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A cross Sectional Study on Factors Associated with Premenstrual Syndrome among Female Students in Medical Colleges of Mosul University

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Abstract: *Premenstrual syndrome is a prevalent health issue, especially among female medical school students, affecting their academic and professional performance. The study aimed to assess the extent of PMS experienced by female medical school students and identify factors that can be associated with the severity of PMS symptoms. A descriptive, cross-sectional design utilizing a quantitative approach was adopted from October 8th, 2022, to March 30th, 2023. Simple random sampling was used to select a sample of 185 students from Mosul University Medical Colleges, with 51 students from the Nursing College, 44 from the Medicine College, 47 from the Pharmacy College, and 43 from the Dentistry College. Data were collected using a structured questionnaire and Premenstrual Syndrome Scale. The sample consisted of female students whose mean age was 22.6 ± 4 years and whose body mass index was 22.8 ± 4.4. Of the total sample, 97 participants (52.4%) reported not participating in physical activity. Furthermore, 79 students (42.7%) exhibited moderate symptoms of premenstrual syndrome (PMS), while 27.6% reported severe symptoms of PMS, assessed using the premenstrual scale. In conclusion, the study found a significant statistical difference between cycle duration, duration of menses, regularity of period, amount of bleeding, duration of premenstrual symptoms, and familial history of PMS concerning the severity of PMS symptoms; further studies could explore the potential role of dietary and lifestyle modifications in the management of PMS symptoms and develop effective interventions to address its impact on female students.*

Keywords: *female students, lifestyle modifications, medical school, premenstrual syndrome.*

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INTRODUCTION

Premenstrual syndrome (PMS) is a set of physical, emotional, and behavioral symptoms that occur in women during the luteal phase of their menstrual cycle (Gnanasambanthan & Datta, 2019). It affects up to 75% of women, and its severity ranges from mild to debilitating. The symptoms of PMS include mood swings, anxiety, irritability, bloating, breast tenderness, headaches, and exhaustion. Some of the factors that have been associated with PMS among medical school students are stress, inadequate physical activity, poor diet, smoking, and a history of previous PMS in the family (Dutta & Sharma, 2021). Sedentary living contributes to the normalization of enzyme secretions and the reduction of stress, yet physical activity makes PMS symptoms decrease. Lack of proper nutrition is also a factor because most medical students ignore their dietary requirements because of their busy timetable and dependence on junk food and fries. Regarding individual changes, medical students should include exercise in their daily regimen. The suggested modifications include gym membership, yoga, or daily walks (Pearce et al., 2020).

As for PMS, it is a well-known problem that prevails among many representatives of the female gender, including students of medical colleges. PMS is commonly brought about by hormonal changes during the menstrual cycle, and there are some risk factors that may predispose someone to develop symptoms that include stress, lack of exercise, poor diet, smoking, and a history of PMS in the family (Dutta & Sharma, 2021). To minimize symptoms related to PMS, medical students need to include balanced diets through meal planning and avoid foods that are rich in sugar and processed foods. Cigarette smoking influences hormone levels and thus has the probability of enhancing the probability of hormonal irregularities and/or imbalances, hence the probability of PMS in Medical College students. In addition, it has been established that the habit of smoking is related to PMS with a genetic factor (AlQuaiz et al., 2022).

Hypoglycemic patients have to try to regulate their symptoms, controlling their physical activity, nutrition, stress, and smoking if they have to. Students who make health and well-being a priority are capable of managing their symptoms in parallel with performing adequately in medical school and in their future careers (Hashim et al., 2019). In a woman's reproductive age, up to 90% of them may have some form of PMS symptoms, and up to 20% of them may have severe cases that affect their day-to-day activities (Dawood, 2020). A systematic review and meta-analysis of 42 cross-sectional studies carried out in 27 countries estimated that the global pooled prevalence of PMS was 47 (Christy et al., 2018). PMS was most commonly seen in Asia, with a frequency of 62%, while Europe had the lowest frequency of 39%. The prevalence of PMS in the Middle East ranges from 26% to 98%; depending on the country and population (Matsumoto et al., 2019).

To the best of our knowledge, there is a dearth of information on the prevalence and epidemiology of PMS among university students in Iraq. However, to the best of the researcher's knowledge, there were few studies that examined the prevalence and severity of PMS among female university students in various areas of Iraq. For instance, a cross-sectional study carried out on medical female students revealed that 83% of the females experienced PMS, and more especially, 89.5% had irritability, while 86.5% had depression, and 83.5% experienced exhaustion (Ahmed & Saeed, 2019). In one more study in Iraqi Kurdistan, the prevalence of major depressive disorder was identified at 66%. With an overall prevalence of PMS of 9%, more common symptoms included mood swings (91.7%), irritability (83.3%), and breast discomfort (79.2%) (Al-Shahrani et al., 2021). The significance of the study. The study is important because PMS is a social disease that prevails in a large number of women, and students of medical faculties are the most vulnerable, given the increased levels of stress and rigidity of lifestyle associated with training as a doctor (Maity et al., 2022). Understanding the risk variables associated with PMS in the study conducted among medical students may aid healthcare professionals in designing individualized approaches to dealing with the risk factors to decrease the incidence and severity of PMS symptoms (Cheng et al., 2013). Through this study, the importance of stress, exercise, nutrition, smoking, and family history in PMS is pointed out as a significant source of information to understand the variation in this disorder and confirm the need for a multi-disciplinary approach to treatment.

Unfortunately, only a few studies on PMS exist in Iraq, and the ones that are accessible demonstrate that the disorder affects female university students significantly and interferes with their routines. Nevertheless, further research is required to establish the prevalence and distribution of PMS in the present context of Iraq and to develop sound approaches aimed at the diagnosis and treatment of the examined condition. Objectives of the study Explain the demographic and menstrual profiles of the participants. Determine the level of experience of women students in medical schools concerning PMS. Identify factors that may be associated with the severity of PMS symptoms.

METHODS

A cross-sectional study design was adopted as a quantitative approach in order to achieve the aim of the present study during the period from October 8 to March 30, 2023. This study design involved collecting

data on a single population at a single point in time and allowed for the collection of both quantitative and qualitative data.

The setting of the study

The data was collected from the medical colleges at Mosul University in the north of Iraq, including the Medicine College, Nursing College, Pharmacy College, and Dentistry College, located in Mosul City, the center of the Nineveh Governorate in the northwest region of Iraq.

Samples and sampling of the study

In this study, a sample of 185 students was selected from the Medical Colleges of Mosul University using simple random sampling. The sample was divided into 51 students from the nursing college, 44 from the medicine college, 47 from the pharmacy college, and 43 from the dentistry college.

Tool of the study

Data were collected using a structured interview questionnaire with two parts. The first part focused on the sociodemographic characteristics of the study participants, including age, college, stage, height, weight, marital status, exercise, mother education, duration of sleep (in hours), breakfast eating habits, caffeine consumption, medication, whether they suffer from any chronic diseases, menarche age (in years), cycle length, duration of menses, regularity of period, amount of bleeding (in number of pads), number of days of premenstrual symptoms, familial history of dysmenorrhea or PMS, and whether they are using hormonal contraception. The second part focused on the Premenstrual Syndrome Scale (PMSS), which included 40 questions about physiological symptoms, psychological symptoms, and behavioral symptoms.

Validity

To ensure the effectiveness of the study instrument, a panel of ten experts from various medical and nursing specialties was selected to evaluate the instrument. Their opinions, suggestions, and recommendations were taken into account in the final version of the tool used in this study.

Reliability

To assess the reliability of the tool, the algorithm was tested using a participant sample from the Cronbach Alpha. The test results were analyzed using appropriate statistical methods to determine the degree of consistency and reliability of the tool. Cronbach's alpha scores the tool with a 0.84 reliability score, indicating a high degree of consistency and reliability.

Pilot study

A pilot study was conducted from October 30 to November 3, 2022, to evaluate the stability and reliability of the instrument. The results of the pilot study were analyzed using appropriate statistical methods to determine the accuracy and reliability of the tool.

Statistical analysis

SPSS version 26 was used to analyze the data and describe and analyze the results of the study. The statistical data were analyzed using various descriptive and indirect statistical tests. The researchers removed all cases with missing data for any variables in the analysis. The results of these tests were used to interpret and draw conclusions from the data.

RESULTS

The results show the average age of female students at 22.58 years and the average body mass index (BMI) at 22.772. Most participants were in their fourth stage of medical education, were single, lived in

urban areas, and did not participate in regular physical activity (Table 1).

Table 1. The demographic characteristics and daily routines of the participants in the study.

Variables	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Age (years)	18	26	22.58	4.002
BMI	16.1	61.3	22.772	4.4338
Menarche age (years)	9	19	13.01	1.466
Variables			Frequency	Percentage (%)
College	College of Medicine		44	23.8
	College of Nursing		51	27.6
	College of Dentistry		43	23.2
	College of Pharmacy		47	25.4
Stage	Second stage		32	17.3
	3rd stage		33	17.8
	4th stage		57	30.8
	5th stage		42	22.7
	6th stage		9	4.9
	Postgraduate		12	6.5
Residence	Rural		23	12.4
	Urban		162	87.6
Marital status	Single		164	88.6
	Married		20	10.8
	Widowed or divorced		1	0.5
Exercise	No Exercise		97	52.4
	1 day/week		38	20.5
	2–3 days/ week		35	18.9
	4–7 days/week		15	8.1
Sleeping durations (hours)	< 5 hr.		12	6.5
	5-6 h.		35	18.9
	6-7 h.		81	43.8
	8hr.		57	30.8
Breakfast eating habits	Yes.		120	64.9
	No		65	35.1
Caffeine Consumption	Never		68	36.8
	1 cup/day		77	41.6
	2-3 cups/day		33	17.8
	≥ 3 cups/day		7	3.8
Total			185	100 (%)

The (Table 1) data summarizes the characteristics of the study participants, including demographic and social data. A total of 470 participants were included in the analysis, with a mean age of 22.5 years (±4). Their body mass index varied between 16.1 and 61.3 with a mean 22.77 (±4.43). the average age at menarche was reported at 13.01 years (±1.47) indicating early onset among the participants. In terms of educational background, the participants were from four colleges. The participants include different academic stages from rural and urban areas with variable marital ststus. The results in (Table 2) show that most of the participants in this study had a menstrual cycle duration of 25-38 days, a menses duration of 3-7 days, a

regular period, a small amount of bleeding (4 pads/day), premenstrual symptoms lasting 1-2 days, and had a family history of premenstrual syndrome.

Table 2. Description of the menstrual characteristics of the study participants.

Variables		Frequency	Percentage %
Cycle length	24 days	49	26.5
	25–38 days	119	64.3
	39 days	17	9.2
Duration of Menses	2 days	3	1.6
	3–7 days	168	90.8
	8 days	14	7.6
Regularity of period	Regular	141	76.2
	Irregular	44	23.8
Amount of bleeding (number of pads)	Little (4 pads/day)	104	56.2
	Moderate (5-7 pads/day)	76	41.1
	Heavy (≥8 pads/day)	5	2.7
Premenstrual symptoms last (days)	1-2 days	89	48.1
	3-5 days	53	28.6
	6-7 days	43	23.2
Familial history of PMS	Yes.	82	44.3
	No	103	55.7
Total		185	100

In Table 3 there is a significant statistical difference between the stage of female students and the performance of physical activity with the severity of symptoms of premenstrual syndrome (PMS). In addition, the results in Table 4 demonstrate a significant statistical difference between the duration of the cycle, the duration of the menses, the regularity of the period, the amount of bleeding, the duration of the premenstrual symptoms, and the familial history of PMS with the severity of the symptoms of premenstrual syndrome (PMS).

Table 3. Determination of the influence of demographic characteristics and daily routine on the severity of premenstrual syndrome among study participants by the ANOVA test

Variables	Sum of squares	Df.	Mean Square	F.	Sig.
Age in years	1274.864	104	12.258	.586	0.995
BMI	1459.762	104	14.036	.520	0.999
College	137.499	104	1.322	1.165	0.238
Stage	247.745	104	2.382	1.920	0.001
Residency	11.057	104	0.106	.936	0.626
Marital status	12.134	104	0.117	1.009	0.487
Exercise	141.715	104	1.363	2.436	0.000
Sleeping durations (hours)	80.645	104	0.775	1.046	0.420
Breakfast eating habits	23.829	104	0.229	1.000	0.504
Caffeine Consumption	76.950	104	0.740	1.192	0.206

*F: Frequency, Df: Degree of freedom, Sig: Significance of the P-valve.

Table 4. Association of participants' menstrual characteristics with the severity of the premenstrual syndrome.

Variables	Chi-square	P-value	Significance
Cycle length	17.282	0.027	S.
Duration of Menses	67.439	0.000	H.S.
Regularity of period	11.096	0.026	S.
Amount of bleeding (number of pads)	22.385	0.004	H.S.
Premenstrual symptoms last (days)	50.469	0.000	H.S.
Familial history of PMS	36.127	0.000	H.S.

*S: Significance at the P-value <.0.05, H.S: Significance at P-value <.0.01.

The analysis of the association between menstrual characteristics and the severity of premenstrual syndrome revealed significant findings. The unadjusted estimates indicate noticeable relationships for various menstrual characteristics, measured using chi-square tests. The cycle length had a chi-square value of 17.282(P=0.027), and the duration of menses showed a highly significant association with a chi-square value of 67.439 (P< 0.001). The detailed symptom level for all respondents is available in Figure1.

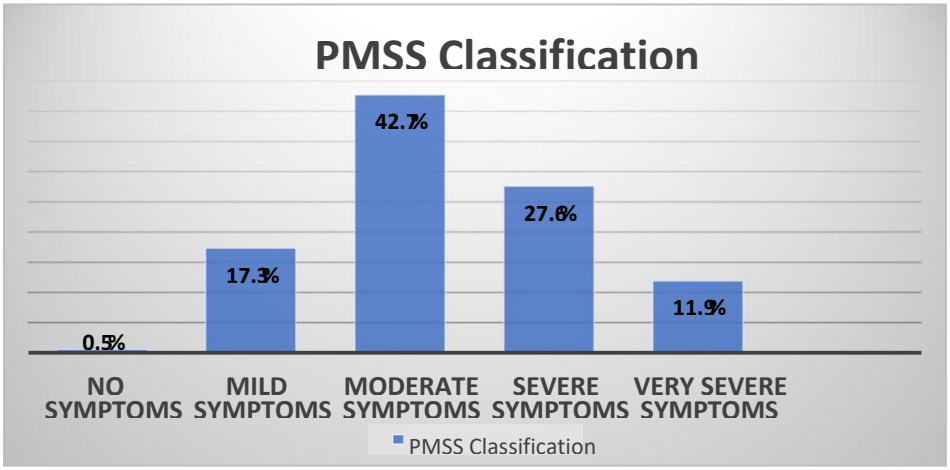

Figure 1. Illustrate the severity of premenstrual syndrome among study participants according to the premenstrual scale.

DISCUSSION

The female population in the age range where they are capable of reproduction commonly experiences premenstrual syndrome (PMS) in addition to undergoing various changes during puberty. A significant number of females undergo this condition. To investigate this, 185 female medical students who agreed to participate were included in the current study.

The current study investigates the potential relationship between age, BMI, and menarche age and a

woman's experience of PMS. The sample consisted of university students with ages ranging from 18 to 26 years, a mean of 22.31 years, and a standard deviation of 4.002. The BMI values ranged from 16.1 to 61.3, with a mean of 22.772 and a standard deviation of 4.4338. Menarche's age ranged from 9 to 19 years, with a mean of 13.01 years and a standard deviation of 1.466. However, statistical analysis indicated that none of these variables was significantly related to PMS, as all values were within normal limits. It should be noted that the study was limited to university students, and therefore the findings may not be generalizable to a larger population.

The female students came from four colleges, with the School of Nursing having the highest frequency (51 individuals, 27.6%), followed by the School of Medicine (44 individuals, 23.8%), the School of Pharmacy (47 individuals, 25.4%), and the School of Dentistry (43 individuals, 23.2%).

The sample consists of students residing either in rural (n = 23, 12.4%) or urban (n = 162, 87.6%) areas. The majority of the participants were single (n = 164, 88.6%), while a minority were married (n = 20, 10.8%) and widowed or divorced (n = 1, 0.5%).

Regarding exercise habits, most of the participants reported participating in physical activity less than 4 days a week (n = 130, 70.3%), and more than half (n = 97, 52.4%) reported no exercise at all. A significant proportion of the sample reported sleeping for 6-7 hours (n = 81, 43.8%), followed by more than 8 hours (n = 57, 30.8%), 5-6 hours (n = 35, 18.9%), and less than 5 hours (n = 12, 6.5%).

In terms of breakfast eating habits, the majority of participants reported consuming breakfast (n = 120, 64.9%), while a significant minority reported skipping breakfast (n = 65, 35.1%). Most participants also reported consumption of caffeine, with 41.6% (n = 77) reporting one cup per day, 17.8% (n = 33) reporting 2 to 3 cups per day, and 3.8% (n = 7) reporting consumption of three or more cups per day. The remaining participants reported never consuming caffeine (n = 68, 36.8%), Consistent with our study, previous research found that the mean body mass index (BMI) of the participants was 20.5±2.1 kg/m2, which suggests that the participants fell within a healthy weight range. Furthermore, the mean reported sleep duration of participants was 6.7±1.1 hours per day, which is slightly below the recommended range of 7-9 hours per day for young adults (Cheng et al., 2013).

In agreement with this study's findings, the studies conducted by (Pearce et al. 2020) also reported similar results. Especially, these works revealed that the mean body mass index was in the normal range and the mean sleeping time was below the young adult range. Moreover, both of them presented the participants' breakfast consumption habits, which, according to the studies, were frequently practiced. From the study, another finding that was established was Table 2, which presents the findings on the nature of the menstrual cycle among the 185 female students. The majority of participants, 64.3%, had a cycle duration of 25–38 days, and 90.8% had a cycle period of 3–7 days. In addition, 76.2% of respondents said that they have normal cycles, while 56.2% of respondents said they experienced small bleeding (four pads per day). The duration of premenstrual symptoms was 1 to 2 days in 48 percent of the patients. The level of specificity to specific individuals in the participants' self-selection analyses was 1% and 44, respectively. Three-point-three percent of the respondents had a family history of PMS, according to the study. Such conclusions may give valuable insights into some aspects of health threats connected with menstruation and might help in practical approaches to clinic management. The studies of Komada (2019) support the outcomes of this research and, help to expand the amount of knowledge about menstruation in young women, including its frequency and peculiarities. The findings of the study are the degree of the identified PMS as measured by the premenstrual scale. One participant out of the total sample claimed to experience no symptoms of PMS at all, with 32 (17.3%) of the participants experiencing mild symptoms of PMS. Also, concerning the severity of PMS symptoms, 79 of them had moderate PMS symptoms, 51 had severe PMS symptoms, and 22 reported very severe PMS symptoms. The intensity of PMS is evaluated based on the pre-menstrual scale, and the validity of the assessment of PMS has been confirmed by Komada (2019) As per the outcomes of the present research, analogous studies (Dawood, 2020) have expressed comparable tendencies.

In a recent study, it was reported that the effect of exercise in improving the symptoms of PMS among female students is an area of significance because, in the case of women, the absence of exercise is commensurate with the extent of PMS AlQuaiz et al (2022).

Lastly, analysis of variance yielded that it differentiated the duration of the cycle, the length of menstruation, the regularity of periods, the number of blood vessels, the extent of symptoms of PMS, and the history of PMS in the family. With p-values of less than 0.05, as Shiferaw et al (2014) have also put forth, there are indications that such factors could have implications for the onset and expression of PMS features.

Study Limitations

Since this study is a cross-sectional study, its results cannot be generalized, and these results are representative of the time in which they were collected. In addition, the small size of the study sample and subjective bias by participants restrict the strength of the finding

CONCLUSION

It was also established that the great majority of female students demonstrated a normal menstrual profile and a history of PMS in their families. The moderate intensity of PMS is present after pre-menstrual periods, and it is significantly associated with the phase of female students and their involvement in physical activities. Besides, there are statistical differences between the duration of the cycle, the duration of the menstruation, the regularity of the period, the amount of blood, the duration of pre-menstrual symptoms, and the family history of PMS regarding the degree of manifestations of PMS.

The recommendation:

1. Officials of universities and health care providers should also consider the implications of PMS on the academic performance and other aspects of female students.
2. Publicity and organizational activities could also be carried out in a way that will double awareness of PMS among female students and thereby encourage them to seek medical attention when necessary.
3. Subsequent studies could look into the efficacy of dietary modifications and counseling as solutions to symptoms of PMS and endeavor to create approaches to help female students lessen the effects' impact on their daily lives.

AUTHOR CONTRIBUTION

Data collection: Younes K. Attia; writing original draft: Atheer Abd Ahmed; Data analysis: Karam Yaseen Fathi; Conceptualization, supervision, and review of the total article: Abdulrahman Mazin Hashim.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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AVAILABILITY OF DATA AND MATERIALS

The data and materials used in this study are available upon request from the corresponding author. Researchers interested in accessing the data for further analysis or collaboration can contact (Younes.khalaf@uomosul.edu.iq).

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