

DOI:

10.22301/IJHMCR.2528-3189.1469

Article can be accessed online on:
<http://www.ijhmcr.com>

ORIGINAL ARTICLE

INTERNATIONAL JOURNAL
OF HEALTH MEDICINE AND
CURRENT RESEARCH

PREVALENCE OF PREMENSTRUAL SYNDROME AMONG TAIBAH UNIVERSITY FEMALE MEDICAL STUDENTS, KSA

Marwa Mohamed Zalat¹, Aishah Nabil Azam², Hanan Ghazi Aahmadi², Nouf Obiad Alhazmi²,
Raghad Ahmed Alshaya², Rawan Asaad Alahmadi^{2*}

¹Associate professor, Family and Community Medicine Department, Taibah University, Saudi Arabia;
Faculty of medicine, Zagazig University, Egypt.

²MBBS, Faculty of Medicine, Taibah University, Saudi Arabia.

ARTICLE INFO

Article History:

Received 04th Sep, 2019
Received in revised form
0th Oct, 2019
Accepted 4th Nov, 2019
Published online 31th Dec, 2019

Key words:

Female Medical students, KSA,
premenstrual syndrome, Prevalence,
Taif University.

*Correspondence to Author:

Rawan Asaad Alahmadi
MBBS, Faculty of Medicine, Taibah
University, Saudi Arabia.

E-mail:

rawan.asad@hotmail.com

ABSTRACT

Aim: Premenstrual syndrome (PMS) is a very prevalent health problems in women at reproductive age where approximately 80% of them experience these symptoms pre-menstrual at some point in their lifetime. The PMS could have effect on the quality of social and working life, so the aim of this study is evaluation of the prevalence of premenstrual syndrome among female medical students at Taibah University, Saudi Arabia. **Methods:** this is a cross sectional study conducted among final two academic years' undergraduate female medical students at Taibah University using self-administered questionnaire included socio-demographic data, menstrual data, family, medical histories, psychiatric disorders and the Premenstrual Evaluating Questionnaire (PEQ) that included the criteria of the American college of obstetrics & gynecology (ACOG) for the diagnosis of PMS. **Results:** Prevalence of premenstrual syndrome was 55.1 % of female medical students and the most common degree of PMS was the mild to moderate degree representing 17.3%, and moderate to severe degree representing 14.2%. Mood swings, nervous tension, and irritability were the most frequent symptoms reported by the students representing 93.9%, 76.5%, and 71.4% respectively. The highly significant prevalent symptoms among PMS than the non-PMS group were nervous tension, anxiety, heart pounding, fatigue,

Copyright © 2019, **Rawan Asaad Alahmadi**. This is an open access article distributed under the creative commons attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Marwa Mohamed Zalat¹, Aishah Nabil Azam², Hanan Ghazi Aahmadi², Nouf Obiad Alhazmi², Raghad Ahmed Alshaya², Rawan Asaad Alahmadi^{2*}, 2019 "Prevalence Of Premenstrual Syndrome Among Taibah University Female Medical Students, KSA", *International Journal Of Health Medicine And Current Research*, 4, (04), 1469-1477.

depression, and confusion ($p < 0.000$). **Conclusion:** PMS is prevalent among final two academic years' undergraduate female medical students at Taibah University with mild to moderate degree in severity. Further research with larger sample size of population including non-university populations within Saudi Arabia is recommended.

INTRODUCTION

Premenstrual syndrome (PMS) is a very common health problem in women at reproductive age.¹ Some studies showed that the onset of premenstrual syndrome symptoms mostly occurs between the adolescence and the age of 20s.² PMS is characterized by physical and emotional symptoms, which are correlated to the luteal phase of the menstrual cycle.³ However, there are more than 100 groups of symptoms that have associated with premenstrual syndrome.⁴ These symptoms are recurrent and could change in strength during each cycle.⁵ The most common emotional symptoms are crying, irritability depression, insomnia, nervous tension, headache and forgetfulness.² Till now, the diagnosis and treatment of premenstrual syndrome are considered as challenge to much medical practice and full medical history should be taken to establish a diagnosis.⁶

Different hypotheses have been suggested for explanation how the PMS occurs such as thyroid dysfunction, genetic factors, hypoglycemia, hormonal imbalance, fluid retention, stress and psychological factors but mainly it occurs secondary to hormonal imbalance.⁷ In addition, lifestyle habits like nutritional history and regular exercise could be linked with premenstrual syndrome.⁶ Many studies showed that there is a strong association between the PMS and impaired quality of life among young age group women. However, the quality of life is also affected by both social and working life. PMS also has an effect on the quality of sleeping.⁸

The PMS among young adolescents' age groups girls could also affect their school performance and social interactions in a negative way.⁵ Approximately 80% of reproductive age women experience these symptoms pre-menstrual at some point in their lifetime.⁵ In a recent research conducted in Saudi Arabia, 448 women (96.6%) developed premenstrual symptoms, of them 176 (37.5%) had a high symptom severity score.⁹ Therefore, the aim of this study is to give insight on this indiscernible health problem with the objective to estimate the prevalence of premenstrual syndrome

among female medical students at Taibah University, Medina, Saudi Arabia.

METHODS

This is a cross-sectional study that was conducted among final two academic years' undergraduate female medical students at Taibah University, Medina, KSA during their academic year (2017-2018).

The inclusion criteria were the fourth and fifth year medical students at Taibah University with a regular menstrual cycle on 21-35 days in length during the preceding 6 months, no history of simultaneous affection by psychiatric or medical disease. The exclusion criteria were an irregular menstrual cycle, use of contraceptive pills, and simultaneous affection by psychiatric or medical disease.

A semi structured self-administered questionnaire was used that included socio-demographic data (i.e. age, residence, marital status, academic year in the university), menstrual data (i.e. onset of menarche, duration and regularity of menses), family, medical histories, psychiatric disorder and the Premenstrual Evaluating Questionnaire (PEQ) based on the criteria of the American college of obstetrics & gynecology (ACOG) for the diagnosis of PMS.⁷ The questionnaire was also adopted from similar study,¹ and also from a gynecologist website.⁵

It was distributed for each student for two prospective cycles. Diagnosis of PMS depended on self-scores of PEQ which contains 18 different symptoms of premenstrual syndrome that the participants answered for two prospective cycles. These symptoms included: anxiety, irritability, nervous tension, mood swings, weight gain, swelling of extremities, tender breast, headache, craving for sweets, increased appetite, heart pounding, fatigue, dizziness or fainting, depression, forgetfulness, crying, confusion, and insomnia. The degree of symptoms were recorded in the week before and after the menstrual period. These symptoms have scale from 0 to 4; which 0 (zero) indicates no occurrence of a particular symptom, 1 (one) indicates that the symptoms were mild (i.e. present but they are not a problem), 2 (two) indicates that the symptoms were moderate in nature (i.e. were significant but tolerable), 3 (three) indicates that the symptoms were severe (i.e. more than just a little uncomfortable, may need to take medication or they are bothering to a significant degree), and 4 (four) indicates at some time during this period, they were partially or completely disabled (i.e. not able to work; have to stay at home possibly in bed). Then the PMS score was calculated by subtract the total score of

week after from the total score of week before the menstrual period.

After that the score was classified based on the following ratings: If score is between 0 and 12 = No PMS. If score is between 13 and 18 = borderline to mild PMS. If score is between 19 and 25 = mild to moderate PMS. If score is between 26 and 35 = moderate to severe PMS. If score is between “36 to 45” = severe PMS. If score is >45 = disabling PMS.

Validity and reliability of the questionnaire:

The items in the questionnaire were obtained from the validated questionnaire⁷ and validity was completed by reviewing it by 3 experts.

Data management:

Data was coded, entered, and analyzed using the Statistical Package for Social Science (SPSS) version 21.0 (SPSS, Chicago, IL, USA). Quantitative data was represented as mean and standard deviation and qualitative data was represented as frequencies and percentages. P-value ≤ 0.05 was considered statistically significant and ≤ 0.01 was considered highly significant.

Student t-test was used for quantitative data and Chi-square test (χ^2) was used for qualitative data.

Ethical approval:

Official permissions were obtained from the scientific ethical committee of the medical college of Taif university, Saudi Arabia at 27-11-2017 and the study ID is PEP4-F3. Informed consent was obtained from all the participants after describing the aim of this study and their role in filling the questionnaire. Privacy and confidentiality was assured.

RESULTS

The overall number of participants was 98 medical students from Taibah University, 34 (34.7%) of them were from 4th academic year and 64 (65.3%) were from 5th academic year, their mean age was 22.4 ± 0.86 and body mass index (BMI) was 23.2 ± 4.63 . According to socio-economic standard, 68 (69.4%) had moderate socio-economic standard, the majority were live with their family 89 (90.8%), and 92 (93.9%) reported that they are single compared to 6 (6.1%) married.

Table 1. Gynecologic, obstetric, family, and medical histories of the studied participants in Taibahu University.

Vribles	Number (n= 98)	Percentage %
Age at menarche (years):	(Mean \pmSD): 12.7\pm1.48	
Duration of menstrual bleeding (days):		
<3days	1	1
3-7days	82	83.7
>7days	15	15.3
Length of menstrual cycle (days):		
≤ 28 days	54	55.1
≥ 29 days	44	44.9
Extent of menstrual flow:		
Heavy	13	13.3
Moderate	76	77.6
Light	9	9.2
Having regular menstruation:		
Yes	83	84.7
No	15	15.3
Having offspring:		
Yes	2	2.0
No	96	98.0
History of abortion:		
Yes	2	2.0
No	96	98.0

Vribles	Number (n= 98)	Percentage %
Present Contraception:		
None	94	95.9
Pill	3	3.2
IUD	1	1.0
Family history of PMS in 1st degree relatives (sister, mother):		
Yes	13	13.3
No	85	86.7
History of taking medical treatment for PMS:		
Yes	8	8.2
No	90	91.8
History of taking medical advice for PMS:		
Yes	14	14.3
No	84	85.7
History of coexisting medical illness:		
Yes	6	6.1
No	92	93.9
History of psychiatric disorder:		
Yes	3	3.1
No	95	96.9

Table 1 shows that the mean age at menarche of participants was 12.7 ± 1.48 , 83.7% had 3-7 days duration of menstrual bleeding, 84.7% reported having regular menstrual cycle, and 77.6% had moderate menstrual flow. About 2 % had offspring, 2 % had history of abortion, and 3.2% are taking contraceptive pills while 1 % use Intra-Uterine Device. Only 13.3% had family history of PMS in 1st degree relatives, 8.2% had a history of taking medical treatment for PMS, while 14.3% had history of taking medical advice, 6.1% had history of coexisting medical illness and 3.1% had history of psychiatric disorder.

"Figure 1" shows that more than half of the participating female medical students have premenstrual syndrome 54 (55.10 %) while 44 (44.90%) were free of premenstrual syndrome.

Concerning the severity of premenstrual syndrome symptoms among the participating students, 17.3% were of mild degree or mild to moderate degree, 14.2 % were of moderate to severe degree, 6.1% had severe form of PMS, and no one reported having disabling PMS as shown in **"Figure 2"**.

Table 2. Frequency of symptoms of PMS among female Medical students of Taibah University.

Symptoms	Number (n= 98)	Percentage %
Nervous Tension	75	76.5
Mood Swings	92	93.9
Irritability	70	71.4
Anxiety	64	65.3
Weight Gain	48	49.0
Swelling of Extremities	11	11.2
Breast Tenderness	67	68.4
Headache	45	45.9
Craving for Sweets	61	62.2

Symptoms	Number (n= 98)	Percentage %
Increased Appetite	68	69.4
Heart Pounding	31	31.6
Fatigue	68	69.4
Dizziness or Fainting	30	30.6
Depression	65	66.3
Forgetfulness	26	26.5
Crying	54	55.1
Confusion	25	25.5
Insomnia	30	30.6

Table 2 shows the frequency of symptoms of PMS among the participating medical students. The highest frequency was for mood swings, nervous tension, and irritability (93.9%, 76.5%, and 71.4% respectively), followed by increased appetite (69.4%), fatigue (69.4%), breast tenderness (68.4%), depression (66.3%), anxiety (65.3%), craving for sweets (62.2%),

and crying (55.1%). While the frequencies of weight gain, headache, heart pounding, dizziness or fainting, insomnia, forgetfulness, and confusion were 49%, 45.9%, 31.6%, 31.6%, 30.6%, 30.6%, 26.5%, and 25.5% respectively, and lowest symptom frequency was for swelling of extremities (11.2%).

Table 3. Comparison between medical students with and without PMS regarding some socio-demographic and menstrual characteristics of the studied subjects.

Characteristics	With PMS		Without PMS		P value
	Number (n= 54)	%	Number (n= 44)	%	
Age: (Mean \pm SD)	22.29 \pm 0.79		22.56 \pm 0.92		0.1
Body mass index: (Mean \pm SD)	22.72 \pm 4.36		23.79 \pm 4.93		0.2
Academic Year:					
-4 th medical student	23	42.6	11	25.0	0.06
-5 th medical student	31	57.4	33	75.0	
Perceived socio-economic standard:					0.6
High	15	27.8	14	31.8	
Low/Moderate	39	72.2	30	68.2	
Marital status:					
Single	50	92.6	42	95.5	0.5
Married	4	7.4	2	4.5	
Age at menarche (years): (Mean \pm SD)	12.73 \pm 1.02		12.68 \pm 1.91		0.8
Length of menstrual cycle (days):					0.3
\leq 28 days	32	59.3	22	50.0	
\geq 29 days	22	40.7	22	50.0	
Extent of menstrual flow:					
Heavy	7	13.2	6	13.6	0.5
Moderate	43	81.1	33	75.0	
Light	4	7.4	5	11.4	

Characteristics	With PMS		Without PMS		P value
	Number (n= 54)	%	Number (n= 44)	%	
Having regular menstruation:					
Yes	46	85.2	37	84.1	0.8
No	8	14.8	7	15.9	
Family history of PMS in 1st degree relatives (sister, mother):					
Yes	7	13.0	6	13.06	0.9
No	47	87.0	38	86.4	
History of psychiatric disorder:					
Yes	3	5.6	1	1.0	0.4
No	51	94.4	43	99.0	

Among those with PMS, the mean age was 22.29 ± 0.79 and mean age of menarche was 12.73 ± 1.02 compared to (22.56 ± 0.92 , 12.68 ± 1.91 respectively) among those without PMS. Students with PMS reported higher prevalence among 4th medical students (42.6% vs. 25.0%) low to moderate social class (72.2% vs. 68.2%)

and with moderate menstrual flow (81.1% vs. 75.0%) respectively than those without PMS. Overall, the results of this study revealed no significant differences between students with PMS and those without PMS regarding their socio-demographic and menstrual characteristics as shown in **table 3**.

Table 4. Premenstrual symptoms percentages among PMS and Non-PMS female medical students.

Symptoms	With PMS		Without PMS		P value
	Number (n= 54)	%	Number (n= 44)	%	
Nervous Tension	49	90.7	26	59.1	0.000**
Mood Swings	53	98.1	39	88.6	0.05
Irritability	45	83.3	25	56.8	0.004*
Anxiety	47	87.0	17	38.6	0.000**
Weight Gain	30	55.6	18	40.9	0.14
Swelling of Extremities	8	14.8	3	6.8	0.21
Breast Tenderness	40	74.1	27	61.4	0.17
Headache	32	59.3	13	29.5	0.003*
Craving for Sweets	35	64.8	26	59.1	0.561
Increased Appetite	39	72.2	29	65.9	0.500
Heart Pounding	27	50.0	4	9.1	0.000**
Fatigue	46	85.2	22	50.0	0.000**
Dizziness or Fainting	23	42.6	7	15.9	0.004*
Depression	46	85.2	19	43.2	0.000**
Forgetfulness	19	35.2	7	15.9	0.032*
Crying	36	66.7	18	40.9	0.011*

Symptoms	With PMS		Without PMS		P value
	Number (n= 54)	%	Number (n= 44)	%	
Confusion	22	40.7	3	6.8	0.000**
Insomnia	23	42.6	7	15.9	0.004*

* Significant **highly significant.

Most of premenstrual symptoms were significantly more frequent among PMS than the non-PMS group. The highly significant prevalent symptoms were nervous tension, anxiety, heart pounding, fatigue, depression, and confusion ($p < 0.000$). While, mood swings, forgetfulness and crying represent the lowest significant prevalent symptoms ($p \leq 0.05$) as shown in **table 4**.

DISCUSSION

Premenstrual syndrome (PMS) is a very common health problems in women at reproductive age.¹ Approximately 80% of reproductive age women experience these symptoms pre-menstrual at some point in their lifetime.⁵

This study has been conducted to evaluate the prevalence of premenstrual syndrome among final two academic years' undergraduate female medical students at Taibah University, Medina, KSA.

The results of our study indicated that more than half (55.1 %) of the female medical students at Taibah University having premenstrual syndrome as estimated by the self-administered questionnaire. This finding is consistent with the other previous similar studies that reported PMS prevalence of 51% in Pakistan¹⁰, 56.4% in Medina, KSA¹¹, 59% in India¹², 60.3% in Southern Brazil¹³, 61.4% in Ankara, Turkey¹⁴ and 63.1% in Malaysia.¹⁵

On contrary, other studies reported higher prevalence of PMS; 100% at King Faisal University in KSA¹⁶, 99.6% among students of Jimma University in Ethiopia¹⁷, 96.6% in Dammam, KSA⁹, 86.3% in Beni-Suef, Egypt¹⁸, 86% in the University of Calabar in Nigeria¹⁹, and 78.5% in Qassim, KSA.⁸ The main difference in these findings was due to different number of participants, it was among 354 female medical students at King Faisal University in KSA¹⁶, in Jimma University in Ethiopia it was conducted among 242 randomly selected female students aged between 17 to 38 years¹⁷, it was among 464 college-aged women in the medical, nursing and medical technology/respiratory therapy educational programs at a university in Dammam, KSA⁹, also In Beni-Suef, Egypt the sample

was 4122 among girls aged 12–25 years¹⁸, in university of Calabar in Nigeria the study was conducted among 200 undergraduate students, nulliparous aged between 16 and 31 years¹⁹ and at Qassim University the sample was among 172 unmarried medical students aged 18-25 years from 1st to 5th grade.⁸ However, our study included female medical students with mean age 22.4±0.86 and range between 21-24 years.

Furthermore, other studies reported lower prevalence of PMS which was (16%, 16.4%, and 17.5%) in Iran, the United Arab Emirates, and in Eritrea respectively.²⁰⁻²² In addition, the variation in prevalence may be attributed to differences in the used instruments, symptoms' patterns, cultural differences, and the use of prospective or retrospective protocols.

In the present research, it was among the final two academic years' undergraduate female medical students at Taibah University while in Iran, it was among 300 female university students aged 18-27 years²⁰ and in United Arab Emirates was among 700 adolescent schoolgirls aged 12-18 years²¹, in Eritrea the number of sample was among Female Health Science Students aged 17-26 years old.²² Another issue in estimating the prevalence rates is the fact that the etiology of PMS remains uncertain; especially that there is no hormone or other laboratory test that confirms the diagnosis of PMS. The difference between PMS and non-PMS women may be due to that those with PMS are more sensitive to the changes in the levels of hormones and that they have increased response to these hormones.²³

Concerning the symptoms severity of PMS, the current study showed various severity 17.3% had mild degree or mild to moderate degree, 14.2 % had moderate to severe degree, 6.1% had severe form of PMS and no one reported having disabling PMS. It was interesting to notice that the frequency of severe PMS symptoms was lower in our research in contrary to what had been reported by a previous study conducted by Cleckner-Smith et al.,²⁴ which was 88%, 73%, and 56% for moderate, severe and extreme form of PMS respectively. Moreover, a study conducted in Ankara, Turkey reported that 45.2% showed mild PMS, 48.9% represented moderate PMS and 5.9% had severe form of PMS.¹⁴ In addition, the majority of the studied group in

Pakistanian¹⁰ and Turkish¹⁴ studies had a mild form of PMS. The difference in the severity of PMS symptoms may be due to the variations between individuals regarding their pain threshold.

The most common reported PMS symptoms among Iranian female university students were feeling of tiredness or lethargy (84%)²⁰, and least frequent symptoms were sleep problems (66%). While in the present study at Taibah University in KSA, the most common symptoms of PMS were mood Swings (93.9%) and the least one was swelling of extremities (11.2%). These differences might be attributed to different culture and environment of life. Also, the variation in symptoms frequency may be due to different PMS symptoms perception of the female students.

The current study revealed no significant differences between students with PMS and those without PMS regarding their socio- demographic and menstrual characteristics.

This result is consistent with the previous research study conducted by Shaheen et al., 2014 at King Fahad Armed Forces Hospital in Jeddah which showed no significant association between age group, marital status and premenstrual syndrome.¹ However, many other studies showed significant relation between PMS and marital status.²⁵ PMS was reported to be higher in single females.^{26, 27}

As regard premenstrual symptoms, this study showed a highly statistically significant difference among PMS than the non-PMS group. The most prevalent symptoms were nervous tension, anxiety, heart pounding, fatigue, depression, and confusion ($p < 0.000$). Similarly, these findings are consistent with that obtained among university female medical students in Malaysia²⁸ that reported significant prevalent symptoms of headache, confusion, irritability, social withdrawal, anxiety and swelling of extremities among PMS than the non-PMS group. The variations of results in different studies could be attributed to various ages of the studied subjects with different symptom's patterns and perception.

CONCLUSION

Premenstrual syndrome (PMS) is a common problem (55.1%) among undergraduate female medical students at Taibah University, Medina, and KSA with various degree of PMS severity. The most common symptoms of PMS were mood swings (98.1%) and the least one was swelling of extremities (11.2%). There were no significant differences between students with PMS and those without PMS regarding their socio-

demographic and menstrual characteristics. So, it is recommended to establish awareness program in Saudi Arabia universities to educate their female students about the premenstrual syndrome with effective interventions to help this population.

ACKNOWLEDGEMENTS

The authors are grateful to the participants in this study for their cooperation and compliance in finishing the questionnaires and sharing their experiences about their premenstrual symptoms.

CONFLICT OF INTEREST: The authors declared that they have no conflict of interest.

FUNDING: This research did not receive any specific grant from funding agencies in public, commercial or not-for-profit sectors.

REFERENCES

1. Shaheen A, Aljohani N, Al-Raddadi R. Premenstrual Syndrome among Female Doctors at King Fahad Armed Forces Hospital: Prevalence and Impact on Work, Jeddah, 2014. *Int J Med Res Prof.* 2016; 2(5); 135-40.
2. Sahin S, Ozdemir K, Unsal A. Evaluation of premenstrual syndrome and quality of life in university students. *J Pak Med Assoc.* 2014 Aug 1; 64(8):915-22.
3. Ashfaq R, Jabeen S. Association between the prevalence of premenstrual syndrome and weight status of adolescent girls (11-21years). *Adv Obes Weight Manag Control.* 2017; 6(1):1-4.
4. Quintana-Zinn FA, Whitcomb BW, Ronnenberg AG, et al. Premenstrual symptom patterns and behavioral risk factors in young women: a cross-sectional study. *J Womens Health.* 2017 Oct 1; 26(10):1099-105.
5. Direkvand-Moghadam A, Sayehmiri K, Delpisheh A, et al. Epidemiology of Premenstrual Syndrome (PMS)-A systematic review and meta-analysis study. *Journal of clinical and diagnostic research: JCDR.* 2014 Feb; 8(2):106.
6. Tadakawa M, Takeda T, Monma Y, et al. The prevalence and risk factors of school absenteeism due to premenstrual disorders in Japanese high school students—a school-based cross-sectional study. *Bio Psycho Social medicine.* 2016 Dec; 10(1):13.

7. Sut HK, Mestogullari E. Effect of premenstrual syndrome on work-related quality of life in Turkish nurses. *Safety and health at work*. 2016 Mar 1; 7(1):78-82.
8. Al-Batanony M, AL-Nohair S. Prevalence of Premenstrual Syndrome and Its Impact on Quality of Life among University Medical Students, Al Qassim University, KSA. *Public Health Research*. 2014; 4(1):1-6.
9. Rasheed P, Al-Sowielem L. Prevalence and Predictors of Premenstrual Syndrome among College-Aged Women in Saudi Arabia. *Annals of Saudi Medicine*. 2003; 23(6):381-387.
10. Nisar N, Zehra N, Haider G, et al. Frequency, intensity and impact of premenstrual syndrome in medical students. *J Coll Physicians Surg Pak*. 2008 Aug 1; 18(8):481-484.
11. Muhtaseb N, Al-Raddadi A, Albukhari I, et al. Prevalence, Severity, and Impacts of Premenstrual Syndrome among Female Medical Students at Taibah University in Saudi Arabia. *International Journal of Academic Scientific Research*. 2015; 3(4):134-142.
12. Mahesh A, Zubair S, Tirmizi A, et al. Frequency and associated factors of Premenstrual Syndrome in Medical College Girls. *Med Channel* 2011, 17(1): 34–38.
13. Silva C, Gigante D, Carret M, et al. Population study of premenstrual syndrome. *Rev Saude Publica*. 2006; 40(1):47-56.
14. Derman O, Kanbur N, Tokur T, et al. Premenstrual syndrome and associated symptoms in adolescent girls. *Eur J Obstet Gynecol Reprod Biol* .2004; 116(2):201-206.
15. Wong L. Attitudes toward Menstruation, Menstrual-Related Symptoms, and Premenstrual Syndrome among Adolescent Girls: A Rural School-Based Survey. *Women & Health*. 2011; 51(4):340-364.
16. AL Ghadeer Z, AL Shuhayb Z, AL luwaim F, et al. Prevalence of Premenstrual Syndrome and its Impact on the Daily Activities of Students in King Faisal University. *International Journal of Academic Scientific Research*. 2016; 4(4):01-10.
17. Tenkir A, Fisseha N, Ayele B. Premenstrual syndrome: prevalence and effect on academic and social performances of students in Jimma University, Ethiopia. *Ethiopian Journal of Health Development* 2003; 17(3): 181-88.
18. Arafa AE, Senosy SA, Helmy HK, et al. Prevalence and patterns of dysmenorrhea and premenstrual syndrome among Egyptian girls (12–25 years). *Middle East Fertility Society Journal*. 2018 Dec 1; 23(4):486-90.
19. Antai A, Udezi A, Ekanem E, et al. Premenstrual syndrome: Prevalence in students of the University of Calabar, Nigeria. *African Journal of Biomedical Research*. 2004; 7:45-50.
20. Bakhshani N, Mousavi M, Khodabandeh G. Prevalence and severity of premenstrual symptoms among Iranian female university students. *J Pak Med Assoc*. 2009; 59(4):205-208.
21. Rizk D, Mosallam M, Alyan S, et al. Prevalence and impact of premenstrual syndrome in adolescent schoolgirls in the United Arab Emirates. *Acta Obstetrica et Gynecologica Scandinavica*. 2006; 85(5):589-598.
22. Azaria E, Mehari M, Kiros N, et al. The Prevalence and Effects of Premenstrual Syndrome among Female Health Science Students in Eritrea. *European Journal of Clinical and Biomedical Sciences*. 2016; 2(1):1-5.
23. Yonkers K, O'Brien P, Eriksson E. Premenstrual syndrome. *The Lancet*. 2008; 371(9619):1200–1210.
24. Cleckner-Smith CS, Doughty AS. Premenstrual Symptoms Prevalence and Severity in an Adolescent Sample. *J Adolesc Health*. 1998; 22(5):403-408.
25. Hamaideh S, Al-Ashram S, Al-Modallal H. Premenstrual syndrome and premenstrual dysphoric disorder among Jordanian women. *Journal of Psychiatric and Mental Health Nursing*. 2013; 21(1):60-68.
26. Tschudin S, Berteau P, Zemp E. Prevalence and predictors of premenstrual syndrome and premenstrual dysphoric disorder in a population-based sample. *Archives of Women's Mental Health*. 2010; 13(6):485-494.
27. Bakhshani NM, Hosseinbor M, Shahraki Z, et al. Premenstrual syndrome symptomatology among married women of fertile age based on methods of contraception (hormonal versus non-hormonal methods of contraception). *Global journal of health science*. 2014 Mar; 6(2):105.
28. Thwin O, Naing D, Min W, et al. Premenstrual Syndrome Among Female Medical Students of Univerisiti Malaysia Sabah. *Health Sciences Research*. 2015; 2(5):45-49.
