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Relationship between Premenstrual Syndrome and Eating Disorders in Adolescent Girls: A Cross-Sectional Study

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Eating disorders are a serious health problem. Premenstrual syndrome includes psychological and physiological symptoms that may contribute to the occurrence of eating disorders. The present study was conducted to investigate the relationship between premenstrual syndrome and eating disorders. Methodologically, this study was descriptive-correlational. The statistical population comprised all female students aged 14 to 18 years in public high schools in Chabahar city, of whom 210 were selected as the research sample using multi-stage cluster sampling. The data collection period was the first quarter of 2025. The Delara et al. (2012) Premenstrual Syndrome Questionnaire and the Garner and Garfinkel (1989) Eating Disorders Questionnaire were used to collect data. Pearson correlation test and stepwise regression test were used to analyze the data. The findings of the study showed that there was a positive and significant relationship between both psycho-behavioral and physical symptoms of premenstrual syndrome and eating disorders (eating habits, bulimia nervosa, and oral control) in students. Psycho-behavioral symptoms of premenstrual syndrome

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had a greater contribution to explaining eating disorders. The findings of this study showed that women with PMS, independent of comorbid mental illnesses, have a higher chance of developing eating disorders. A deeper understanding of the relationship between premenstrual syndrome and eating disorders can lead to the provision of targeted treatment strategies.

Keywords: Premenstrual syndrome, eating disorders, adolescent girls.

Eating disorders are serious mental health conditions with a lifetime prevalence of approximately 1.13% (Udo & Grilo, 2018; Finch et al., 2023). These disorders can affect individuals of all ages and genders, but are most commonly seen during adolescence and young adulthood (Horovitz, 2025). The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) defines the term "feeding and eating disorders" as "persistent disturbances in eating or eating-related behaviors that result in alterations in the intake or absorption of food and significantly impair physical health or psychosocial functioning" (Castellini et al., 2022). The most common eating disorders in adolescents include anorexia nervosa, bulimia nervosa, binge eating disorder, and avoidant/restrictive eating disorder (Pastore et al., 2023). Although the etiology of eating disorders is not fully understood, research has shown that premenstrual syndrome (PMS) is a condition associated with eating disorders that may influence their onset, severity, and duration (Nobles et al., 2016). PMS is a cyclical pattern of physical and psychological symptoms that appear in the luteal phase of menstruation after ovulation and resolve shortly after the onset of menstrual symptoms. A severe form of PMS is called premenstrual dysphoric disorder (PMDD) (Cobanoglu et al., 2021). The most commonly reported physical and psychological symptoms include fatigue, irritability, mood

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swings, depression, bloating, breast tenderness, acne, changes in appetite, and food cravings (Itriyeva, 2022).

According to the American College of Obstetricians and Gynecologists, the diagnostic criteria for PMS require the complaint of at least one physical and emotional symptom during the 5 days before menstruation in each of the previous three menstrual cycles. The symptoms must cause appreciable impairment in economic or social functioning (Badrasawi et al., 2021). The prevalence of PMS symptoms has been estimated to be remarkably high, with approximately 32% of adolescent girls experiencing moderate symptoms and approximately 50% experiencing severe symptoms (Minaei-Moghadam et al., 2024). Another study found that the prevalence of PMS in high school girls was 53.5% (Boustani et al., 2019). The etiology of PMS is unclear, multifactorial, and complex, and has not yet been fully elucidated, and may include: neurotransmitter function, particularly serotonin and GABA, cyclical hormonal fluctuations of estrogen and progesterone, early menstruation, stress, and the presence of serious mood disorders (Sanchez et al., 2023), and medication use, smoking, alcohol, and caffeine consumption (Modzelewski et al., 2024).

Several studies have been conducted on the association between PMS and eating disorders. A national epidemiological study found that women with PMS, independent of comorbid psychiatric disorders, were more likely to develop eating disorders (Çoban et al., 2021). Eating disorders were reported to be significantly associated with physical and psychological symptoms of PMS (such as abdominal pain, anger/irritability, appetite changes, depressed mood, and fatigue), and most of these symptoms were associated with binge eating (Badrasawi et al.,

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2021; Hardin et al., 2020). It has also been identified that potential triggers for eating disorders include physiological changes associated with PMS/PMDD, such as bloating and body weight changes (which can be perceived as "fat" by those with eating disorders) and increased appetite and cravings (which can directly lead to binge eating) (Ryan et al., 2021). Research has shown that women who experience joint and muscle pain and negative emotions related to hormonal changes during the premenstrual period are more likely to experience eating disorder symptoms. In fact, eating disorder symptoms fluctuate\predictably throughout the menstrual cycle and show a particular relationship to ovarian hormones (e.g., estrogens) (Finch et al., 2023). The eating disorders bulimia nervosa and binge eating disorder are specifically associated with premenstrual dysphoric disorder, with women with this disorder being seven times more likely to have bulimia nervosa and twice as likely to have binge eating disorder at the same time (Nobles et al., 2016).

Despite the significant association observed between various aspects of menstrual cycle changes and symptoms of eating disorders, the specific symptoms underlying this association are not clear (Finch et al., 2023), and few studies, especially domestically, have examined the potential role of PMS in the onset, severity, and duration of eating disorders. Eating disorders have the highest mortality rate of all psychiatric illnesses and carry a significant personal, interpersonal, social, and economic burden (Hambleton et al., 2022), therefore, identifying comorbid mental illnesses is essential due to their potential impact on the severity of eating disorder symptoms, individual distress, and treatment effectiveness. In light of the above, the main aim of this study was to investigate the association of PMS with eating

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disorders in adolescent girls. The basic question that the present study seeks to answer is:

- Is there a significant relationship between PMS and eating disorders, and which dimension of PMS is a stronger predictor of eating disorders?

Method

The present study is a descriptive correlational study conducted in 2025. The statistical population of this study included all female students aged 14 to 18 in public high schools in Chabahar city, of which 210 were selected as the research sample using a multistage cluster sampling method. First, based on the list of all public schools in the city, three high schools and one art school were selected. Then, one class from each grade (10th, 11th, and 12th) was randomly selected at each school, resulting in a total of 12 classes. Given that in the studies of Guilford (1954) and Klein (2016), the absolute minimum sample size in correlational studies is 200 people (Kyriazos, 2018), in the present study, considering the possibility of sample attrition, 210 people were selected as the research sample. Also, the study's objectives were explained to the students, and they were assured that their information would remain confidential.

Instruments

Data collection was done through the following questionnaires:

Premenstrual Syndrome Scale

Delara et al. (2012) presented the Premenstrual Syndrome Scale. This scale has 32 questions and its aim is to assess the symptoms of PMS from different dimensions (psycho-behavioral and physical symptoms). This questionnaire has two factors

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(dimensions): Psycho-behavioral symptoms (questions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 22, 23, 24). Physical symptoms: questions 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 30, 31, 32. Its scoring method uses a four-point Likert scale: no symptoms (0), mild (1), moderate (2), and severe (3). On this scale, scores between 0 and 32 indicate mild PMS symptoms, 33 to 64 (moderate), and 65 to 96 (severe). In the study by Delara et al. (2012) the content validity ratio and index values were .78 and .90, respectively. Also, Cronbach's alpha was used to assess reliability, with values of .91 and .79 reported for the first and second factors, respectively. In the present study, Cronbach's alpha coefficients for internal consistency of the psycho-behavioral and physical symptom subscales were reported as .90 and .76, respectively.

Eating Disorders Questionnaire

In the present study, the Eating Attitudes Test (EAT -26), developed by Garner & Garfinkel in 1989, was used to assess eating disorders. This questionnaire is widely used as a self-report screening tool for eating disordered attitudes and behaviors and has been proven to be effective in identifying anorexia nervosa and bulimia nervosa (Mohammadzadeh et al., 2013). The original form of the Eating Attitudes Questionnaire consists of 40 items, which were reduced to 26 questions after Garner et al. (1989) removed 14 unnecessary items. The Eating Attitudes Questionnaire has three subscales: eating habits (questions 1, 6, 7, 10, 11, 12, 14, 16, 17, 22, 23, 24, 26), bulimia nervosa (questions 3, 4, 9, 18, 21, 25), and oral control (questions 2, 5, 8, 13, 15, 19, 20). The questionnaire is scored as follows: 1-25 = 3, mostly = 2, often = 1, sometimes = 0, rarely = 0, never = 0, and item 26 is scored in reverse order. The lowest score an individual

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can receive is 0, and the highest is 78. Scores of 0 to 20 indicate no problem, 20 to 36 indicate the need for examination and treatment, and 36 to 78 indicate severe weight and body disorder. Garner et al. (1989) reported the reliability coefficient of this questionnaire as 0.94 by internal consistency and .84 by test-retest (Aghagedi & Etemadi, 2015). The questionnaire's validity was reported as .76 by Cronbach's alpha, and its reliability was reported as .80 by a a correlation test (Pourghassem Gargari et al., 2010). In the present study, Cronbach's alpha coefficients for internal consistency of the eating habits, bulimia nervosa, and oral control subscales were .73, .75, and .72, respectively.

Data were analyzed using SPSS-26 software. Descriptive statistics, including frequency percentages and means, were used to describe the data. Pearson correlation test and multivariate regression were used to examine the relationship between premenstrual syndrome (PMS) and eating disorders.

Results

The students participating in the present study were 210, with a mean age of 17.01±1.05 years. Table 1 shows the demographic characteristics of the selected sample.

Table 1
Demographic Characteristics of the Selected Sample

Demographic characteristics		percentage
Level of Education	Tenth	36.7
	Eleventh	19.0
	Twelfth	44.3
Marital status	Single	86.7
	Married	13.3

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The frequency of PMS symptoms and eating disorders is reported in Table 2. 21% of the students had mild PMS symptoms, 62.9% had moderate symptoms, and 16.2% had severe symptoms. Also, 66.7% of the students reported no problems with eating disorders, 28.1% had moderate eating disorders (needing investigation and treatment), and 5.2% had severe disorders.

Table 2

Severity Grading of Premenstrual Syndrome Symptoms and Eating Disorders

	Symptom levels	percentage
Premenstrual Syndrome	mild	21.0
	moderate	62.9
	severe	16.2
Eating Disorders	No problem	66.7
	Need for examination and treatment	28.1
	Severe disorder	5.2

In Table 3, the mean total score of students in PMS was 47.96±18.04. The mean scores in the psycho-behavioral domain were 30.27±12.27, and in the physical domain of PMS were 17.69±7.04. The mean total score of eating disorders was 17.13±11.30. The mean scores in eating habits were 9.25±6.94, bulimia nervosa 2.80±3.71, and oral control 5.07±4.65. The highest score in the dimensions of PMS was related to the psycho-behavioral dimension, and in eating disorders was related to the eating habits dimension. According to Table 3, there was a positive and significant correlation between PMS and eating disorders ($r=.37$, $p<.01$). There was also a positive and significant correlation between psycho-behavioral symptoms of PMS and eating habits ($r=.19$, $p<.01$); bulimia nervosa ($r=.28$, $p<.01$), and

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oral control (r=.38, p<.01). There was a positive and significant correlation between physical symptoms of PMS and eating habits (r=.13, p<.05); bulimia nervosa (r=.26, p<.01) and oral control (r=.31, p<.01).

Table 3
Descriptive Statistics and Correlation Coefficients Regarding Variables

Variables	Mean	SD	1	2	3	4	5	6	7
Psycho-behavioral symptoms	30.27	12.27	1			.19**	.28**	.38**	.37**
Physical symptoms	17.69	7.04		1		.13*	.26**	.31**	.30**
Premenstrual Syndrome	47.96	18.04			1	.18**	.29**	.38**	.37**
Eating Habits	9.25	6.94				1			
Bulimia nervosa	2.80	3.71					1		
Oral Control	5.07	4.65						1	
Eating Disorders	17.13	11.30							1

** Correlation is significant (p<.01)
* Correlation is significant (p<.05)

The results of the stepwise multiple regression analysis performed to determine the relationship between PMS and eating disorders are presented in Table 4. Skewness and kurtosis indices were used to examine the normality of the variables, which reported desirable values. Tolerance and VIF values were reported to examine collinearity among the independent variables; values were deemed acceptable (Tolerance = 1 and VIF = 1). Also, the Durbin-Watson statistic for examining collinearity in the errors was 1.96, which was acceptable. Therefore, regression can be used.

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Table 4

Stepwise Regression Model Coefficients to Predict Eating Disorders

Model	R	R^2	F	B	SE	β	t	p
Psycho-behavioral symptoms	.37	.13	33.188 *	.342	.059	.371	5.761	.000

Dependent variable Eating Disorders Syndrome, * p<.01

According to Table 4, stepwise regression was used to predict the total score of eating disorders based on the PMS dimensions, and the results showed that the mental-behavioral symptoms dimension explained 13% of the variance in eating disorders. The dimension of physical symptoms did not meet the entry criteria for the regression equation and was removed. Mental-behavioral symptoms with a value of (Beta = .371 and Sig = .000) had the highest contribution to predicting the total score of eating disorders and were a positive predictor for it.

Discussion

The present study aimed to investigate the relationship between PMS and eating disorders in female students aged 14 to 18 years in Chabahar city. Few studies in the country have shown the relationship between PMS and eating disorders, and most have focused on the role of nutrition in the occurrence of PMS (Mighani et al., 2025; Azadi et al., 2024). According to the results, there was a positive and significant relationship between both psycho-behavioral and physical symptoms of PMS and eating disorders (eating habits, bulimia nervosa, and oral control) in students. The relationship between psycho-behavioral symptoms of PMS and eating disorders was significantly stronger

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and contributed more to the explanation of eating disorders. This finding indicates that as the levels of premenstrual syndrome symptoms increase, especially psycho-behavioral symptoms in adolescent girls, the severity of eating disorders also increases, and vice versa. Overall, the findings of the present study are consistent with previous research showing that PMS is associated with eating disorders such as bulimia nervosa and binge eating disorder (Nobles et al., 2016; Çoban et al., 2021; Badrasawi et al., 2021; Hardin et al., 2020; Ryan et al., 2021; Finch et al., 2023). Studies generally show that eating disorders are significantly more common as the severity of PMS symptoms increases. The study by Çoban et al. found that scores on dieting, binge eating, emotional eating, and uncontrolled eating were significantly higher in PMDD and moderate-to-severe PMS than in mild PMS (Çoban et al., 2021). It has been reported that consumption of high-calorie foods, sweets, and fried and salty snacks was higher in women with severe PMS (Thakur et al., 2022). The relationship between excessive food intake, i.e., binge eating or avoidance behaviors, in PMS has not yet been determined (Dahlgren & Qvigstad, 2018). However, there is a relationship between eating disorders during the luteal phase and estrogens and progesterone. It has been reported that during the menstrual cycle, women who experience moderate to severe menstrual symptoms may be more sensitive to natural fluctuations in estrogen and progesterone and may exhibit increased appetite or food cravings (Ko et al., 2015).

Changes in eating behavior as a bridging symptom between eating disorders and PMS are generally expected, since both eating disorders and PMS share this feature (Finch et al., 2023). Research consistently shows that post-ovulatory changes in ovarian hormones are associated with eating disorders

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(Badrasawi et al., 2021), and fluctuations in sex hormones explain the increase in undesirable eating behaviors, particularly the frequency of binge eating during the luteal phase (Dahlgren & Qvigstad, 2018). As studies suggest, women with PMS and PMDD may be at increased risk for binge eating because they experience more negative affect before menstruation and have a greater appetite for high-calorie foods, which in turn leads to binge eating and emotional eating (Ko et al., 2015; Klump et al., 2013). On the other hand, some women may be particularly vulnerable to the influence of ovarian hormones, and changes in ovarian hormones may increase the risk of binge eating and negative affect, thereby increasing the risk of both disorders simultaneously (Nobles et al., 2016). Furthermore, McNeil & Doucet (2012) found that energy intake from food is relatively constant during the follicular and ovulatory phases, but tends to increase during the luteal phase, when plasma progesterone levels are elevated (Quaglia et al., 2023). It has also been reported that in women with PMS, the consumption of simple carbohydrates is increased during the premenstrual period due to increased ovarian hormone secretion and the greater functional impact of premenstrual symptoms (Strahler et al., 2020).

Simple carbohydrate consumption may serve as a counter-regulatory mechanism to reduce depressed mood during menstruation, as it increases the release of serotonin and dopamine in the brain (Thakur et al., 2022). Carbohydrates increase the availability of tryptophan, a precursor of serotonin. A sharp drop in blood glucose levels may be the cause of the irritability associated with carbohydrate consumption. Therefore, changes in blood glucose levels could shape the relationship between carbohydrate consumption and menstrual-induced mood

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swings (Oboza et al., 2024). In line with this, Wurtman et al. observed that total food intake increased in women with PMS during the luteal phase and that PMS symptoms were reduced after a high-carbohydrate, low-protein meal in the late luteal phase. Depression, anger, tension, fatigue, confusion, and sadness were significantly improved after eating (Wurtman et al., 1989).

Overall, the results of this study indicated that negative emotions and physical discomfort resulting from hormonal changes in PMS may act as a pathway between eating disorders and PMS and facilitate comorbidity. Since this study is among the few that examine the relationship between PMS and eating disorders in the country, it makes a significant contribution to the literature. However, the present study also faced some limitations. First, because this was a cross-sectional study, we can point to an association between PMS and eating disorders, not a causal relationship. Second, the statistical population of this study was students aged 14 to 18 in Chabahar city, which creates a major limitation for generalization to other populations. Despite the limited sample size, the insights gained from this study provide valuable information about the relationship between premenstrual symptoms and eating disorders. These results can serve as a basis for more comprehensive and in-depth research in the future. The association found between PMS and eating disorders in this study suggests that assessing the presence and potential exacerbation of eating disorder symptoms by PMS symptoms may be important in clinical practice. Future research using a longitudinal design and larger population could help to elucidate better the impact of PMS symptoms on the onset and duration of eating disorders. A deeper understanding of the relationship between PMS and eating disorders could lead to targeted treatment strategies.

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