

ORIGINAL ARTICLE

The Effect of Perceived Stress and Body Mass Index on Premenstrual Dysphoric Disorder among Female University Students

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ABSTRACT

Objective: This study aims to assess perceived stress and Body Mass Index (BMI) on premenstrual dysphoric disorder symptoms among young female university students. University life contains a lot of stress, including exams, career and other interpersonal relationships with colleagues and teachers. The current study aims to find the association between perceived stress and Premenstrual Dysphoric Disorder (PMDD).

Study Design: A cross-sectional quantitative study.

Place and Duration of Study: The study was conducted at the Department of Clinical Psychology Shifa Tameer-e-Millet University Islamabad from February 2021 to June 2021. Data was collected from different universities in Islamabad, which include Shifa Tameer-e-Millet University, Bahria University, Islamic university, Air University, NUST, and Quaid-e-Azam University.

Materials and Methods: An online survey was carried out among female university students in the universities of Islamabad. A Questionnaire was developed, which comprised three separate sections. Demographics sheets were used for demographic variables. Premenstrual dysphoric disorder symptoms were assessed based on the scoring of the Carolina Premenstrual Dysphoric Disorder Scale. A perceived stress scale is used to measure stress levels. Multiple linear regression analysis was used to assess the effects of variables. BMI was calculated with the formula of WHO.

Results: The study was conducted on 210 female university students of the Islamabad age range (18-30). The results of the regression analysis indicated that two predictors of this study explained 34% of the variance in our outcome variable ($R^2 = .349$). It was found that perceived stress, but not body mass index, was a significant predictor of premenstrual dysphoric disorder ($\beta = 0.582$, $p < .05$), whereby for each unit increase in perceived stress, the premenstrual dysphoric disorder increased by 0.58 units.

Conclusion: This study has shown that young female adults become more vulnerable to developing symptoms of premenstrual dysphoric disorder due to perceived stress which may affect academic, financial, and familial relationships. The female adults with these symptoms should be addressed by providing them with medical and psychological support.

Keywords: Body Mass Index (BMI), Premenstrual Dysphoric Disorders (PMDD), Perceived Stress.

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Introduction

Premenstrual dysphoric disorder (PMDD) is a psychological disorder among females. It affects females adversely, evidence from the community suggests that of 90% women face premenstrual dysphoric disorder symptoms at least one time in the course of their reproductive life.¹ In our culture, it is considered very normal, no one bother about this condition and doesn't recognize it as a disorder.² In Pakistan, the proportion of severity of PMDD in females ranges from 42% to 44% mild, 18.2%

moderate and 31.7% severe.³ According to the latest meta-analysis, the global prevalence of PMDD ranges from 10% to 98%.⁴

The menstrual cycle is a series of physiological processes along with different bio-psychosocial progressions that affect women of different cultures and socioeconomic statuses. Premenstrual dysphoric disorder may be a mental disorder about 30%-50% of girls of kid bearing suffer from mild to moderate and 3%-8% suffer severely.⁵

The internal uterus lining is a swamp in response to different biochemical substances (hormones) that are secreted by endocrine glands (pituitary and ovaries) in a cyclic manner every month. In this process, there are two major phases: (1) the Follicular phase & (2) the luteal phase. The menstrual cycle varies from woman to woman and has a different range of length (21-40 days) but the average is 28 days. The period of fertility ranges from five days before ovulation, the premenstrual dysphoric disorder is considered as the manifestation of physiological, behavioral and emotional indicators or symptoms that are shown throughout the luteal phase of female menstruation and these symptoms affect various parts of life. Prevalence in the United States of America varies in a range of 20% and 40% in conditions of moderate severity and 3%-8% in severe form.⁶

Stress is a state of emotional or physical tension. Stress has a direct or indirect influence on the menstrual cycle. Stress causes fluctuation in menstrual patterns. Stress might play a task in triggering uneven or missed periods. Numerous stress aspects have a severe risk for menstrual disorders. Perceived stress within the College/University situation may take the form of educational stress.⁷ It comprises numerous stressors such as academic demands, financial, time, health-related and self-induced types of a stressor. A study conducted to measure the impact of stress on the menstrual cycle which shows that stress negatively impacts on cycle in teenage girls.⁸

Literature also supported the role of body mass index in causing PMDD among females. Because females with stress-related symptoms ultimately cause changes in the physiology of the female body and become a determinant of PMDD. Different studies explored that body mass index (BMI) is closely linked

to premenstrual syndrome. As BMI is a modifiable risk factor, PMDD management efforts should add BMI as well as disproportionate stress. Cross-sectional research was conducted to assess the link between PMDD and body mass index (BMI). The result revealed a significant correlation between PMS and the physical component and also between PMS and the mental component.⁹

Researches show that obesity is linked with the premenstrual dysphoric disorder. This factor can be modified in the management of PMDD like other factors smoking and high-stress level. Obese, like 15% high weight than the actual appropriate height, is linked with a long menstrual cycle. Less exercise is also associated with a long menstrual cycle, but appropriate diet can shorten the period length.¹⁰

The PMDD rate is more in late adolescence, and this has caused an aversive effect on daily life activities, hobbies and interpersonal relationship.¹¹

Many research studies stated that bodily changes are directly linked with person age and their diet. But no research evidence presents that body composition is linked with PMDD in females.^{12,13}

Materials and Methods

A cross-sectional analytical study was conducted in Islamabad from February 2021 to June 2021. The target population was female unmarried university students of Islamabad. The sample was collected from Shifa Tameer E Millet University, Bahria University, Islamic university, Air University, NUST, and Quaid E Azam University. The Online Google form sent to the participant. The participants filled out the questionnaire after the informed consent. Participation of the participants was voluntary and anonymous. The survey consists of two sections in section 1, a demographic sheet was provided to collect data on demographic variables height, weight, age and population. Section 2 consists of scales that measure symptoms of the premenstrual dysphoric disorder, perceived stress and body mass index were calculated from the WHO formula.

All participants provided a written informed consent form through Google online form before participating in the study. The total sample of 210 was selected on the basis of random sampling. G power was used to calculate the sample i.e., N=210 female unmarried university students, age range 18-30 years (Mean age =22, SD =2.18) was selected for

the study because it's a time period during which young female adults experience challenges in different domains of life. When these are not handled properly, then it causes stress-like conditions in them that indirectly affect the physical health of females.

This research survey comprised of demographics sheet that includes height, weight & age. Two standardized measures were used to collect the data related to the target variables. Carolina Premenstrual Dysphoric Disorder Scale (Moul et al., 2016) evaluated the mood, cognitive and somatic related symptoms that females experience before the onset of the menstrual cycle. It is comprised 33 items, rated on a 3-point Likert scale one shows mild, two moderate and three severe. The overall PMS symptom screening measure (all 33 items) also had high internal consistency with 0.92 Cronbach's alpha reliability.¹⁴

A perceived stress scale was used to measure stress that individuals experience in daily life (Sheldon, 1983) that is assessed on 14 items.¹⁵ It's a 4-point Likert scale. The Cronbach's alpha reliability was 0.754. Data were analyzed using SPSS-25. Multiple regressions were used to analyze perceived stress, and BMI predicts premenstrual dysphoric disorders.

Results

Results revealed that the majority of participants were from an urban area and with normal BMI shown in table 1 and table 2. Demographic characteristics are shown in table 1. Multiple linear regression results show the effects in table 3. These results were analyzed from the data obtained using SPSS 25.

Table 1 shows the total sample of 210 females the mean age of the sample is 21 years with a standard deviation of 2.6, the minimum age of the sample was 18, and the maximum was 30 years it shows that most women belong to the early adulthood age group. The mean height of the participant was 5'5.4" with a standard deviation of 3.48. The minimum height is 4'1", and the maximum is 5'9". The mean weight is 55kg standard deviation 9.6. The minimum is 36kg, and the maximum is 89kgs. The mean BMI is 18.31, 42% of participant lies in the normal range of BMI, 0.5% obese, 1.4% overweight, and 56.1% are lies in the underweight category. In the total sample, 78 % percent belongs to urban and 22% are from

rural.

Table 1: Demographic characteristics of female participants (N= 210)

Characteristics	f (%)	M (SD)	Ranges	
			Minimum	Maximum
Age		21.44 (±2.674)	18	30
BMI		18.31 (±3.3)	13.9	30
Height		5.54 (±3.48)	4.1	5.9
Weight		55.01 (±9.6)	36	89
Urban	78 (78%)			
Normal (BMI)	88 (42%)			
Obese	1 (0.5%)			
Overweight	3 (1.4%)			
Under weight	119 (56.1%)			

Note. M= Mean, SD= Standard Deviation, f= Frequency, %=Percentage

Table 2 shows the correlation between perceived stress (PS) and premenstrual dysphoric disorder (PMDD), N=210. There is a significant positive correlation found at $p<0.01$. It shows that premenstrual dysphoric disorder and perceived stress are correlated with each other the level of significance is 0.01, and the p -value is less than this level. Hence increase in perceived stress will increase premenstrual dysphoric disorder and vice versa.

Table 2: Correlation between Perceived stress and premenstrual dysphoric disorder

		PMDD	PS
PMDD	Pearson Correlation	1	0.589***
	Sig. (2-tailed)		0.00
	N	210	210
BMI	Pearson Correlation	0.589***	1
	Sig. (2-tailed)	0.00	
	N	210	210

*Note: *** $p\leq0.001$*

PS= Perceived stress PMDD= premenstrual Dysphoric Disorder

Table 3 shows the correlation between premenstrual dysphoric disorder (PMDD) and body mass index there is a statistically insignificant correlation found between BMI and PMDD ($p>0.05$). The significant level for 2 tailed is less than 0.05. Hence correlation is statistically insignificant.

Table 3: Pearson Correlation Coefficients for the Relationship between BMI and PMDD

		PMDD	BMI
PMDD	Pearson Correlation	1	0.115
	Sig. (2-tailed)		0.094
	N	210	210
BMI	Pearson Correlation	0.115	1
	Sig. (2-tailed)	0.094	
	N	210	210

Note: BMI= Body Mass Index, PMDD= premenstrual dysphoric disorder

Table 4 shows the results of multiple linear regressions to show the predictive role of body mass index (BMI) and perceived stress in premenstrual dysphoric disorder. A significant regression equation was found $F = 26.97, p < 0.05$. It indicated that our two predictors explained 34% of the variance in our outcome variable ($R^2 = 0.34$). Perceived stress, but not body mass index, has been found to be a major predictor of premenstrual dysphoric disorder ($\beta = 0.58, p < 0.05$), whereby for each unit increase in perceived stress, the premenstrual dysphoric disorder increases by 0.58 units.

Table 4: Multiple linear regression: Perceived stress, body mass index predict and premenstrual dysphoric disorder among university females (N=210)

Variables	B	<i>B</i>	Premenstrual Dysphoric Disorder		<i>P</i>
			95% Confidence Interval	LL	
Perceived stress	1.253	0.580***	1.492	1.014	0.000
Body mass index	0.152	0.046	0.521	-0.216	0.416
R^2	0.348				
Df	2, 207				

Note. *** $p < 0.05$, *B* = Unstandardized coefficients, β = Beta (Standardized coefficients), R^2 = Explained Variance. UL = upper limit, LL = lower limit

Discussion

The study was done to find the effect of perceived stress and body mass index on premenstrual dysphoric disorder. Study participant was female belonging to early adulthood age group. The demographic detail showed that 78% of female belongs to urban population. The majority of females have an average body mass index. The finding indicated that perceived stress is a strong predictor of premenstrual dysphoric disorder, whereas body mass index is not. The evidence present in the literature by Arati et al. (2019) stated that BMI was not significantly correlated with premenstrual dysphoric disorders which is concurrent to the study, as literature also showed irregular painful menstruation and PMS are significantly concurrent with a high intake of proteins, calories, carbohydrates, fat and also menstruation-related complications are magnified by obesity; Furthermore, it varies from body to body and is also dependent on lifestyles of different

women.¹⁶

The result of this study clearly admits to the fact that perceived stress does affect premenstrual dysphoric disorder by increasing it and as stated before that, for each unit increase in perceived stress, the premenstrual dysphoric disorder increases by 0.58 units. These results are concurrent with the hypothesis which stated that perceived stress predicts premenstrual dysphoric disorder. It correlates with the existing previous study, which states that hormonal changes such as changes in epinephrine and norepinephrine levels may change throughout the menstrual cycle as well, causing perceived stress and making women more sensitive to these changes, therefore increasing premenstrual dysphoric disorder every time.¹⁷ Lustyk M et.al conducted a study to assess the effect of stress and Quality of Life QOL and normal activities of women and PMDD symptoms and they concluded that PMDD is high in college students.¹⁷

A cross-sectional study was conducted on Japanese students which concluded that psychosocial stress is linked with disturbance in the menstrual cycle, and this stress changes the menstrual cycle.¹⁸ The present study also shows that the stresses show a positive correlation with the menstrual cycle.

Menstrual cycles are also linked with physical activities and academic performance. This cycle cause's stress in the girls prior to the cycle and after the cycle.¹⁹ The current study also shows that stress is correlated to the menstrual cycle. A study stated that women who experienced high levels of stress in the prior month reported being considerably more likely to experience more and more severe premenstrual symptoms in the subsequent cycle. Changes in stress levels between the two cycles were connected to alterations in the severity pattern of symptoms. More moderate/severe symptoms were observed during the cycle that was preceded by higher stress levels among those whose stress levels fluctuated from one cycle to the next.²⁰

BMI is affected due to different types of reasons; however, there are some limitations to this as well, with the first one being that this sample is homogenous. Secondly, the sample size taken was 210 women from Islamabad only, so the result could not be generalized to the whole general population.

There are also cultural factors which play a part in the understanding and filling of forms which results in women not filling the questionnaires correctly or may have filled them in a rush. The questionnaire was in English language which might have affected the significance of the results, so; in the future Urdu version of the questionnaire should be used. A longitudinal study can be conducted for a deep understanding of the studied phenomenon. The findings of the study revealed that stress predict premenstrual dysphoric disorder in female. So mental health policy makers should also consider the need for awareness programs at a community level.

Conclusion

Perceived stress is a significant predictor of premenstrual dysphoric disorder. It has been concluded from this study that stress, i.e., financial stress and academic stress in female university students cause disturbances in the menstrual cycle if this disturbance continues; this will lead to premenstrual dysphoric disorder. However, body mass index has no discernible effect.

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