ORIGINAL ARTICLE

Prevalence of premenstrual syndrome and its impact on life among women in Princess Nourah Bint Abdul Rahman University in Riyadh, Saudi Arabia

Hanadi Bakhsh[1], Amal Mohammed Alghamdi[2], Maya Abdullah Alyahya[2], Shaden Jamaan Alghamdi[2*], Afrah Alonazi[2], Rawabi Algomaishy[2], Edward De Vol[3], Abdullah Almalki[3]

ABSTRACT

Background: The study aims to evaluate the prevalence, severity, and impact of premenstrual syndrome (PMS) on females in Saudi Arabia.

Methodology: A cross-sectional study was performed on 274 females using a validated PSST means Premenstrual Symptoms Screening Tool to estimate the prevalence of PMS, impacts of PMS symptoms on functional activities, and relevant sociodemographic data.

Results: The prevalence rate of PMS was 47.1% that influenced the emotional, psychobehavioral, and physical domain, with severe complaints among 10% of the students. More than 60% of the participants complained of any sort of functional impairment, but severe functional impairment ranged from 1.4% to 5.8% for academic achievement and home responsibilities, respectively.

Conclusion: PMS was moderately prevalent with increased sensitivity to rejection and generalized pain affecting one-fifth of the participants.

Keywords: Female, exercise, premenstrual syndrome, sensitivity.

Introduction

Disorders of menstruation constitute major gynecological complaints, especially among adolescents [1]. Premenstrual syndrome (PMS) is characterized by the presence of both physical and behavioral symptoms that occur repetitively in the second half of the menstrual cycle and interfere with some aspects of the woman's life [2]. Women with PMS experience a wide variety of cyclic and recurrent physical, emotional, behavioral, and cognitive symptoms that begin in the luteal phase (second half) of the menstrual cycle and resolve shortly after the onset of menses (the follicular phase). However, the core symptoms include behavioral symptoms; such as depression, irritability, and anxiety; and somatic symptoms; such as breast pain, bloating and swelling, and headache. The core feature is the recurrent onset of symptoms during the end of the luteal phase of the menstrual cycle with a symptom-free period shortly after menses has begun, typically when the menstrual flow has ended [3].

The International Statistical Classification of Diseases and Related Health Problems defined PMS as the occurrence of one premenstrual symptom from a cluster of symptoms. The symptoms included breast swelling and tenderness, acne, bloating and weight gain, pains (headache and joint pains), food cravings, and emotional symptoms, including irritability, mood swings, crying spells, and depression. These symptoms are restricted to the luteal phase of the menstrual cycle and cease with the commencement of menstrual flow [4,5].

Correspondence to: Shaden Jamaan Al Ghamdi
*College of Medicine, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia.
Email: shaden_alghamdi@outlook.com
Full list of author information is available at the end of the article.

Menstrual problems are considered the major ones among the gynecological problems, especially at the age of adolescents [1]. The prevalence of PMS is widely variable, and it had been found to be as high as 75%–85% [6–8]. About the cases in Saudi Arabia, only one study in 2015 was conducted to assess the prevalence, severity, and impacts of premenstrual syndrome among female medical students at Taibah University. The results showed that the prevalence of PMS was 56.4% with no significant difference between the students with and without PMS regarding the effect of the premenstrual period on student's academic and social life [9]. There are only a few published data on PMS in the Saudi Arabia context that resulted in conducting the present study to determine the prevalence of PMS symptoms and its impact on physical activities, social life, and daily activities including the students' academic achievement and employee performance. In a similar context, the present study aims to determine the prevalence of PMS among the females in Princess Nourah Bint Abdul-Rahman University (PNU) in Riyadh, Saudi Arabia.

The present study provides information peculiar to the Saudi population by a large sample of university students, and the prevalence of PMS is estimated along with its consequences on the quality of life. The study is likely to provide the mainstay of intervention to mitigate the consequences of PMS. Moreover, the interventions can be applied at community levels and in healthcare settings to raise awareness and provide recipes to cope with PMS. This would motivate young women to seek medical advice; therefore, an early diagnosis and prompt treatment of PMS will improve health, academic achievements, and overall quality of life.

Subjects and Methods

The present study has employed a cross-sectional analysis that is based on a questionnaire. A convenient sampling technique was used for recruiting females from PNU, Saudi Arabia. The study has been approved by the Institutional Review Board of PNU along with verbal consent from the participants. The study was conducted between December 2016 and March 2017. The inclusion criteria for this study were females' ≥18 years of age with a regular menstrual cycle (between 21 and 35 days), whereas the exclusion criteria were the absence of menses (menopause, pregnancy, and lactating women), irregular menstrual cycle, and a history of systemic disease.

Each item in premenstrual symptoms screening tool (PSST) was rated according to a 4-point Likert scale (0 = absent, 1 = mild, 2 = moderate, and 3 = severe). A positive screen for PMS was established by at least five of the premenstrual symptoms of the first table rated as moderate to severe, the presence of at least one of the first four symptoms rated as moderate or severe, and at least one item of the second table rated as moderate or severe.

The data acquired through the questionnaire were entered into the Statistical Package of the Social Sciences version 20.0 for conducting statistical analysis.

Results

The present study was performed on 274 females, with a mean age of 21.69 ± 4.94 ranging from 18 to 57 years old. Table 1 shows the sociodemographic characteristics of the participants.

Regarding PMS, a total of 129 (47.08%) females had PMS, whereas 145 (52.91%) did not complain about PMS. The majority of the participants (75.18%) never visited the physician because of PMS pain, whereas 11.2% of the participants sometimes did that and 2.4% usually did. There were 129 (47.08%) females, who took medication to relieve the PMS pain, whereas 145 (52.91%) said that they did not take any medication. There were several types of medication used by the females; for instance, 21.4% of the females used paracetamol, followed by 18.9% of females, who used nonsteroidal anti-inflammatory drugs. The results showed that 11.1%

Table 1. The sociodemographic characteristics of participants.

Characteristics		N (%)
Age (years)	<20	91 (33.2)
	20–30	163 (59.5)
	30–40	13 (4.7)
	>40	7 (2.6)
Weight (kg)	<45	17 (6.2)
	45–55	120 (43.8)
	55–65	87 (31.8)
	>65	50 (18.2)
Height (cm)	140–149	3 (1.1)
	150–159	140 (51.1)
	160–169	116 (42.3)
	>170	15 (5.5)
Age of menarche	<13	116 (42.3)
	13–15	150 (54.7)
	>16	8 (2.9)
The approximate number of bleeding days per one cycle	1–3	4 (1.5)
	4–5	86 (31.4)
	6–8	175 (63.9)
	>8	9 (3.3)
College	Health college	194 (70.8)
	Nonhealth college	80 (29.2)
Level of education	1st year	91 (33.2)
	2nd year	62 (22.6)
	3rd year	57 (20.8)
	4th year	29 (10.6)
	5th year	10 (3.2)
	Nonstudent	25 (9.1)
Marital status	Single	248 (90.5)
	Married	24 (8.8)
	Others	2 (0.7)

of the females took some other medications, whereas 1.6% of them did not mention any medicine.

The PMS symptoms were classified into emotional, psychobehavioral, and physical (somatic) symptoms. The severity of these symptoms was also classified into four categories: not at all, mild, moderate, and severe. The reliability was found to be 0.87 and 0.85 for symptoms and impact, respectively, reflecting very good reliability for both symptoms and impact used in the questionnaire. Regarding emotional and psychobehavioral symptoms, tearful and increased sensitivity to rejection was the most severe symptom present among 19.7% of the females, followed by hypersomnia among 17.9% of the females. Regarding physical (somatic) symptoms, generalized body pain was the most common severe symptom experienced by 19.3% of females.

The severe impact experienced by 5.8% of the females was PMS symptoms interfered with home responsibility, followed by PMS symptoms interfered with relationships of participants with their families (5.2%), whereas 4.2% of the females stated that symptoms interfered with their social life activities and 2.4% of the females stated that it had an effect on their work efficacy. The results have shown that 2.2% of the females experienced the interference of symptoms with their relationship with colleagues and 1.8% experienced an absence from lecture or work, whereas 7 females (1.6%) stated that symptoms affected the academic achievements.

Regarding the presence and absence of PMS, Table 2 shows the correlation with different sociodemographics. There was a significant difference (*p*-value = 0.01) regarding the presence or absence of PMS between the age groups, where the age group of 20–30 years was the group who were suffering PMS more (55.8%), followed by those with age less than 20 years (39.5%) (Table 2).

The presence and absence of PMS influenced visiting physicians because of PMS pain (*p*-value = 0.0001). Moreover, there was a significant difference between those who experienced PMS and those who did not regarding taking medication (*p*-value = 0.01). However, there was no significant difference regarding the type of medication used (*p*-value = 0.1) as shown in Table 3. Table 4 depicts a significant difference regarding each impact of PMS between different PMS degrees (*p*-value = 0.0001).

Discussion

A moderate-to-severe PMS influences females' lives negatively, as it could be a source of anxiety for them and their families [12–17]. The present study has shown that the mean age at the commencement of menarche was 12.80 ± 1.4 years with an age range of 9–17 years. Similar results were found in an Egyptian study, where the mean age was 12.3± 1.5 years with an age range of 11–16 years [14]. The present study showed that 47.08% of females had PMS. In a study conducted in Saudi Arabia, the prevalence of PMS was 35.6% [18]. This difference in prevalence may be attributed to the difference in the number of samples between the previous study and the present study. In other community studies, it was found that the prevalence of PMS was ranged from 5.9% to 90% in females of the age group of 15–49 [19,20]. A study in Egypt on El-Minia University students showed a high prevalence rate of PMS that reached 80.2% [23], whereas another study conducted in Egypt on medical students of Ain Shams University showed the PMS prevalence rate to be 89% [24].

An Ethiopian study by Tolossa and Bekele [25] reported that PMS prevalence was 37%, whereas another study by Cheng [26] in Taiwan reported a prevalence of 39.5%. A study in Pakistan showed that the prevalence of the PMS was 51% [27], which was close to the results deduced in the present study. Another prevalence rate of PMS was reported to be 27% in a study performed at Jimma University [19]. A study on female students in Thailand reported a prevalence rate of 28% for PMS [1]. In the present study, 5.4% of the females usually visited the doctors for PMS pain, whereas 27.9% sometimes did that and the large majority (66.7%) never visited the doctor. The same percentage, who experienced PMS, took medication for pain relief (47.08%), the majority of them (43.7%) took paracetamol, 29.6% took nonsteroidal anti-inflammatory, whereas 23.9% used herbs and only 5.6% used other types of medications. Tolossa and Bekele [25] found that pain killers, such as aspirin and ibuprofen, were used for treating pain among 36.4% of the females. A study performed in the US showed that analgesics were the most common medications used for treating PMS pain [28].

Regarding physical symptoms, the severe symptom experienced was generalized body pain (19.3%). Different symptoms were reported by several studies that included abdominal bloating as the most reported symptom (75.3%) [18]. The most common psychobehavioral PMS symptom reported was decreased interest in the usual activities (73.1%) [25], whereas easy fatigability (70.2%) was the most common physical symptom [19]. Mahesh et al. [29] stated that the most prevalent symptoms were increased appetite (67.5%), followed by worry and anxiety (60%) and lethargy (54%). However, the present study showed that the most severe impact was symptoms which interfered with home responsibilities (5.8%).

The impact of symptoms on work efficacy was represented by 2.4% of the females, whereas the impact of symptoms on academic achievements was represented by 1.4% of the females. In an Iranian study, it was reported that 25% of participants missed their classes as an impact of PMS [30]. In a Saudi study, the first impact found was poor concentration, followed by low attendance in college, going out of the home, daily home chores, and finally homework tasks [18]. Regarding emotional and psychobehavioral symptoms, there were significant differences between different degrees of PMS regarding each studied emotional symptom, except for insomnia where no significant difference was

Table 2. Association of sociodemographic and personal factors with PMS using univariate analysis.

Characteristics		Positive N (%)	Negative N (%)	p-value
Age (years)	<20	51 (39.5)	40 (27.6)	0.01*
	20–30	72 (55.8)	91 (62.8)	
	30–40	4 (3.1)	9 (6.2)	
	>40	2 (1.6)	5 (3.4)	
Weight (kg)	<45	7 (5.4)	10 (6.9)	0.9
	45–55	58 (45)	62 (42.8)	
	55–65	41 (31.8)	46 (31.7)	
	>65	23 (17.8)	27 (18.6)	
Height (cm)	140–149	1 (0.8)	2 (1.4)	0.7
	150–159	68 (52.7)	72 (49.7)	
	160–169	53 (41.1)	63 (43.4)	
	>170	7 (5.4)	8 (5.5)	
Age of menarche	<13	52 (40.3)	64 (44.1)	0.5
	13–15	73 (56.6)	77 (53.1)	
	>16	4 (3.1)	4 (2.8)	
Approximate number of bleeding days per one cycle	1–3	2 (1.6)	2 (1.4)	0.1
	4–5	44 (34.1)	42 (29)	
	6–8	81 (62.8)	94 (64.8)	
	>8	2 (1.6)	7 (4.8)	
College	Health college	86 (66.7)	108 (74.5)	0.1
	Nonhealth college	43 (33.3)	37 (25.5)	
Level of Education	1st year	47 (36.4)	44 (30.3)	0.1
	2nd year	31 (24)	31 (21.4)	
	3rd year	23 (17.8)	34 (23.4)	
	4th year	16 (12.4)	13 (9)	
	5th year	4 (3.1)	6 (4.1)	
	Nonstudent	8 (6.2)	17 (11.7)	
Marital status	Single	120 (93)	128 (88.3)	0.2
	Married	8 (6.2)	16 (11)	
	Others	1 (0.8)	1 (0.7)	
Residence	With family	121 (93.8)	134 (92.4)	0.5
	Student housing	7 (5.4)	9 (6.2)	
	Others	1 (0.8)	2 (1.4)	

*p-value significant.

Table 3. Seeking medical advice according to the presence or absence of PMS.

Reactions		Positive N (%)	Negative N (%)	p-value
Visiting physicians because of PMS pain	Usually	7 (5.4)	5 (3.4)	0.0001
	Sometimes	36 (27.9)	20 (13.8)	
	Never	86 (66.7)	120 (82.2)	
Taking medications for relieving pain	Yes	71 (55)	59 (40.7)	0.01
	No	58 (45)	86 (59.3)	
The type of medication used (in case of administrating medication)	Nonsteroidal anti-inflammatory	21 (29.6)	25 (43.1)	0.1
	Paracetamol	31 (43.7)	21 (36.2)	
	Herbs	17 (23.9)	10 (17.2)	
	Others	2 (5.6)	2 (3.4)	

Table 4. Association between PMS according to the criteria of PSST classification and functional domain of life.

Impact					
Have any symptoms listed above interfered with the work efficiency?	17 (20.7)	46 (40.0)	54 (83.1)	12 (100.0)	0.000
Have any symptoms listed above interfered with the relationships with colleagues?	39 (28.5)	45 (56.3)	35 (76.1)	10 (90.9)	0.000
Have any symptoms listed above interfered with the relationships with the family?	25 (21.4)	34 (45.9)	46 (80.7)	24 (92.3)	0.000
Have any symptoms listed above interfered with the social life activities?	17 (19.1)	45 (42.9)	48 (81.4)	19 (90.5)	0.000
Have any symptoms listed above interfered with the home responsibilities?	19 (20.0)	37 (40.2)	45 (77.6)	28 (96.6)	0.000
Have any symptoms listed above interfered with absence from the lecture or work?	42 (30.4)	40 (52.6)	38 (74.5)	9 (100.0)	0.000
Have any symptoms listed above affected the academic achievement or annual evaluation?	60 (34.7)	32 (53.3)	31 (91.2)	6 (85.7)	0.000

found between different PMS degrees (p-value = 0.1). Regarding somatic symptoms, there were significant differences between the degrees of PMS regarding each studied physical symptom, except for weight loss and constipation. Different impacts of PMS were affected by different PMS degrees, and there were significant differences found (p-value = 0.0001) for each impact.

Conclusion

The present study showed that the mean age at menarche differs between different populations as it was affected by multiple characteristics, such as environmental and geographical conditions, nutritional status, and the degree of socioeconomic inequalities within a community. PMS was prevalent, whereas paracetamol was the most common medication used to relieve pain. Approximately one-fifth of the students experienced severe symptoms of increased sensitivity to rejection and generalized pain. Severe functional home responsibilities were experienced by 5.8% of the participants, and severe impact on academic achievements was reported only by 1.4%.

List of Abbreviations
PMS   Premenstrual Syndrome

Conflict of interest
The authors declare that there is no conflict of interest regarding the publication of this article.

Funding
None.

Consent for publication
Informed consent was obtained from all the participants.

Ethical approval
Ethics approval was granted by Ethics committe at Princess Nourah Bint Abdul Rahman University, ref H01R059, dated 20/9/2018.

Author details
Hanadi Bakhsh[1], Amal Mohammed Alghamdi[2], Maya Abdullah Alyahya[2], Shaden Jamaan Alghamdi[2], Afrah Alonazi[2], Rawabi Algomaishy[2], Edward De Vol[3], Abdullah Almalki[3]
1. Clinical sciences department, College of Medicine, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia
2. College of Medicine, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia
3. Biostatistics and Epidemiology Department, Health Science Research Center, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

References

1. Thu M, Diaz EO, Kapaw S. Premenstrual syndrome among female university students in Thailand. AU JT. 2006;9:158–62.

2. Yonkers KA, O'Brien PS, Eriksson E. Premenstrual syndrome. Lancet. 2008;371:1200–10. https://doi.org/10.1016/S0140-6736(08)60527-9

3. O'Brien PM, Bäckström T, Brown C, Dennerstein L, Endicott J, Epperson CN, et al. Towards a consensus on diagnostic criteria, measurement and trial design of the premenstrual disorders: the ISPMD Montreal consensus. Arch Womens Ment Health. 2011;14:13–21. https://doi.org/10.1007/s00737-010-0201-3

4. Erbil N, Karaca A, Kiriş T. Investigation of premenstrual syndrome and contributing factors among university students. Turkish J Med Sci. 2010;40:565–73.

5. World Health Organization. International statistical classification of diseases and related health problems: 10th revision (ICD-10); 1992. Available from: http://www.who.int/classifications/apps/icd/icd

6. El Gilany AH, Badawi K, El Fedawy S. Epidemiology of dysmenorrhoea among adolescent students in Mansoura, Egypt; 2005.

7. American College of Obstetrics and Gynecology. ACOG practicebulletin: premenstrual syndrome. Washington, DC: ACOG; 2000.

8. Agish S. Dating violence and premenstrual syndrome among adolescent girl in senior high schools of Purworejo District. Yogyakarta, Indonesia: Gadjah Mada University; 2011.

9. 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 Quality Life Outcomes. 2012;10:1. https://doi.org/10.1186/1477-7525-10-1

10. Alami McHichi K, Tahiri SM, Moussaoui D, Kadri N. Assessment of premenstrual dysphoric disorder symptoms: population of women in Casablanca. L'Encephale. 2002;28:525–30.

11. Lentz GM. 1ry, 2nd dysmenorrhea, PMS and premenstrual dysphoric disorder: etiology, diagnosis, management. Comp Gynecol. 2012;36.

12. Cakir M, Mungan I, Karakas T, Girisken I, Okten A. Menstrual pattern and common menstrual disorders among university students in Turkey. Pediatr Int. 2007;49:938–42. https://doi.org/10.1111/j.1442-200X.2007.02489.x

13. Kadir RA, Edlund M, Von Mackensen S. The impact of menstrual disorders on quality of life in women with inherited bleeding disorders. Haemophilia. 2010;16:832–9. https://doi.org/10.1111/j.1365-2516.2010.02269.x

14. Nooh AM, Abdul-Hady A, El-Attar N. Nature and prevalence of menstrual disorders among teenage female students at Zagazig University, Zagazig, Egypt. J Pediatr Adolesc Gynecol. 2016;29:137–42. https://doi.org/10.1016/j.jpag.2015.08.008

15. Kaplowitz P. Pubertal development in girls: secular trends. Curr Opin Obstetr Gynecol. 2006;18:487–91. https://doi.org/10.1097/01.gco.0000242949.02373.09

16. Singh A, Kiran D, Singh H, Nel B, Singh P, Tiwari P. Prevalence and severity of dysmenorrhea: a problem related to menstruation, among first and second year female medical students. Indian J Physiol Pharmacol. 2008;52:389–97.

17. Rigon F, De Sanctis V, Bernasconi S, Bianchin L, Bona G, Bozzola M, et al. Menstrual pattern and menstrual disorders among adolescents: an update of the Italian data. Italian J Pediatr. 2012;38:38. https://doi.org/10.1186/1824-7288-38-38

18. Balaha M, Amr MA, Moghannum M, Muhaida N. The phenomenology of premenstrual syndrome in female medical students: a cross sectional study. Pan Afr Med J. 2010;5. https://doi.org/10.4314/pamj.v5i1.56194

19. Tenkir A, Fisseha N, Ayele B. Premenstrual syndrome: prevalence and effect on academic and social performances of students in Jimma University, Ethiopia. Ethiopian J Health Dev. 2003;17:181–8.

20. Songhai BUS. Department of Health and Human Services. Office Women's Health. 2010;1:1–5.

21. Pinar G, Colak M, Oksuz E. Premenstrual Syndrome in Turkish college students and its effects on life quality. Sexual Reprod Healthcare. 2011;2:21–7. https://doi.org/10.1016/j.srhc.2010.10.001

22. Schiola A, Lowin J, Lindemann M, Patel R, Endicott J. The burden of moderate/severe premenstrual syndrome and premenstrual dysphoric disorder in a cohort of Latin American women. Value Health. 2011;14:S93–5. https://doi.org/10.1016/j.jval.2011.05.008

23. Seedhom AE, Mohammed ES, Mahfouz EM. Life style factors associated with premenstrual syndrome among El-Minia University Students, Egypt. ISRN Public Health. 2013;2013. https://doi.org/10.1155/2013/617123

24. 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 Community Med. 2010;28:19–30.

25. Tolossa FW, Bekele ML. Prevalence, impacts and medical managements of premenstrual syndrome among female students: cross-sectional study in college of health sciences, Mekelle University, Mekelle, Northern Ethiopia. BMC Women's Health. 2014;14:52. https://doi.org/10.1186/1472-6874-14-52

26. Cheng SH, Shih CC, Yang YK, Chen KT, Chang YH, Yang YC. Factors associated with premenstrual syndrome—a survey of new female university students. The Kaohsiung J Med Sci. 2013;29:100–5. https://doi.org/10.1016/j.kjms.2012.08.017

27. 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.

28. Singh BB, Berman BM, Simpson RL, Annechild A. Incidence of premenstrual syndrome and remedy usage: a national probability sample study. Altern Ther Health Med. 1998;4:75–9.

29. Mahesh A, Tirmizi SZ, Sanwer Ali S. Frequency and associated factors of premenstrual syndrome in medical college girls. Med Channel. 2011;17.

30. Nourjah P. Premenstrual syndrome among teacher training university students in Iran. Anxiety. 2008;145:45–43.