

ACADEMIC STRAIN UNDER HORMONAL STRESS: PREMENSTRUAL SYNDROME AND PREMENSTRUAL DYSPHORIC DISORDER AMONG FEMALE MEDICAL STUDENTS - PREVALENCE AND ACADEMIC IMPACT

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INTRODUCTION

Premenstrual syndrome (PMS) is a cyclical medical condition marked by recurring physical and psychological symptoms that appear during the luteal phase of the menstrual cycle and subside shortly after menstruation begins. Diagnosis requires three main criteria: consistent symptom recurrence across most menstrual cycles, significant disruption of daily activities, and ruling out other medical or psychiatric conditions.¹ The International Classification of Diseases ICD-10 specifies that PMS requires at least one characteristic symptom, such as psychological discomfort, bloating, breast tenderness, peripheral edema, musculoskeletal pain, concentration issues, sleep disturbances, or appetite changes that resolve with the onset of menstruation.² A more severe form, Premenstrual Dysphoric Disorder (PMDD), affects a

smaller group of individuals. According to DSM-5 criteria, diagnosing PMDD requires at least five symptoms, including at least one emotional symptom, i.e., mood swings, irritability, depression, or anxiety, along with possible physical symptoms.³ Both conditions negatively impact quality of life, but PMDD's emotional symptoms generally cause greater psychosocial disruption.⁴ Globally, 50 to 80% of women of reproductive age experience premenstrual symptoms, with 30 to 40% reporting moderate to severe PMS needing treatment, and 3 to 8% meeting the criteria for PMDD.⁵ The effects of PMS/PMDD are especially significant in academic environments. Studies from Brazil show PMS prevalence of 46.9% among university students, with 11.1% meeting PMDD criteria.⁶ Similarly, data from a Pakistani medical university indicates higher rates, 51.7% for PMS and

ABSTRACT

OBJECTIVES

The study aims to determine the prevalence of premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) among female medical students and evaluate the impact these conditions have on the students' academic performance.

METHODOLOGY

This cross-sectional study was conducted over two months at Suleman Roshan Medical College, using a census to include all female medical students with regular cycles and no major health conditions. Data were collected via a structured questionnaire based on ICD-10 and DSM-5 criteria to diagnose PMS and PMDD, and to assess academic impact. Participation was voluntary, anonymous, and required informed consent. Data were analyzed using SPSS version 23, employing both descriptive and inferential statistics. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Study found high prevalence of premenstrual disorders among the 182 participants, with 90.1% meeting the criteria for PMS and 26.4% for PMDD. The most common moderate-to-severe symptoms were fatigue 61.0%, irritability 52.2%, and depressed mood 50.5%. Symptoms were strongly associated with academic impairment, with over 70% of students reporting negative effects on exam performance and concentration. A direct dose-response relationship was observed, with increased symptom severity associated with greater academic performance difficulties.

CONCLUSION

This study concludes that premenstrual syndrome and premenstrual dysphoric disorder are highly prevalent among female medical students and are significantly associated with substantial academic impairment.

KEYWORDS: Premenstrual Syndrome, Premenstrual Dysphoric Disorder, Academic Performance, Students, Medical

5.8% for PMDD.⁷ These conditions notably interfere with learning, with 76.3% of affected students reporting decreased academic performance, 79.2% struggling with group discussions, and over 66% facing challenges during evaluations.⁸ This relationship is bidirectional: neuroendocrine research demonstrates that cyclical fluctuations in estrogen directly influence cognition and emotional regulation, while academic stressors, such as demanding coursework and financial pressures, may worsen symptoms.^{9,10,11} This creates a vicious cycle where poor academic performance increases stress, which further intensifies premenstrual symptoms.^{12,13} Although international data on PMS prevalence exist and a few Pakistani studies have reported basic prevalence rates among female medical students, research examining its academic impact on medical students in Pakistan is limited.^{14,15,7,16,8,17} To our knowledge, no such study has been conducted within our institution. This study aims to fill this important gap by examining the prevalence of PMS according to ICD-10 criteria and PMDD based on DSM-5 criteria among female medical students, while also evaluating its academic effects to highlight the need for targeted interventions, such as counseling services, cognitive behavioral therapy, and institutional academic support for students affected.^{2,4}

METHODOLOGY

A cross-sectional, questionnaire-based observational study was conducted over two months at Suleman Roshan Medical College. A complete enumeration (census) sampling method was employed; all eligible female medical students were invited to participate voluntarily with informed consent, as the total population was under 400, thereby enhancing statistical power and eliminating sampling bias. Inclusion criteria required participants to be female medical students of the college with regular menstrual cycles over the preceding 6 months and no known medical or psychological disorders; individuals who did not meet these criteria or who refused to participate were excluded. Data were collected using a structured questionnaire, developed by the research team, which consisted of sections on socio-demographics, gynecological history, and assessment of premenstrual syndrome against ICD-10 diagnostic criteria, evaluation of premenstrual dysphoric disorder against DSM-5 criteria, including the requisite five symptoms and functional impairment, and the academic impact of these conditions. Symptom severity was classified as none, mild, moderate, or severe using Sternfeld's criteria, and participants were specifically instructed to report symptoms that exhibited a cyclical pattern, appearing in the luteal phase and resolving after menstrual onset. The final section included an open-

ended question that solicited students' views on the institutional support needed. The study received prior approval from the Institutional Review Board, and ethical standards were maintained through strict data anonymization and voluntary informed consent. The collected data were analyzed using IBM SPSS Statistics. Descriptive statistics, including frequencies and percentages, were used to summarize participants' sociodemographic, gynecological, and clinical characteristics. The prevalence of PMS and PMDD was calculated as simple proportions. To evaluate the association between PMS severity and academic impairment, a one-way analysis of variance (ANOVA) and Logistic regression were performed. The tests were selected to compare the mean academic impact scores across the ordinal categories of PMS severity (none, mild, moderate, severe). A p-value of < 0.05 was considered significant.

RESULTS

Table 1 (a): Association between Sociodemographic/Menstrual Characteristics and Premenstrual Dysphoric Disorder (PMDD) of the participating medical students (N=182)

		Premenstrual Dysphoric Disorder		P-value
		No (n=134)	Yes (n=48)	
Age (years)	16 – 20	24 (17.9%)	10 (20.8%)	0.65
	>20	110 (82.1%)	38 (79.2%)	
Marital Status	Single	127 (94.8%)	46 (95.8%)	0.900
	Married	07 (5.2%)	02 (4.2%)	
Academic Year	1st year	28 (20.9%)	07 (14.6%)	0.707
	2 nd year	15 (11.2%)	03 (6.2%)	
	3 rd year	29 (21.6%)	10 (20.8%)	
	4 th year	25 (18.7%)	16 (33.3%)	
	5 th year	37 (27.6%)	12 (25.0%)	
Age at menarche (year)	<13	35 (26.1%)	20 (41.7%)	0.061
	13 – 16	93 (69.4%)	23 (47.9%)	
	>16	06 (4.5%)	05 (10.4%)	
Menstrual Cycle Length	<21 days	15 (11.2%)	09 (18.8%)	0.078
	21-35 days	110 (82.1%)	35 (72.9%)	
	>35 days	09 (6.7%)	04 (8.3%)	
Bleeding Duration	1-3 days	46 (34.3%)	13 (27.1%)	0.013*
	4-5 days	75 (56.0%)	28 (58.3%)	
	≥6 days	13 (9.7%)	07 (14.6%)	
Menstrual Flow Intensity	Too Light	21 (15.7%)	05 (10.4%)	0.332
	Moderate	106 (79.1%)	38 (79.2%)	
	Heavy	07 (5.2%)	05 (10.4%)	
Menstrual Pain Severity	None	10 (7.5%)	03 (6.2%)	0.001
	Mild	46 (34.3%)	07 (14.6%)	
	Moderate	44 (32.8%)	22 (45.8%)	
	Severe	29 (21.6%)	12 (25.0%)	
	Very Severe	05 (3.7%)	04 (8.3%)	
Family History of PMS/PMDD	Yes	96 (71.6%)	40 (83.3%)	0.128
	No	37 (27.6%)	08 (16.7%)	
Actions Taken for Symptoms	None	38 (28.4%)	12 (25.0%)	0.001
	Take Pain Relief Medication	37 (27.6%)	20 (41.7%)	
	Heat pad	43 (32.1%)	13 (27.1%)	
	Massage	09 (6.7%)	02 (4.2%)	
	Take Consultation	07 (5.2%)	01 (2.1%)	

Table 1(b): Association between Sociodemographic/Menstrual Characteristics and Premenstrual Syndrome (PMS) of the Participating Medical Students (N=182)

		Premenstrual Syndrome		P-value
		No (n=18)	Yes (n=164)	
Age (years)	16 – 20	02 (11.1%)	32 (19.5%)	0.385
	>20	16 (88.9%)	132 (80.5%)	
Marital Status	Single	17 (94.4%)	156 (95.1%)	0.900
	Married	01 (5.6%)	08 (4.9%)	
Academic Year	1 st year	03 (16.7%)	32 (19.5%)	0.707
	2 nd year	02 (11.1%)	16 (9.8%)	
	3 rd year	02 (11.1%)	37 (22.6%)	
	4 th year	04 (22.2%)	37 (22.6%)	
	5 th year	07 (38.9%)	42 (25.6%)	
Age at menarche (year)	<13	02 (11.1%)	53 (32.3%)	0.061
	13 – 16	16 (88.9%)	100 (61.0%)	
	>16	0 (0.0%)	11 (6.7%)	
Menstrual Cycle Length	<21 days	0 (0.0%)	24 (100.0%)	0.078
	21-35 days	18 (12.4%)	127 (87.6%)	
	>35 days	0 (0.0%)	13 (100.0%)	
Bleeding Duration	1-3 days	02 (11.1%)	57 (34.8%)	0.013*
	4-5 days	16 (88.9%)	87 (53.0%)	
	≥6 days	0 (0.0%)	20 (12.2%)	
Menstrual Flow Intensity	Too Light	04 (22.2%)	22 (13.4%)	0.332
	Moderate	14 (77.8%)	130 (79.3%)	
	Heavy	0 (0.0%)	12 (7.3%)	
Menstrual Pain Severity	None	03 (16.7%)	10 (6.1%)	0.001
	Mild	13 (72.2%)	40 (24.4%)	
	Moderate	2 (11.1%)	64 (39.0%)	
	Severe	0 (0.0%)	41 (25.0%)	
	Very Severe	0 (0.0%)	9 (5.5%)	
Family History of PMS/PMDD	Yes	17 (94.4%)	119 (72.6%)	0.128
	No	01 (5.6%)	44 (26.8%)	
Actions Taken for Symptoms	None	15 (83.3%)	35 (21.3%)	0.001
	Take Pain Relief Medications	01 (5.6%)	56 (34.1%)	
	Heat pad	2 (11.1%)	54 (32.9%)	
	Massage	0 (0.0%)	11 (6.7%)	
	Take Consultation	0 (0.0%)	8 (4.9%)	

Table 2: Frequency and Severity of Premenstrual Symptoms among Medical Students (N=182).

	Symptoms	None n (%)	Mild n (%)	Moderate n (%)	Severe n (%)
Psychological Symptoms Severity	Irritability/mood swings	31 (17.0%)	56 (30.8%)	53 (29.1%)	42 (23.1%)
	Anxiety/tension	43 (23.6%)	53 (29.1%)	55 (30.2%)	31 (17%)
	Depressed mood	42 (23.1%)	48 (26.4%)	55 (30.2%)	37 (20.3%)
	Poor Concentration	54 (29.7%)	46 (25.3%)	62 (34.1%)	20 (11.0%)
	Fatigue/Lethargy	29 (15.9%)	42 (23.1%)	70 (38.5%)	41 (22.5%)
	Sleep disturbances	50 (27.5%)	58 (31.9%)	49 (26.9%)	25 (13.7%)
Physical Symptoms Severity	Breast tenderness	93 (51.1%)	59 (32.4%)	27 (14.8%)	03 (1.6%)
	Bloating/weight gain	83 (45.6%)	53 (29.1%)	39 (21.4%)	7 (3.8%)
	Headaches	70 (38.5%)	56 (30.8%)	41 (22.5%)	15 (8.2%)
	Muscle/joint pain	45 (24.7%)	53 (29.1%)	59 (32.4%)	25 (13.7%)
	Appetite changes	48 (26.4%)	62 (34.1%)	60 (33.0%)	12 (6.6%)
	Swelling (hands/feet)	117 (64.3%)	43 (23.6%)	17 (9.3%)	05 (2.7%)

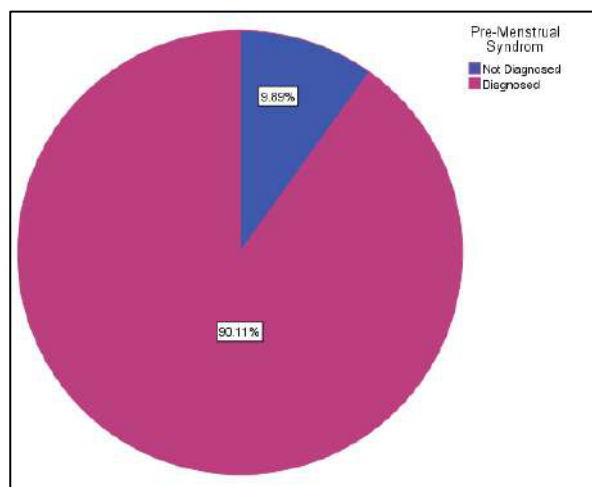
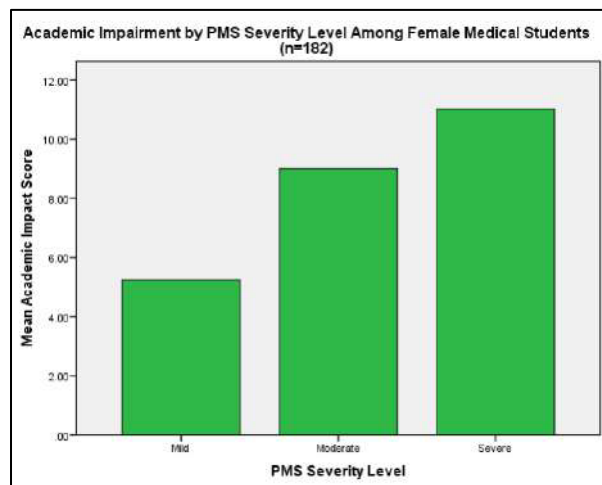
**Figure 1: Proportion of medical students diagnosed with Premenstrual Syndrome (PMS) based on ICD-10 criteria. Among the 182 participants, the prevalence was 90.1% (n=164).**

Table 3: Prevalence and Severity of Academic Impairment during Premenstrual Phase among Female Medical Students (N=182)

Academic Domain	Not at all n (%)	Slightly n (%)	Moderately n (%)	Severely n (%)	Percentage of students experiencing any impairment
Class concentration	54 (29.7%)	78 (42.9%)	42 (23.1%)	07 (3.8%)	70.3 %
Assignment completion	68 (37.4%)	61 (33.5%)	41 (22.5%)	12 (6.6%)	62.6 %
Lecture attendance	67 (36.8%)	55 (30.2%)	46 (25.3%)	14 (7.7%)	63.2 %
Study group participation	65 (35.7%)	63 (34.6%)	48 (26.4%)	06 (3.3%)	64.3 %
Academic motivation	61 (33.5%)	57 (31.3%)	60 (33%)	04 (2.2%)	66.5 %
Group work	60 (33%)	61 (33.5%)	53 (29.1%)	07 (3.8%)	67 %
Exam performance	51 (28%)	53 (29.1%)	70 (38.5%)	08 (4.4%)	72 %

**Figure 2: Association Between Premenstrual Syndrome Severity and Academic Impairment Among Medical Students (N=182)** Bars represent mean academic impact scores with 95% confidence intervals. Academic impairment demonstrates a significant progressive increase with PMS severity ($p < 0.001$).**Table 4: Association between PMDD Diagnosis and Academic Impact Areas (Chi-Square Tests)**

Academic Impact Area	Pearson Chi-Square Value	P-Value and statistical significance
Class Concentration	15.81	0.001
Group Participation	17.21	0.001
Academic Motivation	9.32	0.025
Exam Performance	9.27	0.026
Group Work	13.92	0.003
Assignments Completion	15.20	0.002
Lecture Attendance	10.46	0.015

DISCUSSION

Our study reveals considerable menstrual health challenges faced by female medical students, with

90.1% experiencing PMS (as shown in Figure 1) and 24.6 % meeting criteria for PMDD. Additionally, dysmenorrhea affected 92.9% of participants, with 63.7% reporting moderate to very severe pain. This high burden translates directly into academic impairment. A particularly strong finding was the dose-response relationship; as PMS severity increased, so did the level of academic difficulty, a correlation that was both statistically strong and educationally meaningful. The results of the current study align with those of Siregar et al., who also showed a direct relationship between increasing premenstrual symptom severity and its negative effect on academic performance. A similar relationship was shown in a study of Iraqi medical students, which revealed that 40% experienced increased learning challenges, primarily manifesting as a lack of concentration (50.1%) and trouble working (42.7%).^{18,19} However, it contrasts with the work of Alemu et al., who found no significant link, suggesting that the unique pressures of medical education may amplify these effects, variations in diagnostic criteria, and sociocultural factors influencing symptom reporting. A key consistency with other literature is the dominance of psychological symptoms over purely physical complaints, highlighting the profound impact on mental focus and motivation.^{20,21} The PMDD prevalence in this study (26.4%) is higher than the 16.3% and 13.8% reported by Omar et al. and Alemu et al., respectively, yet remains lower than the 34.7% documented by Minichil et al.^{20,22,23} Whereas, the prevalence of dysmenorrhea 92.9% matches exactly with a study conducted at an Egyptian university on female medical students. Worldwide, dysmenorrhea rates vary widely, 16.8% to 94%, according to a WHO review, suggesting that cultural and methodological factors influence these numbers.^{24,25,26} A critical analysis of our findings with other studies reveals a distinction between the perception of premenstrual symptoms and their underlying pathology. While students who perceived their menstrual pain as impacting their academic performance were more likely to develop PMDD, suggesting a notable cognitive-affective component, our bivariate analysis identified a later age at menarche as the statistically significant associated factor for a PMDD diagnosis. This contrast implies that while subjective appraisal may amplify distress, the development of PMDD may be intrinsically linked to specific biological determinants of reproductive development. In comparison, a PMS diagnosis was more directly associated with greater menstrual pain severity.^{10,23,27}

LIMITATIONS

This study's limitations include its cross-sectional design, which precludes causal inference, and its single-

institution sample, which may limit generalizability. Reliance on self-reported data introduces the possibility of recall bias. Furthermore, the findings may be influenced by the specific cultural context and the use of subjective academic impact measures rather than objective performance indicators. Future longitudinal, multi-institutional studies incorporating clinical assessments and objective metrics are recommended to address these constraints.

CONCLUSIONS

This study confirms a high prevalence of premenstrual syndrome among female medical students, with symptom severity demonstrating a direct, dose-response relationship to academic impairment. The significant disruption to exam performance and concentration necessitates institutional recognition of this issue. These findings provide compelling evidence for implementing supportive policies, such as academic accommodations and wellness resources, to promote educational equity and student well-being.

CONFLICT OF INTEREST: None

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The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.



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