



Influences of Daily Habits on Pre-menstrual Syndrome among Adolescent Girls in Saudi Arabia: A Cross-sectional Study

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ABSTRACT

Background: Pre-menstrual syndrome is a multi-factorial syndrome that upsets adolescent girls psychologically and physically. **Purpose:** To determine the influence of daily habits on pre-menstrual syndrome among adolescent girls. **Methods:** Six governmental intermediate and four high schools for girls; two intermediate and two secondary schools were used. The participants were female teenage students aged 13-18 years. A quantitative cross-sectional study design was used. A convenient sample including 207 students was recruited. **Results:** The mean age was 16.41 years, and most of the study sample members were single (87%). One-fourth were in preparatory school, and most lived in the family house with their parents. There are statistically significant differences between participants' residence and pre-menstrual syndrome ($t=3.714$, $P=0.000$). Statistically significant differences are found between participants' smoking habits and pre-menstrual syndrome ($t=-2.511$, $P=0.013$). Nonetheless, a statistically significant association was observed between a diet rich in sugar (carbohydrates) and PMS. A statistically positive relationship was found between psychological and physical domains and pre-menstrual syndrome ($r=0.667$ and $P=0.000$). **Conclusion:** The daily nutrition intake reflects statistically significant differences between a diet rich in sugar and PMS. The current study concludes a positive correlation between psychological and physical domains and pre-menstrual syndrome. **Implications for Nursing:** Nurses could play a vital role in identifying adolescents at risk of PMS syndromes and guiding them toward a healthy lifestyle. Nurses should assess physical, psychological and behavioral domains when managing adolescents with PMS. Understanding the impacts of daily activities, including exercise, diet and smoking on PMS symptoms. It is essential to collaborate with dietitians to enhance the effectiveness of nutritional interventions regarding PMS symptoms.

Keywords: Influence, Daily habits, Pre-menstrual syndrome, Adolescent girls.

What does this paper add?

1. It reports significant relationships between heavy physical activity, sugar-rich diets, smoking habits, and the severity of PMS symptoms.
2. It highlights a positive correlation between psychological and physical domains and the severity of PMS among adolescent girls.

Introduction

The pre-menstrual syndrome (PMS) is a cyclic late luteal phase disorder of the menstrual cycle, where a female of childbearing age is influenced by emotional and physical symptoms significantly interfering with her daily activities (Rapkin & Winer, 2009). Although the

etiology of PMS is partially known, symptoms are generally subjective and commonly seen in young to middle-aged women (Kutlu et al., 2017). Pre-menstrual syndrome is a multi-factorial syndrome that upsets adolescent girls psychologically and physically (Hofmeister & Budden, 2016).

Accordingly, symptoms occur repetitively in the second half of the menstrual cycle and often during the first few days of menses (ACOG, 2017). The most significant symptoms are psychological and behavioral changes. However, the emotional symptoms lead to more significant impairments than most physical symptoms, being characterized by tension or anxiety, depressed mood, sensitivity and crying spells, mood swings, irritability or anger, appetite changes, food cravings, trouble falling asleep (insomnia), social withdrawal, poor concentration and changes in libido. Additionally, a steady psychological state is often reflected on the female's appearance (Qasass et al., 2022; Schmalenberger et al., 2017). In addition, instability, a decrease in attention, and dysmnnesia are observed, which resolve with the start of menstruation (Miyaoka et al., 2011). However, frequent physical symptoms most commonly reported are: joint or muscle pain, headache, fatigue, weight gain related to fluid retention, abdominal bloating, breast tenderness, acne flare-ups, constipation, or diarrhea (Pilver et al., 2011).

However, PMS may negatively impact performance, and performing aerobic physical activities once or twice a week for one to six months can significantly affect menstrual disorder symptom reduction (Safarzadeh et al., 2016). Also, PMS is reported as a limitation for female adolescents and young adults when they aspire to achieve developmental goals. PMS may lead to decreased occupational productivity, lower health-related quality of life, increased dependence on specialized healthcare, and interference with interpersonal relationships and daily-life activities (Dennerstein et al., 2010; Goker, 2015). The epidemiology, etiology, and pathophysiology of PMS are not entirely understood. In the literature, some factors can play a role in PMS symptoms. On one hand, it could be connected to such estrogen-progesterone imbalance, a decrease in progesterone level in the luteal phase, prolactin, and renin-angiotensin aldosterone imbalance. On the other hand, other factors include a shortage in some micro-nutrients, such as calcium, magnesium, and vitamins or minerals, as well as

psychosocial and genetic factors (Kutlu et al., 2017). PMS is an output of the interaction between genetic presence, ethnicity and daily activities. Although these symptoms are seen in 80% of women, only 5%-10% are affected in terms of the quality of life and require treatment (Farasati et al., 2015; Sharma et al., 2013).

Background

The literature supports the association between cultural context/ethnicity and PMS as well as other pre-menstrual disorders, with altered cultural contexts having diverse effects on the manifestations and consequences of PMS (Abdelmoty et al., 2015). Cultural and ethnic manifestations of how girls deal with menstruation are reflected in the presence of certain beliefs, depicting menstruation as a hygienic crisis and as a private event resulting in a culture of concealment surrounding menstruation, as reported for Egyptian adolescent girls. Further, manifestations related to cultural and habits are expressed in the different measures used by menstruating girls to alleviate menstrual pain, including using a heating pad, rest, herbal drinks, exercise, and non-contraceptive hormonal medications (Abdel-Malak et al., 2015).

In the Gulf Cooperation Council (GCC) and other Islamic countries, female adults have community and culture-acquired health beliefs, behaviors, and practices concerning puberty and menstruation. Therefore, various dietary and personal lifestyle behaviors and remedial approaches are followed to alleviate menstrual and pre-menstrual symptoms (Rana et al., 2018; Hawkey et al., 2017). These approaches include using vitamins, a healthy diet, analgesics, personal hygiene, increased intake of vegetables and fruits; exercise, and warm showers (Gamal et al., 2015). Therefore, diet is the cornerstone in preventing menstrual disorders, because improper dietary practices can trigger underlying menstrual disorders. Moreover, PMS symptoms may be relieved by avoiding caffeine, sugar, salt, white flour, red meat, dairy, butter, mono-sodium glutamate, fried foods, and processed foods during the two weeks before menstruation. Some researchers have found that shifting the balance of the diet away from fatty foods toward high-fiber plant foods is helpful (Barnard, 2013).

Research studies have revealed a correlation between PMS and the risk of depression (Sahin et al., 2014). In Saudi Arabia, studies have shown a high prevalence of sedentary behavior, physical inactivity,

smoking, and unhealthy dietary habits among adolescents, which has become a significant concern for public health specialists. Moreover, lifestyle modifications, particularly the promotion of dietary and exercise habits and smoking cessation, must be emphasized in health-related initiatives of governmental and non-governmental organizations in Saudi Arabia (Karout, 2015). Saudi studies (Al-Batanony & Al-Nohair, 2014; Ibrahim et al., 2015; Karout, 2015; Shaheen et al., 2016) all focused on college students, and not on adolescents. Hence, there is a need to evaluate the current habits regarding lifestyle among school-age adolescent students and their influence on pre-menstrual syndrome. Therefore, the current study aimed to determine the influence of knowledge and daily habits on PMS among adolescent girls through the following objectives: determining the factors affecting PMS among adolescents and identifying relationships between daily life activities and PMS.

The operational definition of daily habits in this research refers to the questionnaire items, which investigate daily nutritional habits, daily physical activities, and smoking habits among female participants.

Methods

Study Design

A quantitative cross-sectional study design was utilized to conduct the study, conducted in Makkah governorate in western Saudi Arabia, which includes eight educational offices. Bahra educational office was selected randomly to be the study setting, including six intermediate governmental schools and four high schools for girls; two intermediate and two secondary schools, randomly selected for the study.

The potential participant is a female adolescent student affiliated with the randomly selected governmental intermediate and high schools in Jeddah. The inclusion criteria included female students aged 13-18 years, who had a menstrual cycle, were available, and agreed to participate in the study. The study excluded students who did not have a menstrual cycle, those who withdrew, and those with blood disorders, such as anemia or thalassemia.

The study conducted a non-probability, convenient sampling technique to approach the study participants. Therefore, all students who met the inclusion criteria were invited to participate, and those who agreed to participate voluntarily were involved in the study. The

total number of students was 870. Raosoft's calculation estimated the sample size to achieve the power of 90% with a medium effect size of 0.3 and an error probability of 5%. So, the number of sample members was 207. Around 40-41 students were selected randomly from each school, and 13-14 students were selected randomly from each academic grade.

Data Collection Methods, Instruments Used, and Measurement

A self-administered and semi-structured questionnaire used for data collection included demographic characteristics of the study participants, obstetrics and gynecologic profiles, and possible symptoms of PMS. PMS symptoms were measured using the Arabic Pre-menstrual Syndrome Scale (APMSS) developed by Algahtani and Jahrami (2014). The APMSS criteria are based on a four-point Likert-type scale with degrees of severity (none, mild, moderate, and severe). Operational definitions for mild, moderate, and severe PMS were cleared, where mild PMS symptoms do not interfere with the daily routine, moderate PMS symptoms interfere moderately with the daily routine, and severe PMS symptoms impair the daily routine.

The questionnaire contained 23 items in three domains: psychological, physical, and behavioral. Psychological symptoms included depressed mood, hopelessness, guilt, anxiety/worry, effectiveness, lability, increased sensitivity toward others, anger, easily being irritated/agitated, lack of interest, difficult concentration, loss of control, and feeling overwhelmed. Physical symptoms included lethargy/fatigue /decreased energy, increased appetite, cravings for certain foods, hypersomnia, insomnia, breast tenderness, breast engorgement or weight gain, headache, muscle/joint/back pain, and acne. Behavioral symptoms interfere with daily routines, such as relationships, work, and school.

Validity and Reliability

The reliability and validity of the instrument have been established in previous studies (Lee et al., 2011; Saglam et al., 2010). Algahtani and Jahrami (2014) reported in the Saudi study that the A-PMS scale was sensitive enough to produce results similar to published literature. Results indicate that 99% of the sample suffered from PMS symptoms. Psychological and physical symptoms were equally presented with no significant functional impairment. The scale showed

high internal consistency and validity properties as a research tool.

Pilot Study

A pilot study was conducted on ten students from each level to test the questionnaire's feasibility and reliability. The results of the pilot study are not included in the research.

Data Management and Analysis

All statistical tests were conducted using SPSS for windows, version 25.0 (SPSS, Chicago, IL). Continuous data was normally distributed and expressed in mean $\pm$ standard deviation (SD). Categorical data was expressed in frequency and percentage. The comparisons were determined using Student's t-test for two variables with continuous data ANOVA test for more than two variables with continuous data. Pearson correlation analysis was used to assess the inter-relationships among quantitative variables. Statistical significance was set at $p < 0.05$.

Ethical Considerations

The researchers sought approval from the College of Nursing-Jeddah (CON-J) Research Unit and then from the Institutional Review Board (IRB)/CON-JRU-10-005 of King Abdullah Medical Research Center (KAMRC). An official letter from CON-J was sent to the International Directorate of Education in Bahra governorate to gain acceptance; complete information about the research aim, settings, subjects, and instruments was clarified. The researchers contacted the managements of the female schools (intermediate and high schools) only after IRB approval. The principal of each school received a letter of permission from the female directorate of education asking the principal to provide the researchers with access to students to conduct this study. The study participants were approached online after getting permission from the school administration. The parents/legal guardians did

not have access to what the girls answer in the research questionnaire, in order to maintain confidentiality. Once they are recruited and sign the electronic consent form, the researchers sent the E-research survey, giving the necessary information and guidance to fill in the questionnaire.

Results

Table 1 shows the socio-demographic characteristics of the study respondents; the mean age was 16.41 years. However, most of the respondents were single (87%) and about (13%) were married. Regarding the educational level, about one-fourth of them (25.6%) were in preparatory schools, while the rest were in secondary schools (33.3%, 25.6%) respectively. Most of the study respondents (80.2%) were living in the family house and about 20% lived in an apartment. Regarding the nutritional habits among respondents, less than a half (41.5%, 45%) were consuming a diet rich in sugar ranging between 1 and 4 times/day. Only (13.7%) of them consumed 2-4 diets rich in sugar/per month. (36.2%) and (43.5%) were consuming a diet poor in sugar either 1-2 times/day or 3-4 times/day, respectively. In contrast, less than one-fourth (20.3%) of them were consuming 2-4 diets poor in sugar/per month. Regarding milk intake, about one-third (30%) of the respondents were taking milk daily, while 30.9% were consuming milk 1-4 times per week. However, those who consumed milk every day constituted 30.90%. In this respect, about a half of the respondents, (49.8%), were taking whole cream milk, while 35.7% consumed low-fat milk, and the rest (9.2%, 5.3%) were consuming either skinned milk or milk with flavor, respectively. Regarding the intake of dairy products, an equal percentage of participants (3.6%) were taking them either daily or weekly. Regarding the intake of caffeine products, 44.4% of the respondents took only one cup per day, while more than one-third of them (37.2%) took 2 or more cups per day.

Table 1. Socio-demographic data and daily nutritional habit characteristics among respondents (N=207)

Items	No.	%
Age (mean $\pm$ SD)	16.415 $\pm$ 1.421	
Marital status		
• Single	180	87
• Married	27	13
Educational level		
• Preparatory school	53	25.6
• Secondary school	154	74.4

Residence		
• Family house	166	80.2
• Apartment	41	19.8
Diet rich in sugar (carbohydrates)		
• 1-2/ day	86	41.5
• 3-4/day	93	45
• 5-6/month	28	13.5
Diet poor in sugar (carbohydrates)		
• 1-2/ day	75	36.2
• 3-4/day	90	43.5
• 5-6/month	42	20.3
Milk frequency intake		
• Daily	62	30
• 1-4 /week	64	30.9
• 2-4 /month	29	14
• 1/month	35	16.9
• Never	17	8.2
Milk type		
• Full cream	103	49.8
• Low cream	74	35.7
• Skimmed	19	9.2
• Milk with flavor	11	5.3
Dairy products		
• Daily	80	38.6
• Weekly	80	38.6
• Monthly	33	16
• Never	14	6.8
Caffeine intake		
• 1 cup per day	77	37.2
• ≥ 2 cups per day	92	44.4
• Never	38	18.4
Green vegetable intake frequency		
• Daily	55	26.6
• Weekly	87	42
• Monthly	28	13.5
• Less than one time per month	37	17.9
Solid vegetable intake frequency		
• Daily	40	19.4
• Weekly	70	33.8
• Monthly	41	19.8
• Less than one time per month	26	12.5
• Never	30	14.5
Daily vegetable amount intake		
• 1(5 spoons)	67	32.4
• 2(10 spoons)	67	32.4
• 3(15 spoons)	34	16.4
• More than 3	16	7.7
• Never	23	11.1
Daily fruit amount intake		
• One fruit	74	35.7
• Two fruits	54	26.1
• Three fruits	37	17.9
□ +3 fruits	19	9.2
• Never	23	11.1
Herbal type		
• Cinnamon	58	28
• Ginger	53	25.7
• Chamomile	33	15.9
• Mint	52	25.1
• Fenugreek	11	5.3

Diet rich in iron & zinc		
• Yes	148	71.5
• No	59	28.5
Food intake frequency		
• Daily	75	36.2
• Weekly	72	34.8
• Monthly	43	20.8
• Less than monthly	17	8.2
Vitamin intake		
• Yes	110	53.1
• No	97	46.9
Specific food during menstruation		
• Sweets	100	48.3
• Salty food	65	31.4
• Nuts	38	18.4
• Dates	4	1.9

Table 2, concerning physical activities, shows that two-fifths of the respondents (40.6%) were practicing heavy exercises up to twice each week, with more than a half (58.5%) spending 30 minutes on these exercises. A minor percentage (7.2%) practiced light exercises,

while about a half (49/7%) of respondents stayed sitting for between one and two hours. Nearly one-third (33.8%) of the study respondents were smokers, while the rest were not. 22.9% among the smokers smoked only 1-2 cigarettes per day.

Table 2. Daily physical activities/habits among respondents

	No.	%
Physical activities		
Heavy activities' frequency		
• 1-2 days per week	84	40.6
Heavy activities' duration		
• 1 hr per day	51	24.6
• 30 min per day	33	58.5
Medium activities' frequency		
• 1-2 days per week	78	37.7
Medium activities' duration		
• 1 hr per day	40	51.3
• 30 min per day	38	48.7
Light activities' frequency		
• 1-2 days per week	15	7.2
• No physical activities	30	14.5
Light activities' duration		
• 1 hr per day	10	66.7
• 30 min per day	5	33.3
Sitting position duration		
• 1-2 hr/day	103	49.7
• 30 min/day	62	30
• Do not know	42	20.3
Items of daily habits of smoking among respondents (N=70)	No.	%
Smoking		
• Yes	70	33.8
• No	137	66.2

Cigarette smoking amount		
• 1-2 cigarettes/day	16	22.9
• 20 cigarette/per week	21	30
• 1 packet/ month	18	25.7
• 2-5 cigarettes/week	11	15.7
• 5-20 cigarettes/ month	4	5.7

Regarding psychological domain symptoms, presented in Table 3, around (48.8%) of the respondents never had a depressive mood during this period, while about one-fourth (24.6%) of them had, and those with severe depressive mood constituted (17.9%) of the participants. (44.9%) feel hopeless, while a nearly equal percentage (17.4 % and 16.4%) either feel moderate or severe hopelessness, respectively. About one-third (33.3%) had moderate anxiety, while (28%) had severe anxiety. More than one-third (38.6%) had severe mood swings, while (28.6%) had moderate mood swings. Concerning increased sensitivity or being more sensitive, 36.2% were more sensitive, while nearly one-fourth of them (25.6% and 24.2%) were moderately or mildly sensitive, respectively. Concerning feeling angry, (31.4%) of them feel severely angry, while (27.1%) and (24.6%) feel either moderate or mild anger, respectively. Regarding being quickly tempered (fighting), one-third (37.1%) reported being severely tempered, while (23.7%) were either moderately or mildly or tempered. About one-third (34.2% and 30%) had either severe or moderate lack of interest. Regarding difficult concentration, the results revealed that (30%) of the respondents had mild difficulty, while about one-fourth (28.6%) and (24.6%) had either severe or moderate difficulty in concentration, respectively. The physical domain symptoms showed that (33.8%) of the

study respondents suffered from severe lethargy and fatigue while (28%) and (20.8%) suffered from either moderate or mild lethargy, respectively; however, (17.4%) did not suffer from any lethargy. (30%) and (31.9%) of the respondents had severe or moderate increases in their appetite, respectively, while more than one-fourth of the respondents (25.6%) had a mild increase in their appetite. Concerning cravings for a particular food, either sweet or salt, the results revealed that slightly more than one-third of the participants (33.8%) had severe cravings for a particular food, while (25.1%) and (27.5%) had either moderate or mild cravings for a particular food; however, (13.5%) did not have any cravings for a particular food. Concerning sleeping problems, about (32.3%) of the participants suffer from severe hypersomnia compared to (25.6%) suffering from severe insomnia, respectively. Concerning losing control over emotion, nearly one-third (32.4%) of the participants had a moderate loss of control, while (17.8%) did not feel any. 29% and 26.6% had severe breast tenderness or breast engorgement, respectively. 23.7%, 33.8%, and 28% had either severe, moderate, or mild headaches, while 14.5% had no headaches. In addition, about 22.7%, 30.4%, and 30% of the respondents had either severe, moderate, or mild muscle, joint, or back pain, respectively.

Table 3. Psychological and physical domain symptoms of the study sample (N=207)

Symptoms	Never		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
Depressed mood (SAD)	101	48.8	18	8.7	51	24.6	37	17.9
Hopelessness (HOPE)	44	21.3	93	44.9	36	17.4	34	16.4
Guilty feeling (GUILT)	46	22.2	64	30.9	55	26.6	42	20.3
Anxiety/ worry (STRESS)	30	14.5	50	24.2	69	33.3	58	28
Affective lability (MOOD SWINGS)	29	14	39	18.8	59	28.6	80	38.6

Increased sensitivity (SENSITIVITY)	29	14	50	24.2	53	25.6	75	36.2
Feeling angry (ANGER)	35	16.9	51	24.6	56	27.1	65	31.4
Easily tempered (FIGHTING)	32	15.5	49	23.7	49	23.7	77	37.1
Lack of interest (HOBY)	30	14.5	44	21.3	62	30	71	34.2
Difficulty in concentrating (LOW CONCENTRATION)	35	16.9	62	30	51	24.6	59	28.6
Physical domain symptoms of the study respondents(N=207)								
Lethargy/ fatigue/ decreased energy (TIREDNESS)	36	17.4	43	20.8	58	28	70	33.8
Increased appetite (HIGH APPETITE)	26	12.5	53	25.6	66	31.9	62	30
Craving for a certain food (SWEET.SALT)	28	13.5	57	27.5	52	25.1	70	33.8
Hypersomnia (SLEEP)	37	17.9	43	20.8	60	29	67	32.3
Insomnia (NO SLEEPING)	34	16.4	48	23.2	72	34.8	53	25.6
Loss of control (EMOTIONAL)	30	14.5	53	25.6	67	32.4	57	27.5
Feeling overwhelmed (ENDURANCE)	37	17.8	53	25.6	55	26.6	62	30
Breast tenderness (BREAST PAIN)	44	21.3	57	27.5	46	22.2	60	29
Breast engorgement or weight gain (HEAVY BREAST)	46	22.2	47	22.7	59	28.5	55	26.6
Headache (HEADACHE)	30	14.5	58	28	70	33.8	49	23.7

Tables 4.1 and 4.2 show the participants' demographic data and their pre-menstrual syndrome. There are statistically significant differences between respondents' residence and their pre-menstrual syndrome ($t=3.714$, $P= 0.000$). There are statistically significant differences between smoking and PMS ($t=-2.511$, $P=0.013$). Regarding cigarette consumption and PMS, there are no statistically significant differences. There are statistically significant differences between

heavy activities' frequency and no physical activity at ($t=-1.755$, $P= 0.041$). There are no statistically significant differences regarding diet poor in sugar (carbohydrates), milk type and frequency, caffeine intake, green vegetable and fruit intake, herbal type, vitamin intake, and specific food during menstruation. However, the only statistical significance was shown between diet rich in sugar (carbohydrates) and PMS at ($p=0.043$).

Table 4.1. Mean differences between PMS participants' demographic data and activities' data

Items	PMS Mean (SD)	Significance
Marital status		
• Single	56.722 (16.890)	$t=0.385$ $p=0.700$
• Married	55.370 (17.681)	
Educational level		
• First	53.679 (2.250)	$F=1.050$ $p=0.352$
• Second	57.187 (2.081)	
• Third	14.220 (1.711)	
Residence		
• Family house	58.656 (16.093)	$t=3.714$ $p=0.000^{**}$
• Others	48.000 (17.864)	

Smoking		
• Yes	52.423 (15.423)	t=-2.511
• No	58.635 (17.374)	p=0.013*
Cigarette smoking amount(N=70)		
• 1-2 Cigarettes		
• Packet	56.437 (14.60)	F=0.938
• 1/ day	50.142 (15.550)	p=0.448
• 2-5 per week	49.888 (18.313)	
• 5-20 per month	51.636 (9.091)	
	62.500 (17.597)	
Heavy activities' frequency		
• 1-2 days per week	54.845 (16.405)	t= -1.755
• No physical activities	59.035 (17.535)	p=0.041*
Heavy activities' duration		
• 1 hr per day	18.182 (2.546)	F=1.945 p=0.146
• 30 min per day	18.299 (2.072)	
• Do not know	14.329 (1.622)	
Medium activities' frequency		
• 1-2 days per week	55.938 (16.481)	t=-0.662
• No physical activities	57.551 (17.778)	p=0.508
Medium activities' duration		
• 1 hr per day	13.307 (1.590)	F=1.972 p=0.142
• 30 min per day	19.133 (2.286)	
• Do not know	17.681 (2.160)	
Light activities' duration		
• 1 hr per day	17.110 (1.575)	F=0.945 p=0.332
• 30 min per day	16.756(1.776)	
• Don't know	16.957 (1.178)	
Sitting position duration		
• 1-2 hr/day	13.772 (1.357)	F=0.933 p=0.395
• 30 min/day	19.569 (2.485)	
• Don't know	19.748 (3.047)	

Table 4.2. Mean differences between PMS and daily nutritional data

item		Mean (SD)	Significance
Diet rich in sugar (carbohydrates)	• 1-2/ day	15.532 (1.674)	F=2.399
	• 2-4/day	16.512 (1.712)	p=0.043*
	• 2-4/month	21.328 (4.030)	
Diet poor in sugar (carbohydrates)	• 1-2/ day	58.133 (15.737)	F=0.516
	• 2-4/day	55.722 (17.830)	p=0.598
	• 2-4/month	55.476 (17.330)	
Milk frequency	• Daily	57.596 (14.646)	F=0.495
	• 1-4 /week	54.953 (16.723)	p=0.740
	• 2-4 /month	54.310 (20.511)	
	• 1/month	58.457 (18.277)	
	• Never	58.588 (17.353)	
Milk type	• Full cream	58.135 (12.909)	
	• Low cream	55.973 (20.720)	F=0.917
	• Skimmed	51.947 (19.718)	p=0.434
	• Milk with flavor	53.454 (17.620)	

Dairy products	• Daily • Weekly • Monthly • Never	58.887 (14.522) 54.412(19.094) 54.545 (16.992) 60.071 (16.221)	F=1.291 p=0.279
Caffeine intake	• ≥ 2 per day • 1 per day • Never	58.142 (15.360) 53.769 (18.519) 60.052 (15.348)	F=2.428 p=0.091
Green vegetable frequency	• Daily • Weekly • Monthly • Less than one time per month	56.090 (17.059) 56.229 (17.471) 59.642 (14.499) 55.621 (17.695)	F=0.368 p= 0.776
Solid vegetable frequency	• Daily • Weekly • Monthly • Less than one time per month • Never	56.625 (14.564) 55.985 (16.558) 58.463 (18.880) 50.730 (17.432) 60.166 (17.362)	F=1.263 p=0.286
Daily vegetable volume intake	• 1(5 spoons) • 2(10 spoons) • 3(15 spoons) • More than 3 • Never	57.776 (15.112) 56.000 (17.126) 54.735 (21.045) 52.500 (16.227) 60.043 (15.755)	F=0.670 p=0.613
Daily fruit volume intake	• One fruit • Two fruits • Three fruits • +3 fruits • Never	55.067 (15.276) 56.018 (17.542) 56.675 (20.163) 59.210 (11.707) 60.130 (19.278)	F=0.524 p=0.719
Herbal type	• Cinnamon • Ginger • Chamomile • Mint • Fenugreek	54.655 (15.817) 54.584 (18.470) 58.090 (18.807) 58.980 (16.664) 59.818 (16.664)	F=0.793 p=0.531
Diet rich in iron & zinc	• Yes • No	57.682 (15.554) 53.694 (19.912)	t=1.532 p=0.127
Food intake frequency	• Daily • Weekly • Monthly • Less than monthly	56.466 (16.203) 58.194 (16.049) 54.255 (18.323) 55.705 (20.888)	F=0.499 p=0.683
Vitamin intake	• Yes • No	56.418 (16.971) 56.690 (17.027)	t=-0.115 p=0.908
Specific food during menstruation	• Sweets • Salty food • Nuts • Dates	55.480 (15.470) 56.553 (18.747) 57.526 (17.646) 73.750 (8.015)	F=1.559 p= 0.201

Discussion

The psychological domain symptoms of PMS reported were anxiety and worry, which were reported as

moderate symptoms among about one third of the participants, while mood swings were reported as a severe symptom by about two-fifths of the respondents. Lack of

interest was reported by almost one-third or more as a moderate problem. Feeling angry was reported by around one-third as a severe problem among respondents. These results are similar to those of Salem et al. (2020), who reported that common affective symptoms among respondents were angry bursts as reported by 34.3%, followed by headache, whereas the results of the present study revealed that the most common reported symptoms were: headache, depression, irritability, and anxiety.

The study by Kroll-Desrosiers et al. (2017) showed similar results to those of the current study and reported that emotional hypersensitivity, irritability, and mood changes were the common affective problems indicated, respectively. The present study revealed higher percentages of suffering from moderate or severe hypersensitivity, respectively, and stress and mood changes were reported by about one-third of the sample. These differences may be attributed to differences in age groups of the respondents in both studies.

Buddhabunyakan et al. (2017) disagreed with the current study, as their findings highlighted angry outbursts as significant affective symptoms reported by the vast majority, followed by anxiety and irritability as reported by three-quarters and two-thirds, respectively, while in the current study, anxiety was reported by the lowest percentage. Irritability and anger issues were reported by nearly one-third of the participant. Although the two studies were conducted among the same age group, these differences could be explained by the cultural differences, since the other study was conducted in Thailand.

The results of the present study revealed that the most reported physical complaints as severe manifestations were tiredness, craving for a particular food, hypersomnia, insomnia, and breast tenderness which was reported by more than one-third, followed by headache and joint pain. These results disagree with the study conducted by Buddhabunyakan et al. (2017), who reported that breast tenderness, abdominal floating, and craving for sweets were the most common problems. This difference may be related to the different scales used in both studies. Similarly, a study conducted by Salem et al. (2020) reported that breast tenderness and swelling were mentioned by 33.3% of the respondents, followed by muscle and joint pain, while a lower percentage reported the same problems in the current study.

In a study conducted by Kroll-Desrosiers et al. (2017), food craving and appetite changes were reported

by one-fifth of the respondents, which differs from the current study results with a higher reported percentage, which may be related to the different age groups of the participants in both studies. The behavioral domain during PMS revealed that the most common problems were alteration of lifestyle, and school performance, followed by alteration of the relations with others. These results came in line with Rizk et al. (2004), who reported that PMS had a moderately significant impact on the quality of life, particularly school performance, social interaction, and lifestyle, as well as Shrestha & Giri (2020), who revealed that more than a half of the respondents reported that PMS interfered with their work efficiency and productivity.

Buddhabunyakan et al. (2017) found that PMS was associated with various problems related to educational activities, such as concentration, motivation, and work performance. Regarding PMS and demographic data, the present study revealed no significant relationship between participants' demographic data, which was also found by Rad et al. (2018). In contrast, the current study revealed a statistically significant relationship between PMS and place of residence. The mean of PMS was higher among those living in the family home. This could be explained by the fact that those who lived in the family home may share family experiences and receive more information about PMS that could help them recognize PMS and its symptoms.

This assumption is supported by Shrestha & Giri (2020), who revealed a significant association between PMS and family history. Rizk et al. (2004) reported a significant association between PMS and having sisters, while the current study revealed statistically significant differences between smoking habit and PMS, whereas no significant differences were found between smoking consumption and PMS. These results are in line with Fernandez et al. (2019), who reported that PMS was higher among smokers compared with non-smokers, but also reported that smoking consumption was likely higher to develop PMS. Another study (Choi & Hamidovic, 2020) reported that smoking among adolescents and young adults is independently associated with high risk to develop PMS, leading to worsening PMS symptoms.

The current study revealed mean differences between PMS and daily activities' data. There are statistically significant differences between heavy activities' frequency and no physical activity. At the same time, there are no statistically significant

differences between heavy, medium, and light activities and sitting position duration and PMS. These results are similar to those of a study by Priyanka (2018). which reported that respondents who were doing less physical activities per week had a higher percentage of PMS than others. Safarzadeh et al. (2016) agree with the current study results, reporting a significant relationship between exercise and PMS, since the highest percentage of individuals with moderate and severe PMS belongs to those who practice exercise less than twice per week. Moreover, Morino et al. (2016) reported that PMS rate was higher among women who had either low or high daily physical activity levels than others; however, Kroll-Desrosiers et al. (2017) disagree with the current study results, since they reported no association between physical activities and the total score of PMS.

Concerning the difference between the participants' daily nutrition intake and pre-menstrual syndrome, there are no statistically significant differences regarding poor-sugar diet (carbohydrates), milk type and frequency, caffeine intake, green vegetable and fruit intake, herbal type, vitamin intake, and specific food during menstruation. However, the only statistical significance is shown between high-sugar diet (carbohydrates) and PMS. These results disagree with Ersheed et al. (2020), who reported that there is a link between PMS women following a western diet containing high fat and low fiber, since low-fat diet

decreases plasma estrogen level and decreases the duration of PMS. In addition, Moradi Fili et al. (2017) reported that individuals in the highest percentile of the western dietary pattern were more likely to experience PMS, while both traditional and healthy dietary patterns were inversely associated with PMS.

However, Hashim et al. (2019) partially aligned with the current study results; they reported that high caloric, sugar, salt, and fat diets were associated with an increased risk of reporting physical symptoms of PMS. Rad et al. (2018) reported a significant relationship between PMS and sweet drinks, fried food, fast food, and fruits. Based on the results of different studies, it is recommended to change dietary habits toward consuming more complex carbohydrates and vegetables, less simple carbohydrates, animal protein, saturates, fatty acids, as well as increased fiber intake, as reported by Ersheed et al. (2020).

The current study revealed a positive correlation between the psychological and physical domains and pre-menstrual syndrome ($r = 0.667$ and $P = 0.000$); these results are in line with Firoozi et al. (2021), who reported that the PMS group was significantly higher than the healthy group; however, increased severity of PMS symptoms was accompanied with increased anxiety and depression symptoms. In addition, Abu Alwafa et al. (2021) came in line with the present study results, since all the PMS symptoms were significantly associated with psychiatric symptoms.

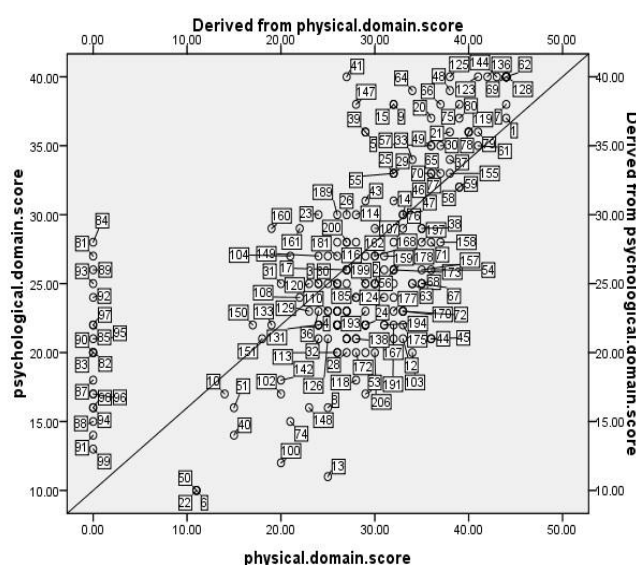


Figure 1

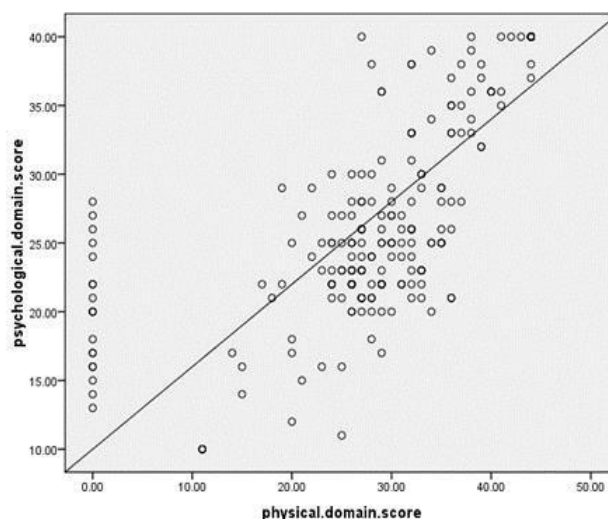


Figure 2

Figures 1 and 2. Correlations between psychological and physical domains and pre-menstrual syndrome

Implications for Nursing

Nurses should apply a holistic assessment to assess the physical, psychological, and behavioral domains when managing adolescents with pre-menstrual syndrome (PMS).

Understanding the impact of daily activities, including exercise, diet, and smoking habits, can help identify potential triggers for PMS symptoms.

Collaboration with dietitians can enhance the effectiveness of nutritional interventions of PMS symptoms, emphasizing the need for dietary counseling.

Nurses should educate adolescents on the impact of smoking on PMS and provide resources for quitting, including support groups and smoking cessation tools.

Nurses can play a key role in identifying adolescents at risk for PMS and guiding them toward healthy lifestyle choices that may prevent or reduce symptom severity.

Conclusion

This study identified common factors affecting pre-menstrual syndrome (PMS) among adolescents and

examined the relationship between their daily activities and PMS. The findings revealed statistically significant differences in PMS symptoms between those engaging in heavy physical activity and those with no physical activity. Anxiety and worry were the most prevalent psychological symptoms. Additionally, a significant association was found between PMS and both high sugar intake and smoking habits. The study concludes a positive correlation between psychological and physical factors and PMS.

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Conflict of Interests

No conflict of interests is to be declared by the authors.

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