test

Table 4: The mean difference of demographic characteristics between PMS and normal subjects

Variables	Normal (n=160)	PMS (n=101)	P Value‡
Age	21.08±2.29	20.99±2.07	0.740
BMI	22.41±3.18	21.75±3.07	0.010
Weight	57.22±9.53	59.34±9.59	0.423
Semester	4.27±2.26	4.10±2.26	0.556
Number of menstrual days	6.54±1.48	6.14±1.43	0.032

‡ Based on t-test

categories (51.7% Vs. 36.8% in normal and 25.7% in lower weight groups, P=0.032). Married students experienced PMS 58.3%, while the PMS in single students was 35.7%. (P=0.010). In addition, 53.7% of students with chronic disease history have PMS while in students without chronic disease history, the PMS occurrence was 36.6% (p=0.040). In addition, 57.1% of students who reported continuous usage of medication were diagnosed with PMS, in comparison to 36.6% of students without any medication usage (P=0.035). Stress in the last 3 months was significantly related to PMS and the PMS incidence was 55.1% in subjects with a stress history, while this rate was calculated as 35.1% for other subjects (p=0.010). Moreover, there was no observed significant relationship between PMS occurrence and student residential place (p=0.507), age group (P=0.548), educational grade (p=0.324), and college (p=0.468) of students with PMS.

According to Table 4, there was no observed significant difference in mean of age, weight, and educational semester between students in PMS and normal groups. Nevertheless, the menstrual duration in normal and PMS groups was estimated as 6.54±1.48 days and 6.14±1.43 days that was significantly different between the two groups (P=0.032).

Results of multivariate logistic regression (Table 5) showed that being married and stressed in the last 3 months were the two most important predictors of PMS in medical students. Married individuals had 2.1 times higher odds of having PMS (OR=2.1, 95% CI: 1.12-4.42).Having stress during the three last months increased the rate of PMS to 2.38 times (OR=2.38, 95% CI: 1.23-4.63).

Table 5- The results of multivariate logistic regression regarding the related factors of PMS after control for other confounder studied variables

		Beta coefficient	S.E. for Beta coefficient	Wald	P Value	Odds ratio (OR)	95% Confidence Interval for Odds ratio (OR)	
							Lower	Upper
Marital status	Single				1	-	-	
	Married	0.753	0.38	3.92	0.048	2.10	1.12	4.42
Stress in the last 3 months	No				1	-	-	
	Yes	0.868	0.34	6.55	0.010	2.38	1.23	4.63

Excluded variables form the model were residency, chronic disease history, BMI, age, number of menstrual days, and continuous use of medication

DISCUSSION:

The PMS and PMDD incidence was estimated as 38.6% and 8%, respectively, and stress and marriage were the two most important predictors of PMS. The prevalence of being overweight/ obese was 22.3%. Based on the review studies, the worldwide prevalence of PMS is 48% and in Iran, varies from 30% to 99.5%.[16, 17]. The PMS incidence varied among different studies from 37% in Indian medical[10] students to 64.9% in Saudi Arabia[3], and 75% in another study in Sabzevar,[7] Iran. In addition, another similar study showed the prevalence of PMS and PMDD 26.1% and 10.0% among young Turkish women, respectively based on the DSM-V criteria using PSST[5].

In Shrestha et al.'s study of students of a teaching hospital in Nepal, 72.3% reported at least one premenstrual syndrome symptom and 25.9% reported at least one severe symptom. Criteria of PMDD were observed in 2.1% and 17.2% were affected by moderate and severe PMS (18). In another cross-sectional study on 388 female medical students by Al-Shahrani et al. at Bisha University, Saudi Arabia, data were gathered by a self-administered Premenstrual Syndrome Scale (PSS). Their results showed that the PMS prevalence was 64.9%(3). In another study by Mishra of Indian medical students, the PMDD incidence was 37% and that higher rate of PMDD was observed in older and postgraduate students[10]. Our results were similar to students in India, but lower than Saudi Arabia.

Our results were close to Indian students[10], lower than Saudi Arabia[3], and lower than other recent studies in Iran.[16, 17] However, based on the study design and data collection methods, this study is succeptible to different biases including selection bias, information bias, and confounding bias. We tried to remove selection bias by using random sampling, but nonresponding subjects rising the probability of selection bias and due to the students with severe problems, were non-respondent subjects and the overall estimate of PMS and PMDD is underestimated. Moreover, the information bias may have occurred in the current study due to some religious considerations. All these biases are related to the underestimation of PMS and PMDD. However, we used multivariate logistic regression to remove the potential effects of confounder factors and minimize the effect of them in PMS occurrence. Based on our results, the PMS occurrence was 51.7% in students with BMI>25 in comparison

to 36.8% in normal BMI students. Similar results were obtained on other studies. In another study, obesity increased the risk of PMS nearly a three-fold increase risk compared to non-obese women (OR = 2.8)[19]. In addition, Bertone-Johnson et al.'s study showed that women with BMI ≥ 27.5 kg/m are at higher risk of PMS than women with BMI lower 20 kg/m after adjustment for other confounding variables such as age, smoking, and physical activity[20]. Moreover, in the results of Rad et al. study on female high school students in Sabzevar city, hip circumference, and body mass index were significant related factors of PMS.[7] However, different studies showed the relationship between PMS and hormonal abnormalities, mineral deficiencies, stress, smoking, certain dietary habits, and lack of exercise[21]

According to bivariate analysis, the stress in the last 3 months was significantly related to PMS and the PMS incidence was 55.1% in subjects with a stress history, while this rate was calculated as 35.1% for other subjects. In addition, continuous consumption of medication and chronic disease history were significant related factors of PMS. Nevertheless, multivariate logistic regression, after adjusting the confounding variables showed that stress condition during the three last months was the most important factor of PMS that increased the risk of PMS more than twofold. In addition, married women were at higher risk of PMS. This is probably associated with higher stress in married students due to distance from their husbands, dormitory difficulties, and unknown future in their life due to socioeconomic problems. Similar results showed by Arafa et al.'s study that married Egyptian girls were at a higher risk of PMS[21]. Karimiankakolaki et al.'s study in Iran showed that marital dissatisfaction is a more common problem in women with PMS[22]. Nevertheless, another study showed that single women experience PMS symptoms more[23]. However, according to some large cohort and longitudinal studies, a significant relationship between stress exposure history such as trauma history, emotional and childhood physical abuse as well as work or daily living stress with PMS/PMDD is demonstrated[24-26].

According to our results, decreased interest in daily activities, depressed mood, fatigue/lack of energy, physical symptoms, and difficulty concentrating were the most common PMS symptoms. In Daşıkan et al.'s study in Turkish young women anger/irritability was the most common symptoms that occurred in 97.4% of subjects[5], while in another study, anxiety (78.8%), stomachache (72.2%), and skin spot and ache (29.6%) were the common symptoms before and during menstruation period[8]. However, the PMS complaints are negatively affecting the familial conditions and social amalgamation of the affected students.[8] The results of recent studies showed that PMS was related to daily activities, quality of life, homework, and their learning environment[3]. In addition, PMDD is significantly associated with lifestyle factors including sleep, physical activity, and food intake under stress.[10]. However, modification in lifestyle such as decreasing daily stress by increasing physical activity and consumption of healthy food, could be a reliable approach for PMS/PMDD management[10, 21].

Our results could be generalizable to all other female students in Iran due to the random selection of the subjects and the high response rate of participants. These findings suggest that PMS and PMDD are significant issues in Iran and that the prevalence has largely been underestimated due to a lack of awareness and understanding of the condition. Additionally, the identified predictors highlight potential risk factors for the development of PMS and PMDD. It is important that these findings are taken into account in the development of interventions designed to mitigate the impact of PMS and PMDD. Further research is needed to gain a better understanding of PMS and PMDD in the Iranian population and identify effective strategies for the prevention and treatment of PMS and PMDD in Iran.

LIMITATIONS:

This study could estimate the PMS/PMMD incidence among medical students in one of the most religious cities of Iran for the first time. Nevertheless, we cannot assess the effect of a healthy lifestyle and its components on the PMS incidence. Moreover, the causality cannot assess in cross-sectional study and the effect of PMS on quality of life did not determine in current study. Therefore, prospective studies of women in different socioeconomic and cultural classes with adequate sample size are suggested to validate these findings.

CONCLUSION:

According to our results, decreasing the student's stress, especially in students with chronic disease history that have continuous medication consumption could be effective factor for controlling or declining PMS symptoms. Moreover, educational stress and higher familial stress in married students due to socioeconomic and cultural factors, are the related predictive determinants of PMS. Therefore, among medical students, the change or balancing of modifiable risk factors should be considered as the critical intervention programs. Health education for a good lifestyle, rest taking and enough sleep, counseling and appropriate medical treatment could help the affected subjects.

CORRESPONDING AUTHOR

Maryam Derakhshani (MD,PhD)

E-mail: drmaryamderakhshani66@gmail.com

REFERENCES

1. Ramezanpour F, Bahri N, Bagheri L, Fathi Najafi T. Incidence and Severity of Premenstrual Syndrome and its relationship with Social and Demographic Characteristics among Students' College, Gonabad - 2013. The Iranian Journal of Obstetrics, Gynecology and Infertility. 2015;18(170.169):21-8. DOI:10.22038/ijogi.2015.6130
2. Hannani S, Ghanbary Nekoo N, Nasiri Ziba F, Hosseini A. The Prevalence of Premenstrual Syndrome and Its Influential Factors in Operating Room Technologists. Iran Journal of Nursing. 2019;32(118):67-77. DOI: 10.29252/ijn.32.118.62
3. Al-Shahrani AM, Miskeen E, Shroff F, Elnour S, Algahtani R, Youssry I, et al. Premenstrual Syndrome and Its Impact on the Quality of Life of Female Medical Students at Bisha University, Saudi Arabia. Journal of multidisciplinary healthcare. 2021;14:2373-9. DOI: 10.2147/jmdh.S327893
4. Bakhshani NM, Mousavi MN, Khodabandeh G. Prevalence and severity of premenstrual symptoms among Iranian female university students. JPMA The Journal of the Pakistan Medical Association. 2009;59(4):205-8. PMID: 19402278
5. Dalıkan Z. Premenstrual disorders among young Turkish women: According to DSM-IV and DSM-V criteria using the premenstrual symptoms screening tool. Perspectives in psychiatric care. 2021;57(2):481-7. DOI: 10.1111/ppc.12656
6. Hantsoo L, Epperson CN. Premenstrual Dysphoric Disorder: Epidemiology and Treatment. Current psychiatry reports. 2015;17(11):87. DOI: 10.1007/s11920-015-0628-3
7. Rad M, Sabzevary MT, Dehnavi ZM. Factors associated with premenstrual syndrome in Female High School Students. Journal of education and health promotion. 2018;7:64. DOI:10.4103/jehp.jehp_126_17
8. Öztürk GJIJoCM. Determinants of Premenstrual Syndrome Among Medical Students: Premenstrual Syndrome Among Medical Students. International Journal of Current Medical Biological Sciences. 2022;2(2):82-9. DOI: 10.5281/zenodo.6523510
9. Ryu A, Kim T-H. Premenstrual syndrome: A mini review. Maturitas. 2015;82(4):436-40. DOI: 10.1016/j.maturitas.2015.08.010
10. Mishra A, Banwari G, Yadav P. Premenstrual dysphoric disorder in medical students residing in hostel and its association with lifestyle factors. Industrial psychiatry journal. 2015;24(2):150-7. DOI: 10.4103/0972-6748.181718
11. Liu Q, Zhang W-J, Qiao W, Wang Y-s. Effects of biofeedback training on resting-state electrophysiology and emotion: evidences from the females with premenstrual syndrome. Neuropsychiatry. 2017;7(5):700–9. DOI: 10.4172/Neuropsychiatry.1000267
12. Direkvand-Moghadam A, Sayehmiri K, Delpisheh A, Kaikhavandi S. Epidemiology of Premenstrual Syndrome (PMS)-A Systematic Review and Meta-Analysis Study. Journal of clinical and diagnostic research : JCDR. 2014;8(2):106-9. DOI: 10.7860/jcdr/2014/8024.4021
13. Endicott J, Nee J, Harrison W. Daily Record of Severity of Problems (DRSP): reliability and validity. Archives of women's mental health. 2006;9(1):41-9. DOI:10.1007/s00737-005-0103-y
14. Steiner M, Macdougall M, Brown E. The premenstrual symptoms screening tool (PSST) for clinicians. Archives of women's mental health. 2003;6(3):203-9. DOI:10.1007/s00737-003-0018-4
15. Steiner M, Peer M, Palova E, Freeman EW, Macdougall M, Soares CN. The Premenstrual Symptoms Screening Tool revised for adolescents (PSST-A): prevalence of severe PMS and premenstrual dysphoric disorder in adolescents. Archives of women's mental health. 2011;14(1):77-81. DOI:10.1007/s00737-010-0202-2
16. Ranjbaran M, Omani Samani R, Almasi-Hashiani A, Matourypour P, Moini A. Prevalence of premenstrual syndrome in Iran: A systematic review and meta-analysis. International journal of reproductive biomedicine. 2017;15(11):679-86. PMID: 29404529
17. Direkvand-Moghadam A, Sayehmiri K, Delpisheh A, Sattar K. Epidemiology of Premenstrual Syndrome (PMS)-A Systematic Review and Meta-Analysis Study. Journal of clinical and diagnostic research : JCDR. 2014;8(2):106-9. DOI:10.7860/jcdr/2014/8024.4021
18. Shrestha DB, Shrestha S, Dangol D, Aryal BB, Shrestha S, Sapkota B, et al. Premenstrual Syndrome in Students of a Teaching Hospital. Journal of Nepal Health Research Council. 2019;17(2):253-7. DOI:10.33314/jnhrc.v0i0.1213
19. Masho SW, Adera T, South-Paul J. Obesity as a risk factor for premenstrual syndrome. Journal of psychosomatic obstetrics and gynaecology. 2005;26(1):33-9. DOI: 10.1080/01443610400023049
20. Bertone-Johnson ER, Hankinson SE, Willett WC, Johnson SR, Manson JE. Adiposity and the development of premenstrual syndrome. Journal of women's health (2002). 2010;19(11):1955-62. DOI: 10.1089/jwh.2010.2128
21. Arafa AE, Senosy SA, Helmy HK, Mohamed AA. Prevalence and patterns of dysmenorrhea and premenstrual syndrome among Egyptian girls (12–25 years). Middle East Fertility Society Journal. 2018;23(4):486-90. DOI: 10.1016/j.mefs.2018.01.007
22. Karimiankakolaki Z, Mazloomy Mahmoodabad SS, Heidari F, Gerayllo S, Khabiri F. The Relationship between Premenstrual Syndrome and Women's Marital Satisfaction %J Journal of Midwifery and Reproductive Health. 2019;7(2):1650-5. DOI: 10.22038/jmrh.2019.33287.1361

23. Farahmand M, Ramezani Tehrani F, Khalili D, Amin G, Negarandeh R. Factors associated with the severity of premenstrual syndrome among Iranian college students. The journal of obstetrics and gynaecology research. 2017;43(11):1726-31. DOI:10.1111/jog.13439
24. Pilver CE, Levy BR, Libby DJ, Desai RA. Posttraumatic stress disorder and trauma characteristics are correlates of premenstrual dysphoric disorder. Archives of women's mental health. 2011;14(5):383-93. DOI:10.1007/s00737-011-0232-4
25. Bertone-Johnson ER, Whitcomb BW, Missmer SA, Manson JE, Hankinson SE, Rich-Edwards JW. Early life emotional, physical, and sexual abuse and the development of premenstrual syndrome: a longitudinal study. Journal of women's health (2002). 2014;23(9):729-39. DOI: 10.1089/jwh.2013.4674
26. Lee W, Lee S, Ahn J, Lee RS, Kang S-K. Premenstrual syndrome incidence rate and risk factors among the working population in the Republic of Korea: a prospective cohort study. BMC Women's Health. 2022;22(1):265. DOI: 10.1186/s12905-022-01852-5