Public Health and Epidemiology: Open Access ISSN: 3068-9139

PRIME OPEN ACCESS

Volume 2, Issue 2

Research Article

Date of Submission: 26 Mar, 2026
Date of Acceptance: 21 Apr, 2026
Date of Publication: 28 May, 2026

Prevalence and Psychosocial Correlates of Premenstrual Syndrome Among University Students in Pakistan

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Citation: Irfan, M., Rafique, S., Rafique, F., Siddique, S., Fatima, L., et al. (2026). Prevalence and Psychosocial Correlates of Premenstrual Syndrome Among University Students in Pakistan. *Public Health Epidemiol OA, 2*(2), 01-10.

Abstract

Objective

To investigate the prevalence of PMS and Premenstrual dysphoric disorder (PMDD) and their associations with mental health and quality of life among university students in Pakistan.

Methods

A total of 221 female university students aged 18–30 years were recruited via simple non-random sampling. Data were collected using an online survey from October 2024 to July 2025. The questionnaire assessed PMS and PMDD status by using the Premenstrual Symptoms Screening Tool (PSST), sociodemographic factors and utilized standardized instruments, including the Perceived Stress Scale (PSS-10), Generalized Anxiety Disorder-7 (GAD-7), Center for Epidemiologic Studies Depression Scale (CES-D), and Short Form Health Survey (SF-36 to assess mental health and quality of life. Statistical analyses included descriptive statistics, t-tests, chi-square tests, and linear regression.

Results

The prevalence of PMS was 36.2%, and PMDD was 8.5%. Participants with PMS reported significantly higher levels of stress score (β=4.741, p=0.000), and depression score (β=9.380, p=0.000) compared to those without PMS. PMS was also associated with significantly poorer scores across all eight domains of QoL ($p<0.05$), with the most substantial declines in role limitations due to physical (β=-28.017, p=0.000) and emotional (β=-26.306, p=0.000) problems. PMDD was strongly associated with depression (β=7.226, p=0.042) and significantly greater role limitations due to emotional problems (β=-29.542, p=0.041).

Conclusion

Both PMS and PMDD are prevalent and significantly associated with poorer mental health and reduced quality of life among university students in Pakistan. These findings underscore the need for increased awareness, screening, and targeted interventions in educational and healthcare settings to mitigate the impact of premenstrual disorders.

Keywords: Premenstrual Syndrome, Mental Health, Quality Of Life, Pakistan, University Students, Depression

Introduction

Menstruation is a normal physiological process that involves the monthly shedding and restoration of the uterine wall that affects women who are of reproductive age. It consists of phases (menstrual, follicular, ovulation, luteal). The onset of menstruation, known as "menarche," generally takes place between the ages of 10 and 16, with an average onset age of 12.4 years. Research on the factors influencing menarcheal age is ongoing; factors such as family size, seasonality, genetics, general health, dietary status, exercise, and socioeconomic circumstances are all believed to be involved. Menarche usually happens suddenly and without pain [1]. Women are negatively impacted by the physical and psychological elements of menstruation, particularly in underprivileged nations. According to epidemiologic research, PMS occurs in 30–40% of women who are of reproductive age [2].

The premenstrual syndrome (PMS) was first described in 1931 by Frank and Horney [3]. PMS is a collection of physical, emotional, and behavioral symptoms that appear cyclical and repeated, varying in quality and intensity [4]. Research on this topic has been conspicuously neglected in developing countries such as Pakistan. Women's psycho-social health is severely impacted by the challenging financial and socioeconomic circumstances, which also negatively affects their physical health. The incidence of PMS among Pakistani women and its associations with stress, anxiety, and depression require immediate attention. PMS begin during the week before menstruation and go away when the menstrual flow starts [5].

According to reports, between 20 and 32% of premenopausal women and 30 to 40% of reproductive women have PMS [6]. PMS is not always regarded as pathological, until a woman begins to feel that her behavior is out of control, which might impact her relationships with others, particularly her intimate partner [7].

Studies have found that up to 200 premenstrual symptoms can occur [8]. However, there are three categories of PMS that have been documented in the literature: behavioral, physical, and emotional. Depression, anger, anxiety, tension, crying, oversensitivity, feeling out of control, and mood swings are among the most prevalent emotional symptoms of PMS. Abdominal cramps, fatigue, bloating, breast pain and tenderness, acne, swelling, pains, and weight gain are examples of physical symptoms. Food cravings, changes in appetite, difficulty concentrating, sleep issues, social disengagement, forgetfulness, and a drop in activity level are examples of behavioral symptoms [9].

The symptoms might be minor, moderate, or severe in their intensity. If PMS becomes incapacitating or extremely severe, it may irreversibly ruin a woman's well-being and social life [10]. Most women were able to manage their PMS symptoms with conservative treatments and lifestyle changes, including dietary changes, emotional stability, exercise, mindfulness, calmness, and good sleep practices [11].

Premenstrual dysphoric disorder (PMDD), a particularly severe type of PMS, affects 3–8% of women. The symptoms of PMS and PMDD are similar in women. PMDD is distinguished by a set of symptoms that are severe enough to impede a woman's ability to function. The DSM-IV-Text Revision (DSM-IV-TR) lists the 11 symptoms of PMDD that the American Psychological Association found. Irritability, depression, sadness, feeling burdened, stress, oedema, bloating in the abdomen, being overweight, muscle pain, insomnia or hyper insomnia, and breast tenderness are some of these symptoms [12]. It is characterized as a unique affective disease with at least five symptoms (Sadness, depression, loss of control, food cravings, and irritability) that appear in the late luteal phase, at least one of which must be affective [13]. Women with PMDD, like those with major depressive disorder, endure significant disruptions in their social, professional, and romantic lives [9].

PMS has been extensively studied and considered, but it is still an ill-defined clinical entity with an unknown etiology, causing controversy and confusion in the medical community as well as among the general public regarding its nature and cause. Though its precise causes are still unknown, a combination of environmental, hormonal, neurological, and genetic factors that influence symptom severity are thought to be the cause of PMS [1]. The diagnosis of PMS is made solely on the basis of self-reported symptoms because a large number of women experience similar symptoms to a mild or moderate degree in the premenstrual phase of the menstrual cycle [14].

There are many factors that affect the prevalence and severity of both PMS and PMDD. These include things like perceived stress levels, age, education, marital status, body mass index (BMI), menstruation history, nutrition, and physical activity [15]. According to research done globally, between 75% and 85% of women who menstruate had PMS, and between 3% and 10% had PMDD [16]. The prevalence of PMS and PMDD was found to be higher in younger women, women with less than a high school diploma, women with lower incomes, women with higher body mass indexes, women whose menarche age was 12 years or younger, women whose menstruation lasted longer than six days, women who smoke, women who are physically inactive, and women who reported higher levels of perceived stress [17,9,18].

The prevalence of PMS varies by country, with China having a rate of 34%, Turkey having a rate of 71%, Pakistan having an 80% rate, and Jordan having a 92%. In the last 20 years, a number of further research on the prevalence of PMS in Middle Eastern nations have been carried out. For example, the prevalence of PMS among college students was 71.9% in Palestine, 92.3% in Jordan, 80.2% in Egypt, and 63% in Lebanon [19]. A study on PMS prevalence among different

countries worldwide found that 47.8% of women have PMS [20].

Women with PMS have higher impairments to their work productivity than women without PMS, and the condition is linked to a decrease in health-related quality of life (QoL). PMS is a prevalent complaint among women, and it has the potential to lower both the QoL and productivity of women in the workplace [21]. Pakistani women report that physical symptoms are the most common type of PMS and have a major impact on their daily activities. Pakistani women of reproductive age have reported a very high frequency of PMS (81.25%). The QoL and productivity of women are negatively impacted by PMS, making it a prevalent issue. Physical discomfort, mood swings, and exhaustion are examples of cyclical and disruptive symptoms that can cause emotional difficulties, elevated stress levels, and decreased productivity. Improving the general QoL for women with PMS requires increasing awareness, encouraging self-care, and putting focused interventions into place [3].

Most previous studies have been conducted in Western populations and have emphasized diagnostic aspects, with limited focus on the psychological profile of PMS and PMDD among South Asian women. Cultural, lifestyle, and environmental differences may alter how emotional symptoms manifest in this region. Unlike earlier work, our study utilized standardized psychological assessments and regression-based analysis to objectively compare emotional symptoms between women with and without PMS and PMDD. There is limited research on the prevalence of PMS and PMDD and its effects on mental health, despite its widespread impact on women's quality of life. The present research was designed to investigate prevalence of PMS and PMDD among a homogenous Pakistani young women population and effects on their mental health and QoL parameters. This study will help females in their reproductive age as it contribute to concluding the main contributing factors to PMS and support the development of healthcare policies and treatments that fit the local culture.

Materials And Methods

Ethical Consideration

Participants were asked for their informed written consent, and only those who signed the consent form were included in the study. Individuals' information was kept private. The ethical approval was provided by the Ethical Committee of Pir Mehr Ali Shah Arid Agriculture University Rawalpindi (PMAS-AAUR/1EC/237) to conduct this research. The study strictly followed the Declaration of Helsinki principles for ethical research conduct.

Study Design

A cross-sectional, prospective, questionnaire-based study was conducted to investigate the prevalence and psychosocial correlates of PMS among university students in Pakistan.

Population and Sampling

The study population consisted of women aged 18–30 years who were enrolled as university students in Pakistan. Females taking hormonal drugs, such as hormone replacement therapy or contraceptives, were not included in order to reduce disruption to normal hormonal fluctuations. Participants were selected from different universities to ensure representation from a range of academic disciplines and study levels. The students were visited in their classes and willing students were sent a link of the online survey. The participants in this study were chosen through convenience (non-probability) sampling. Intially 321 students were asked to take part in the study however 221 were willing to participate. Complete information was provided by 199 participants.

Data Collection

An online questionnaire collected the data from October 2024 to July 2025. The questionnaire consisted of sociodemographic and economic characteristics (age, height, weight, BMI, marital status, working hours/day, household income), mental health (stress, anxiety, depression) and QoL. Validated scales and question formats were used to make sure the results would accurately represent the psychological burdens that premenstrual changes may cause.

The PSST is an easy-to-use, validated screening tool for women with severe PMS or PMDD. The tool asks 19 questions about how symptoms affect relationships and day-to-day activities to determine whether a woman has PMS or PMDD [22]. The CES-D is an established, valid, and reliable depression screening tool. This measure evaluated the frequency of depressive symptoms, such as feelings of sadness, hopelessness, fatigue, and changes in eating and sleep patterns, throughout the previous week. The CES-D is frequently used in population-based research and offers a trustworthy assessment of participants' emotional burden [6]. The GAD-7 scale is a trustworthy, well-validated self-report anxiety screening tool. This quick, seven-item test screened for symptoms of generalized anxiety, including excessive worry, restlessness, and trouble focusing. The GAD-7 was useful in determining the severity of anxiety and whether it was related to the premenstrual phase [23]. The PSS-10 is a reliable and valid tool for measuring perceived stress in general adult and clinical populations. This scale assessed respondents' feelings of unpredictability, uncontrollability, and overload in their day-to-day lives over the previous month [24]. The SF-36 was used to measure quality of life. This commonly used tool evaluated eight basic areas of health: mental health, role limitations because of emotional issues, physical functioning, bodily pain, general health perceptions, vitality (energy/fatigue), and social functioning. The SF-36 made it possible to assess how premenstrual symptoms affected everyday life and general wellbeing [25].

Statistical Analysis

Data were entered, coded, and cleaned before statistical testing using self-constructed questionnaire and standardized instruments, including the PSST, CES-D, GAD-7, PSS-10, and SF-36. Sociodemographic, mental health, and QoL factors were summarized using descriptive statistics, such as means with standard errors and frequencies with percentages. Chi-square tests for categorical variables and independent sample t-tests for continuous variables were used to compare groups of PMS and non-PMS and PMDD and non-PMDD.

The QoL scores and CES-D and PSS-scores that had significant difference across groups were taken as dependent factors for PMS and PMDD in a linear regression analysis to assess the intensity and direction of associations. P-values (< 0.05) was considered as statistically significant. The Statistical Package for the Social Sciences (version 16.0), was used to analyze the data.

Results

Prevalence

The prevalence of PMS and PMDD was 36.2% and 8.5%, respectively among university students (Figure 1).

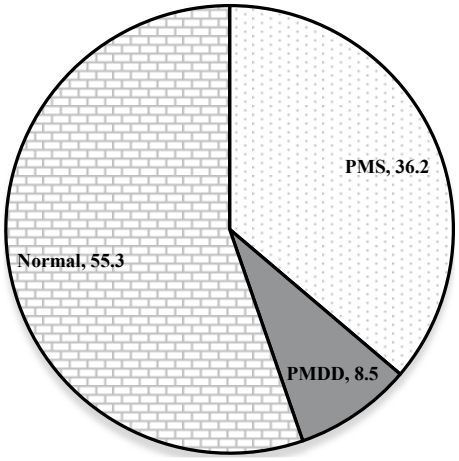

Figure 1: Prevalence (%) of PMS and PMDD Among Young Women.

Sociodemographic and Anthropometric Characteristics

Table 1 results suggested that the prevalence of premenstrual disorders may not be significantly influenced by sociodemographic and anthropometric characteristics, as the majority of these factors did not show any statistically significant (p>0.05) differences between PMS, non-PMS, and PMDD groups. These factors included age, height, weight, BMI, household size, marital status, living system, type of residence, and economic status. However, a significant (p<0.05) difference was observed in daily working hours, where participants with PMS were found to work fewer hours compared to non-PMS and PMDD groups.

7.799±0.396		**Non-PMS (Mean+S.E)/ Frequency (%)**	**PMS (Mean+S.E)/ Frequency (%)**	**Non-PMDD (Mean+S.E)/ Frequency (%)**	**PMDD (Mean+S.E)/ Frequency (%)**
Age (year)		20.080±0.503	20.915±0.395	20.407±0.378	20.000±0.982
Height (cm)		159.93± 1.291	158.76±1.308	159.71± 1.015	157.13±1.906
Weight (kg)		53.243±0.994	51.319.461	52.712±0 .858	50.778± 3.086
BMI (kg/m2)		20.725±0.488	19.398±0.862	20.213±0.469	20.613±1.308
Household		6.569±0.287	6.468±0.337	6.482±0.217	7.11±1.160
Working hours/day		7.799±0.396	6.771±0.330*	7.450±0.309	7.643±0.472
Marital Status	Single	93.6% (88)	95.9%(47)	94.0%(125)	100.0%(10)
	Married	6.4% (6)	4.1%(2)	6.0%(8)	0 .0%(0)
Living system	Joint	66.7%(28)	28.0%(14)	31.0%(40)	18.2%(2)
	Isolated	68.9%(62)	72.0%(36)	69.0%(89)	81.8%(9)
Living in	Own house	74.7%(65)	85.7%(42)	79.2%(99)	72.7%(8)
	Rent	25.3%(22)	14.3%(7)	20.8%(26)	27.3%(3)
Economic status	Middle	98.9%(90)	95.9%(47)	97.7%(126)	100.0%(11)
	High	1.1%(1)	4.1%(2)	2.3%(3)	0.0%(0)

Table 1: Sociodemographic And Economic Characteristics Of Young Women.

*Significantly difference (p<0.05) in Chi-square; BMI: body mass index; SE: standard error

Mental Health

• Stress

Table 2 reports that students with PMS had significantly ($p<0.05$) higher frequencies of moderate (87.0%) and perceived stress (8.7%) compared to non-PMS (79.3% & 2.4%, respectively). Participants with PMS had significantly ($t = -3.708$, $p = 0.000$) higher perceived stress scores (19.220 ± 1.038) compared to non-PMS (14.479 ± 0.747). PMS increased stress scores by 4.741 points (95% CI: 2.224–7.259, $p = 0.000$) in participants (Table 3). PMDD and Non-PMDD groups had non-significant difference in stress scores (Table 4).

Factors	Attributes	Non-PMS	PMS	Non-PMDD	PMDD
Stress	Low Moderate Perceived	18.3% 79.3% 2.4%	4.3% 87.0%* 8.7%*	13.6% 81.4% 5.1%	10.0% 90.0% 0.0%
Anxiety	Minimal Mild	63.6% 36.4%	20.0% 80.0%*	45.0% 55.0%	0.0% 100.0%
Depression	Depressed Undepressed	52.1% 47.9%	81.0%* 19.0%	60.4% 39.6%	100.0%* 0.0%

Table 2: Association Of Pms And Pmdd And Mental Health Of Young Women.
Chi-square analysis (PMS vs. Non-PMS & PMDD vs. Non-PMDD); *p<0.05

• Anxiety

Mild anxiety was significantly ($p<0.05$) more common in PMS (80.0%) than in non-PMS (36.4%) (Table 2). However, GAD-7 anxiety score were statistically similar ($p>0.05$) among women with and without PMS (Table 3). PMDD and Non-PMDD groups had non-significant difference in anxiety scores (Table 4).

Factors	Non-PMS (Mean+S.E.)	PMS (Mean+S.E.)	Student t-test		Linear Regression	
			t-value	p-value	95% C.I for B (Lower-Upper)	P-value
PSS-10 Score	14.479±0.747	19.220±1.038	-3.708	0.000*	4.741 (2.224;7.259)	0.000*
CES-D Score	14.160±1.054	23.540±1.543	-5.020	0.000*	9.380 (5.760;13.001)	0.000*
GAD-7 Score	0.607±0.218	1.338±0.392	-1.631	0.106	0.960 (-0.060;1.981)	0.065
Working hours/ day	8.017±0.374	7.468±0.448	0.940	0.350	-1.027 (-2.245;-0.190)	0.097
Quality of Life Parameters						
Physical functioning	67.087±3.028	56.962±3.139	2.321	0.022*	-10.125 (-19.216;-1.035)	0.029*
Role limitations due to physical health	68.778±4.027	40.761±6.207	3.787	0.000*	-28.017(-42.023;-14.011)	0.000*
Role limitations due to emotional problems	66.228±4.258	39.923±5.900	3.616	0.001*	-26.306(-40.548;-12.063)	0.000*
Energy/ fatigue	56.767±1.715	42.361±2.303	5.018	0.000*	-14.406(-20.054;-8.758)	0.000*
Emotional well being	64.755±1.828	54.000±2.090	3.874	0.000*	-10.755(-16.457;-5.053)	0.000*
Social functioning	66.667±2.725	56.771±3.244	2.336	0.021*	-9.896(-18.470;-1.322)	0.024*
Pain	68.233±2.462	53.085±2.996	3.907	0.000*	-15.148(-22.892;-7.404)	0.000*
General health	61.732±2.096	50.629±2.530	3.379	0.001*	-11.103(-17.731;-4.475)	0.001*

Table 3: Association Of Pms To The Mental Health And Quality Of Life Parameters Of Young Women.
*p<0.05; PSS-10: Perceived Stress Scale-10; CES-D: Center for Epidemiologic Studies Depression Scale, GAD-7: Generalized Anxiety Disorder-7

• Depression

According to Table 2, female students with PMS had a significantly ($p<0.05$) higher rate of depression (81.0%) compared to non-PMS (52.1%). Similarly, CES-D depression scores were significantly ($t = -5.020$, $p = 0.000$) higher in PMS (23.540 ± 1.543) than non-PMS (14.160 ± 1.054) women. Presence of PMS significantly increased the depression score by 9.380 points (95% CI: 5.760–13.001, $p = 0.000$) (Table 3). For PMDD, depression was the only significant ($p<0.05$) factor. All PMDD cases (100%) were depressed compared to 60.4% in non-PMDD group (Table 2). Women with PMDD had increased depression score by 7.23 points (95% CI: 0.266–14.187, $p = 0.042$) than non-PMDD women (Table 4).

Factors	Non-PMDD (Mean+S.E.)	PMDD (Mean+S.E.)	Student t-test		Linear Regression	
			t-value	p-value	95% C.I for B(Lower-Upper)	P value
PSS-10 Score	15.917±0.656	18.636±2.383	-1.100	0.294	2.719 (-1.987;7.425)	0.255
CES-D Score	16.865±0.961	24.091±3.918	-1.791	0.100	7.226 (0.266;14.187)	0.042*
GAD-7 Score	0.858±0.209	1.063±0.727	-0.270	0.790	-0.126(-1.949;1.697)	0.891
Quality of Life Parameters						
Physical functioning	62.923±2.419	66.818±5.732	-0.626	0.541	3.896 (-12.062;19.853)	0.630
Role limitations due to physical health	60.045±3.770	34.259±11.740	2.091	0.064	-25.785(-52.952;1.382)	0.063
Role limitations due to emotional problems	58.709±3.71	29.167±13.270	2.144	0.064	-29.542 (-57.873;-1.211)	0.041*
Energy/ fatigue	52.208±1.565	43.636±4.819	1.692	0.116	-13.232 (-19.204;2.061)	0.113
Emotional well being	61.481±1.503	53.546±5.393	1.417	0.183	-7.935 (-18.270;2.400)	0.131
Social functioning	63.559±2.157	56.818±9.589	0.686	0.507	-6.741 (-21.836;8.353)	0.379
Pain	63.482±2.065	50.250±7.486	1.704	0.118	-13.232 (-27.606;1.142)	0.071
General health	58.409±1.734	48.826±6.174	1.494	0.162	-9.583 (-21.534;2.367)	0.115

Table 4: Association Of Pmdd To The Mental Health And Quality Of Life Parameters Of Young Women.
*p<0.05; PSS-10: Perceived Stress Scale-10; CES-D: Center for Epidemiologic Studies Depression Scale, GAD-7: Generalized Anxiety Disorder-7

- **Quality of Life (QoL)**

All domains of QOL were significantly (p<0.05) poorer in female students with PMS compared to those without PMS. Physical functioning, role limitations due to physical health, role limitations due to emotional problems, energy/fatigue, emotional well-being, social functioning, pain, and general health scores were significantly (p<0.05) lower among PMS women than non-PMS. Furthermore, PMS significantly (p<0.05) reduced all socres of quality of life parameters (Table 3).

According to Table 4, most domains of QoL did not differ significantly (p>0.05) between PMDD and non-PMDD groups. Physical functioning, energy/fatigue, emotional well-being, social functioning, pain, and general health scores were slightly lower in PMDD but not statistically significant. However, role limitations due to emotional problems showed a significant (p<0.05) difference, with PMDD women reporting lower scores (29.167 ± 13.270) compared to non-PMDD (58.709 ± 3.710). PMDD decreased score of role limitations due to emotional problems by almost 30 points (β = -29.542, 95% CI: -57.873 to -1.211, p = 0.041).

Discussion

The present study investigated the prevalence and psychosocial correlates of premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) among university students in Pakistan, providing novel data from a region where menstrual and mental health are often underexplored. The findings revealed that PMS affected 36.2% of participants, while 8.5% met criteria for PMDD. PMS was significantly associated with higher levels of perceived stress and depressive symptoms, as well as poorer quality of life across multiple functional domains. The strongest impairments were observed in emotional and physical role limitations, highlighting the substantial psychosocial burden these disorders impose on young women.

The results of the present study are consistent with global research, but they also highlight the unique challenges faced by women in Pakistan. These challenges may include cultural stigma, limited awareness, and inadequate access to reproductive healthcare. Overall, the findings emphasize that PMS and PMDD are not just physiological issues; they are complex biopsychosocial conditions that require thorough assessment and targeted intervention.

Meta-analyses have documented PMS prevalence ranging from 30% to 50% and PMDD from 3.2% to 7.7% in confirmed and provisional diagnoses, respectively, among women of reproductive age, with higher rates often reported among younger and university students [26-28].

Prevalence of PMS was reported 40% in Europe, 85% in Africa, 46% in Asia and 60% in South America [20]. Studies conducted in neighboring countries, such as Afghanistan Iran and India report comparatively elevated frequencies

than our study, suggesting that premenstrual disorders represent a significant and widespread health concern in South Asia [4,27,29,30]. Within Pakistan, earlier research identified prevalence rates as high as 70–80%, particularly in less urbanized areas [10,5,31].

The differences in PMS may result from a combination of environmental and genetic factors. Cultural factors can affect the reported prevalence of PMS in relation to socio-feminist culture and socioeconomic status. Women in countries with low female social status may not express their PMS symptoms because of the challenges of exclusion, humiliation, and inadequate awareness of menstrual issues, which might lead to the underestimation of PMS. A lower rate of obesity and low-calorie intake may be possible reasons for the lower burden estimates in low socioeconomic regions. The enhancement in obesity and precocious puberty associated with a more westernized diet will raise the burden of PMS [32]. In the present study, the participants were university students who had similar sociodemographic and anthropometric characteristics, suggesting that within this specific population of young, predominantly single, middle-class university students, these baseline characteristics are not major differentiating factors for developing PMS or PMDD. This reinforces the concept that the etiology of premenstrual disorders is complex and rooted in individual neurobiological sensitivity to hormonal fluctuations, rather than broad sociodemographic determinants [11].

The strong associations identified between PMS and stress, anxiety, and depression are also consistent with prior literature demonstrating the connection between hormonal fluctuations and mental health dysregulation [5,33]. The women with PMS may have high fatigue, physical pain, anxiety, irritability, and depression. The women suffering from PMDD may have an increased tendency to suicidal attempts during the luteal phase of menstruation [34]. Similar findings have been reported among student populations, where elevated psychological distress has been shown to correlate with PMS severity and poorer quality of life [19,35]. Moreover, our observation that PMS significantly impairs quality of life across multiple domains supports previous evidence that women with moderate to severe premenstrual symptoms experience functional limitations comparable to those seen in chronic health conditions [35].

The underlying mechanisms of PMS and PMDD are complex and multifactorial, involving an interaction between hormonal fluctuations and neurobiological sensitivity. While ovarian hormone levels in women with PMS and PMDD are generally within normal physiological ranges, their central nervous system response to these cyclical changes differs from asymptomatic women [11]. The luteal-phase decline in estrogen and progesterone has been shown to influence the synthesis and function of key neurotransmitters, particularly serotonin, which regulates mood, emotion, and cognitive stability [32]. Reduced serotonergic activity, altered receptor sensitivity, and impaired reuptake mechanisms have all been implicated in the emotional and behavioral symptoms that characterize PMS and PMDD [36]. In addition to serotonergic dysregulation, neuroendocrine factors, including dysfunction in the hypothalamic-pituitary-gonadal (HPG) and hypothalamic-pituitary-adrenal (HPA) axes, may contribute to heightened stress reactivity and mood disturbances during the premenstrual phase [33]. Variations in gamma-aminobutyric acid (GABA) and allopregnanolone levels have also been associated with irritability, anxiety, and fatigue, possibly via neuroinflammatory responses [33,34]. These biological mechanisms may help explain the present finding that participants with PMS and PMDD exhibited significantly higher stress and depression scores compared to those without symptoms.

The results of the association of PMS and PMDD with quality of life align with the previous literature that reported PMS and PMDD significantly impair quality of life, affecting physical, mental, and social functioning. PMDD is defined by its severe impact, with symptoms potentially being as disabling as major depression and a high risk for suicide attempts. Women with these disorders experience lower quality of life in domains like physical pain, self-esteem, and social/occupational function, leading to reduced productivity, absenteeism, and strained relationships [37]. PMS may lead to absenteeism, loss of income, lower productivity, and decreased work-related quality of life. The results of the present study reported reduced working hours [38].

The strong associations observed between premenstrual disorders and adverse psychological outcomes highlight the need for comprehensive, evidence-based management strategies that address both physiological and emotional dimensions. For women experiencing mild to moderate symptoms, lifestyle modification remains the cornerstone of management. Regular physical activity, adequate sleep, a balanced diet low in caffeine and refined sugars, and stress-reduction practices such as mindfulness and relaxation training have been shown to alleviate symptom severity and improve overall well-being [35].

Nutritional supplementation, particularly with calcium, vitamin B6, and magnesium, may also provide additional benefits in symptom control [36]. For individuals with moderate to severe PMS or PMDD, pharmacological and psychological interventions are often required. Selective serotonin reuptake inhibitors (SSRIs) represent first-line pharmacological therapy due to their well-documented efficacy in reducing both emotional and somatic symptoms by enhancing serotonergic activity [35]. In addition, hormonal therapies, including combined oral contraceptives and gonadotropin-releasing hormone (GnRH) agonists, can stabilize hormonal fluctuations and relieve symptoms in selected patients. Cognitive-behavioral therapy and other structured psychotherapeutic interventions are valuable adjuncts that help women develop adaptive coping strategies and enhance emotional resilience [37].
Despite the growing recognition of menstrual and reproductive mental health globally, significant cultural and social barriers continue to impede awareness, diagnosis, and management of PMS and PMDD in Pakistan. Deeply rooted

sociocultural taboos surrounding menstruation often prevent open discussion of menstrual or emotional difficulties, leading many women to perceive premenstrual symptoms as a normal or shameful part of womanhood rather than a treatable health condition [3,5]. This stigma contributes to low health-seeking behavior, particularly among young, unmarried women, who may fear social judgment or family disapproval when discussing menstrual or mental health concerns [14]. Limited access to gynecologic and mental health services, combined with inadequate reproductive health education in schools and universities, further exacerbates the problem. Socioeconomic constraints and the lack of female healthcare providers also hinder help-seeking behavior, while cultural expectations surrounding modesty and emotional control discourage acknowledgment of premenstrual distress [10]. These findings highlight the need for culturally sensitive awareness campaigns and education programs to normalize menstrual discussions and promote supportive healthcare environments. The findings of this study carry important clinical and public health implications for improving women's reproductive mental health in Pakistan. The significant associations observed between PMS, PMDD, and psychological distress emphasize the need for early screening and timely intervention at both clinical and community levels using validated tools such as the PSST or DSM-5 criteria. Establishing campus-based counseling and health education programs may also foster awareness, reduce stigma, and encourage help-seeking behavior among young women. Furthermore, collaboration between gynecologists, psychiatrists, and psychologists is essential to deliver integrated care that addresses both biological and psychosocial components of premenstrual disorders. At a broader level, menstrual health education should be integrated into academic curricula to empower women with knowledge about menstrual physiology, emotional regulation, and treatment options. These efforts could substantially enhance reproductive well-being, academic performance, and overall quality of life among young women in Pakistan [14,10,39].

Strengths and Limitations

The present study possesses several notable strengths. It employed validated and internationally recognized instruments such as the PSST, PSS-10, GAD-7, CES-D, and SF-36, ensuring the reliability and comparability of its mental health and quality-of-life assessments. Focusing on female university students in Pakistan, it provides valuable insight into an under-researched and socioeconomically important homogeneous population in reproductive health studies. The research adopted a comprehensive approach by examining psychological factors, including stress, anxiety, and depression, alongside QoL dimensions, thereby offering a multidimensional understanding of the psychosocial burden associated with PMS and PMDD. Additionally, the study's findings have direct public health implications, emphasizing the need for awareness, early screening, and university-based interventions to support young women's reproductive and mental well-being.

However, several limitations should be acknowledged. The cross-sectional design prevents the establishment of causal relationships between PMS/PMDD and psychological outcomes. The use of convenience sampling limits the generalizability of the results. The reliance on self-reported data introduces the potential for recall bias and subjective misclassification of symptoms. Moreover, the study did not include clinical confirmation or prospective symptom diaries, which would provide greater diagnostic accuracy for PMS and PMDD. Biological and lifestyle factors such as hormonal levels, diet, and physical activity were not measured, which could influence symptom severity. The characteristics of the menstrual cycle were not determined in the included females, as variations in cycle patterns may impact the assessment of premenstrual symptoms. Finally, the small sample size of the PMDD subgroup may have reduced statistical power, limiting the ability to detect more subtle associations. Despite these limitations, the study offers important and context-specific evidence linking premenstrual disorders to psychological distress and reduced quality of life among young women in Pakistan.

Future Recommendation

Longitudinal designs are recommended to track hormonal and emotional fluctuations across multiple menstrual cycles, enabling stronger causal inferences and unraveling mediating factors. Incorporating objective hormonal assays (e.g., estrogen, progesterone, cortisol, melatonin) and circadian rhythm markers would provide biological validation of self-reported symptoms. Studies with larger and more diverse populations should be conducted to enhance generalizability and account for socio-cultural variations in symptom perception and reporting. Furthermore, integrating neuroendocrine, genetic, and environmental factors such as stress exposure, sleep-wake patterns, and nutritional status could clarify mechanistic pathways linking hormonal imbalance and mood disturbances. Finally, future interventions may explore behavioral, nutritional, and pharmacological strategies for mitigating PMDD-associated depressive symptoms and improving overall reproductive mental health.

Conclusion

The prevalence of PMS and PMDD among young women was 36.2% and 8.5%, respectively. PMS was significantly associated with poorer mental health and reduced quality of life among university students. PMS exerts a broad negative impact across multiple domains of well-being, while PMDD is specifically and strongly linked to severe depression and emotional dysfunction. These results highlight the need for increased awareness, screening, and management of premenstrual disorders in educational and clinical settings to mitigate their impact on women's mental health and quality of life.

Acknowledgments

The authors express their sincere gratitude to all the students who participated in this study by completing the questionnaires.

Author Contributions

MI and MS conceived the idea for the protocol and made the main contribution to planning and preparation of timelines for its completion. SS, HK, LF, MS, MK did the data collection and and MI and FR did statistical analysis. SR & FR designed the tables and wrote the first draft of the manuscript, which was then reviewed and amended by MI, HM. All authors then approved the final written manuscript.

Declaration of Conflicting Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Statement

This research received no specific grant or financial support from any funding agency.

Data Availability

All relevant data supporting the findings of this study are included within the paper.

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