***Original Research Article***

**Comparative Analysis of Blood Pressure Variations during the Follicular and Luteal Phases of the Menstrual Cycle among Teachers with PMS**

**ABSTRACT**

Background : Blood pressure (BP) naturally fluctuates throughout the menstrual cycle due to hormonal changes, and these variations may contribute to worsening symptoms in women with premenstrual syndrome (PMS). Teachers were chosen for this study because their profession is demanding—both emotionally and physically with rigid schedules that might influence BP regulation. Given the vital role educators play in society, understanding these fluctuations could help guide health interventions to better support their well-being.

Aim: This study aimed to compare BP variations between the follicular and luteal phases of the menstrual cycle in women with PMS and explore how PMS severity relates to these changes.

Methods: A cross-sectional study was conducted with 100 teachers diagnosed with PMS. Baseline characteristics such as age, menstrual history, and dietary habits were recorded. BP was measured during the follicular (phase 1) and luteal (phase 2) phases, and the relationship between PMS severity and BP changes was analyzed using paired t-tests and chi-square tests.

Results: Among the participants, 43% were aged 33–37 years, 75% were married, and 86% reported a family history of PMS. The mean systolic BP (SBP) increased from 117.50 mmHg (SD = 4.42) in the follicular phase to 129.02 mmHg (SD = 4.80) in the luteal phase (p < 0.001). Similarly, mean diastolic BP (DBP) rose from 79.84 mmHg (SD = 2.69) to 85.38 mmHg (SD = 3.10) (p < 0.001). Higher PMS severity in the luteal phase was linked to increased SBP (r = 0.809, p < 0.001) and DBP (r = 0.633, p < 0.001). Chi-square analysis also showed a significant association between PMS severity and hypertensive BP levels in the luteal phase (SBP: χ² = 47.395, df = 4, p < 0.001; DBP: χ² = 13.880, df = 4, p = 0.008).

Conclusion

BP levels were notably higher during the luteal phase, and this increase was more pronounced in women experiencing severe PMS symptoms. These findings highlight the need to consider BP fluctuations when addressing PMS-related distress in working women. Future research could explore strategies to help mitigate these effects and promote better health outcomes.

Keywords

Premenstrual syndrome, Blood pressure changes, Menstrual cycle phases, Teachers, Occupational stress

**Introduction**

Blood pressure is under complex physiological regulation, involving hormonal pathways. In females, these sex-specific alterations are evident throughout the menstrual cycle and affect cardiovascular dynamics. Research shows that blood pressure levels are higher in the luteal phase than in the follicular phase, possibly due to increased sympathetic nervous system activity and fluid retention.¹ This variation has substantial clinical significance, especially in women who suffer from premenstrual syndrome (PMS), a luteal-phase occurrence of psychiatric and somatic symptoms that resolve with menses.²

Premenstrual syndrome (PMS) is prevalent among women of reproductive age, and symptoms can vary from mild discomfort to serious distress that impacts daily activity and job performance.³ It is a complex disorder with multisystem dysfunction, including hormonal imbalances, neurotransmitter dysregulation, inflammation, and abnormal cardiovascular function.⁴ Recent research has increasingly focused on blood pressure variations as a potential underlying factor for PMS and, in some studies, an increased risk of developing hypertension in PMS patients. Additionally, reports indicate a rise in hypertension cases among young women.¹ Our understanding of blood pressure alterations throughout the menstrual cycle and their link to hypertension is relatively poor.⁵

The hypothalamic-pituitary-ovarian (HPO) axis governs the menstrual cycle, which consists of two main phases: the estrogen-dominant follicular and the progesterone-surge luteal phase. These hormonal and physiological changes affect vascular tone, fluid volume, and autonomic nervous system regulation, all of which contribute to changes in blood pressure.⁶ Although some studies have indicated a direct link between hormonal fluctuations and cardiovascular responses, results are inconsistent, warranting further empirical investigation.⁷

Given the considerable stress experienced by teachers in the workplace, which can lead to hormonal imbalances and aggravate PMS symptoms, the study population was determined to be female educators. Teaching is widely recognized as one of the most stressful professions, involving heavy workloads, long hours, and the emotional labor of managing student behavior.⁸ Chronic occupational stress in educators has been shown to affect autonomic nervous system function, menstrual cycle regulation, and blood pressure fluctuations.⁹ These factors make female teachers an important population for examining the relationship between PMS, cardiovascular function, and occupational stress. Moreover, stress-induced fluctuations in key hormones, particularly cortisol and catecholamines, influence vascular resistance and blood pressure regulation, highlighting the need to investigate occupational health risks for women balancing work and family responsibilities while navigating career competition.

The association between PMS and hormonal fluctuations is thought to play a pivotal role in blood pressure control, highlighting the importance of examining how blood pressure varies throughout the menstrual cycle, particularly in women with PMS. A greater understanding of these differences could better inform clinical management of PMS-related cardiovascular symptoms and long-term hypertension risk.

Using standardized measurements and comprehensive statistical analysis, this study investigates the changes in systolic and diastolic blood pressure between the follicular and luteal phases in women with PMS. It seeks to enhance our knowledge of the effects of hormonal changes on cardiovascular adaptation by filling gaps in the current literature. The findings may help inform clinical recommendations on health risks associated with PMS and support more individualized care for women. Because data on whether and how these changes vary across different populations and job settings remain scarce, this study also underscores the need for broader research in diverse groups. By providing a clear comparison of blood pressure differences across the menstrual cycle, this study contributes to women's heart health and may help refine recommendations for blood pressure monitoring frequency to support more effective and personalized healthcare approaches.

**Statement of the Problem**

Comparative Analysis of Blood Pressure Variations during the Follicular and Luteal Phases of the Menstrual Cycle among teachers with PMS in selected schools at Kalaburagi

**Objectives**

* To compare blood pressure levels between the follicular and luteal phases of the menstrual cycle among women with PMS.
* To assess the severity of PMS symptoms during the follicular and luteal phases of the menstrual cycle.
* To determine the correlation between blood pressure variations and the severity of PMS symptoms across the menstrual cycle phases.
* To find the association of severity of PMS with blood pressure variations during the menstrual cycle phases among women with PMS.

**Assumption**

Blood pressure variations occur naturally across different phases of the menstrual cycle and are measurable among women with premenstrual syndrome (PMS).

Women experiencing PMS exhibit distinct physiological, psychological, and behavioural symptoms that vary in severity between the follicular and luteal phases.

The variations in blood pressure across the menstrual cycle are correlated with the severity of PMS symptoms, suggesting a physiological link between cardiovascular function and PMS.

women with more severe PMS symptoms experience greater blood pressure fluctuations during the menstrual cycle compared to those with milder symptoms.

**Hypothesis**

There is a significant difference in blood pressure levels between the follicular and luteal phases of the menstrual cycle among women with PMS.

The severity of PMS symptoms differs significantly between the follicular and luteal phases of the menstrual cycle.

There is no significant correlation between blood pressure variations and the severity of PMS symptoms.

There is no significant difference in blood pressure fluctuations during the menstrual cycle between women with severe PMS symptoms and those with milder symptoms.

**Materials and Methods**

This study used a descriptive cross-sectional research design to compare blood pressure variations between the follicular and luteal phases of the menstrual cycle among women with PMS in government, private, and aided schools in Kalaburagi from June to September 2022.

**Sampling and Participants**

Participants were selected using cluster random sampling. The study included women aged 22 to 49 years with regular menstrual cycles and a Premenstrual Symptoms Screening (PMSS) score above 40. Women with polycystic ovarian disease (PCOD), lactation amenorrhea, pelvic inflammatory disease, diabetes, or hypertension were excluded. Additionally, women using oral contraceptives, obsessed, smoking, consuming alcohol, or engaging in intense exercise were excluded to minimize confounding factors affecting blood pressure and PMS symptoms.

**Data Collection and Measures**

Participants were screened using a structured tool and a self-administered questionnaire that collected demographic details, including age, place of residence, education level, marital status, type of institution, monthly income, age at menarche, menstrual cycle duration, family history of PMS, dietary habits, and food cravings. PMS severity was assessed using the standardized Premenstrual Symptom Scale.

Blood pressure was measured using a digital monitor. For accuracy, readings were compared with a Richter mercury sphygmomanometer in 10 individuals, and the Pearson correlation coefficient was calculated. The digital monitor’s accuracy was periodically verified throughout the study.

**Study Procedure**

Seventy-five schools were selected in Kalaburagi, equally distributed among private, government, and aided institutions. Teachers from these schools were invited to participate, and 300 were initially screened for PMS. Of these, 258 returned the screening tool, and 180 were identified as having PMS. Among them, 100 met the inclusion criteria and were selected for the study.

Blood pressure measurements were recorded for the 100 teachers diagnosed with PMS during two phases of their menstrual cycle: two days before menstruation (luteal phase) and two days after menstruation (follicular phase). Measurements were taken on the right arm after a 10-minute rest, with the cuff placed 1–2 cm above the elbow. Systolic and diastolic blood pressure readings were documented. These measurements were repeated during the first and fourth menstrual cycles to assess variations between the two phases.

### Statistical Analysis

Data were analyzed using SPSS 26, employing the following statistical tests:

* **Paired sample t-test** to compare blood pressure readings between the follicular and luteal phases.
* **Chi-square test** to analyze categorical variables, including sociodemographic factors and PMS severity.
* A **significance level of P < 0.05** was considered for all statistical analyses.

**RESULTS:**

The baseline characteristics of the study participants (N=100) provide key demographic and health-related insights. The majority of participants (43%) belonged to the age group of 33–37 years, followed by 28–32 years (22%) and 38–45 years (25%), with the least representation from the 22–27 age group (10%). Regarding educational status, 27% had a BSc/B.Ed. Degrees, 24% held an MSc/M.Ed., 21% completed a BA/B.Ed., and 22% had an MA/M.Ed. Qualifications, while 6% belonged to other categories. A significant proportion (75%) were married, while 25% were unmarried. Institutional affiliation showed a nearly even distribution among government (37%), private (34%), and aided (29%) schools.

Monthly income varied, with 39% earning between ₹25,001 and ₹35,000, followed by 26% in the ₹15,001–₹25,000 range and 17% earning ₹35,001–₹40,000. Only 10% earned₹40,001 or more, while 8% had an income of₹15,000 or less. The majority of participants (58%) reported experiencing menarche between 13 and 16 years, with 27% at ≤13 years and 15% at ≥16 years.

Menstrual cycle duration varied, with the majority (57%) reporting a 28-day cycle, while 23% had a 24-day cycle and 10% each had either a 23-day or 35-day cycle. A notable 86% of participants had a family history of premenstrual syndrome (PMS), with mothers being the most frequently affected (52%), followed by grandmothers (14%), aunts (11%), and sisters (9%).

Dietary patterns revealed that 60% followed a mixed diet, 24% were vegetarians, and 16% were non-vegetarians. Food cravings were prevalent among 83% of participants, with sweets (54%) being the most commonly craved item, followed by sour foods (10%), spicy foods (9%), dark chocolates (6%), and salty foods (4%). No participants reported craving beverages.

Fig :1 Pie diagram :01 showing PMS Severity Distribution during the Follicular Phase and luteal phase

**Table 1 :** Blood Pressure Variations During the Follicular and Luteal Phases of the Menstrual Cycle

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  | | --- | | **Phase** | | |  | | --- | | **BP Type** | | **N** | **Min** | **Max** | **Mean** | **SD** |
| Follicular Phase | Systolic BP (mmHg) | 100 | 107 | 127 | 117.50 | 4.42 |
| Diastolic BP (mmHg) | 100 | 73 | 85 | 79.84 | 2.69 |
| Luteal Phase | Systolic BP (mmHg) | 100 | 117 | 139 | 129.02 | 4.80 |
| Diastolic BP (mmHg) | 100 | 79 | 91 | 85.38 | 3.10 |

The comparative analysis of blood pressure variations across the follicular and luteal phases of the menstrual cycle reveals notable differences. During the follicular phase, the mean systolic blood pressure (SBP) was 117.50 mmHg (SD = 4.42), ranging from 107 to 127 mmHg, while the mean diastolic blood pressure (DBP) was 79.84 mmHg (SD = 2.69), with values ranging from 73 to 85 mmHg.

In the luteal phase, there was a marked increase in blood pressure readings. The mean SBP rose to 129.02 mmHg (SD = 4.80), with a range of 117–139 mmHg, while the mean DBP increased to 85.38 mmHg (SD = 3.10), with values ranging from 79 to 91 mmHg. These findings indicate a significant elevation in both systolic and diastolic blood pressure during the luteal phase compared to the follicular phase, suggesting potential physiological influences of hormonal fluctuations on cardiovascular parameters. This variation may have clinical implications, particularly for individuals prone to premenstrual hypertension or related cardiovascular concerns.

Table 2 : Showing the Comparative Analysis of Blood Pressure Between Follicular and Luteal Phases of the Menstrual Cycle

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| BP | Follicular  Mean | Luteal Mean | Mean Difference | SD | t  value | df | p-value | 95%  CI |
| Systolic (mmHg) | 117.50 | 129.02 | -11.52 | 0.73 | -157.50 | 99 | <0.001 | -11.665 to -11.375 |
| Diastolic (mmHg) | 79.84 | 85.38 | -5.53 | 0.40 | -136.10 | 99 | <0.001 | -5.617 to -5.456 |

The paired sample t-test was conducted to compare systolic and diastolic blood pressure between the follicular and luteal phases of the menstrual cycle. The results indicate a statistically significant increase in both systolic and diastolic blood pressure during the luteal phase. The mean systolic blood pressure increased from 117.50 mmHg (SD = 0.73) in the follicular phase to 129.02 mmHg in the luteal phase, with a mean difference of -11.52 mmHg (t = -157.50, df = 99, p < 0.001). The 95% confidence interval for the mean difference ranged from -11.665 to -11.375, confirming a significant rise. Similarly, the mean diastolic blood pressure increased from 79.84 mmHg (SD = 0.40) in the follicular phase to 85.38 mmHg in the luteal phase, with a mean difference of -5.53 mmHg (t = -136.10, df = 99, p < 0.001). The 95% confidence interval for the mean difference ranged from -5.617 to -5.456, reinforcing the significance of the increase. These findings suggest a consistent elevation in blood pressure during the luteal phase, which may be attributed to hormonal fluctuations associated with the menstrual cycle. The results highlight the potential need for monitoring blood pressure changes in women experiencing premenstrual symptoms, particularly those at risk of hypertension.

**Table 3 :** Showing Comparative Analysis of Premenstrual Syndrome (PMS) Scores Between Follicular and Luteal Phases

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PHASE | PMS  Mean & SD | Mean Difference | t value | df | p-value | 95% CI |
| Follicular Phase | 129.98±**15.12** | -16.470 | -52.106 | 99 | < 0.001 | -17.211 to -15.949 |
| Luteal Phase | 146.56±**16.90** |

A paired sample t-test was conducted to compare PMS scores between the follicular and luteal phases. The mean PMS score was **129.98 (SD = 15.12)** in the follicular phase and **146.56 (SD = 16.90)** in the luteal phase. The difference was statistically significant, **t(99) = -52.11, p < .001**, with a **mean difference of -16.47** (95% CI [-17.21, -15.95]). These findings indicate a significant increase in PMS symptoms during the luteal phase. The results align with existing literature on hormonal fluctuations exacerbating PMS symptoms, underscoring the need for targeted symptom management strategies.

**Table 4 :** Showing the Correlation Between Premenstrual Syndrome (PMS) Scores and Blood Pressure During Follicular and Luteal Phases

|  |  |  |  |
| --- | --- | --- | --- |
| Phase | Variable | R | p-value |
| Follicular Phase | PMS Score & Systolic BP | 0.787 | < 0.001 |
| PMS Score & Diastolic BP | 0.614 | < 0.001 |
| Luteal Phase | PMS Score & Systolic BP | **0.809** | < 0.001 |
| PMS Score & Diastolic BP | 0.633 | < 0.001 |

The results indicate a strong positive correlation between PMS scores and systolic blood pressure across both menstrual phases, with a slightly higher correlation observed in the luteal phase (r = 0.809, p < 0.001) compared to the follicular phase (r = 0.787, p < 0.001). This suggests that as PMS severity increases, systolic blood pressure tends to rise, with a more pronounced effect during the luteal phase, likely due to hormonal fluctuations. Similarly, a moderate but significant positive correlation was found between PMS scores and diastolic blood pressure, with the correlation being slightly stronger in the luteal phase (r = 0.633, p < 0.001) than in the follicular phase (r = 0.614, p < 0.001). These findings highlight a consistent association between PMS severity and blood pressure regulation, with systolic BP showing a stronger relationship compared to diastolic BP.

**Table 5:** Showing the association between PMS severity and systolic Blood Pressure categories during Follicular and Luteal Phases

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Phase | PMS Severity | Normal BP | Elevated | Hypertensive | χ² df | Cramér’s V | P value |
| Follicular | Moderate | 19 | 7 | Nil | 14.562  df 2 | 0.382 | < 0.001 |
| Sever | 54 | 18 | Nil |
| Very Sever | 1 | 1 | Nil |
| **Total** | **74** | **26** | **Nil** |
| Luteal | Moderate | 1 | 4 | 5 | 47.395  df 4 | 0.688 | < 0.001 |
| Sever | 4 | 31 | 31 |
| Very Sever | 1 | 12 | 11 |
| **Total** | **6** | **47** | 47 |

A chi-square test revealed a significant association between PMS severity and systolic BP across both menstrual phases. In the **follicular phase (χ² = 14.562, df = 2, p = 0.001)**, the relationship was moderate, indicating that while PMS severity influenced BP, its effect was not very pronounced. However, in the **luteal phase (χ² = 47.395, df = 4, p < 0.001)**, the association was stronger, with a higher number of participants experiencing elevated and hypertensive BP as PMS severity increased. This suggests that PMS-related physiological changes have a **greater impact on systolic BP during the luteal phase**, aligning with the known effects of hormonal fluctuations on cardiovascular regulation.

**Table 6:** Showing the association between PMS severity and Diastolic Blood Pressure categories during Follicular and Luteal Phases

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| PHASE | PMS Severity | Normal BP | Elevated | Hypertensive | χ² df | Cramér’s V | P value |
| Follicular | Moderate | 16 | 9 | Nil | 21.722  df 2 | 0.466 | < 0.001 |
| Sever | 46 | 27 | Nil |
| Very Sever | - | 01 | Nil |
| **Total** | **63** | **37** | **Nil** |
| Luteal | Moderate |  | 9 | 01 | 13.880  df 4 | 0.373 | > 0.001 |
| Sever | 02 | 65 | 06 |
| Very Sever | 01 | 15 | 01 |
| **Total** | **03** | **89** | 08 |

A chi-square test demonstrated a significant association between PMS severity and **diastolic blood pressure (DBP)** across menstrual phases. In the **follicular phase (χ² = 21.722, df = 2, p < 0.001),** individuals with severe PMS were more likely to have elevated DBP, though none were classified as hypertensive. The association was stronger in the **luteal phase (χ² = 13.880, df = 4, p = >0.001),** where a notable shift toward elevated and hypertensive DBP was observed as PMS severity increased. This indicates that diastolic pressure is more impacted in the luteal phase, possibly due to heightened autonomic and vascular responses linked to hormonal fluctuations.

**DISCUSSION**

Premenstrual syndrome (PMS) is a common condition that encompasses a range of physical, emotional, and behavioural symptoms that manifest during the luteal phase of the menstrual cycle and subside after menstruation. The severity of PMS varies from moderate to severe, and some people feel that it negatively impacts their daily lives, including their social and professional lives. The hormones progesterone and estrogen believed to be responsible for their presence at this time of the month, and emerging evidence indicates that PMS may also be associated with physiological changes, such as changes in blood pressure with potential cardiovascular effects. Since Premenstrual symptoms are associated with symptomatic and long-term health impairment, the current study sought to assess PMS severity on blood pressure variability over the menstrual cycle concerning demographic and lifestyle characteristics with symptomatology expression.

This study was conducted among teachers and confirmed that PMS was predominantly diagnosed in women in their 30s (Osborn et al., 2020), with most of the participants (43%) being in the age group 33–37 years old. 10 Furthermore, because the study participants had a high level of education, this feature has been linked in the past to increased awareness and reporting of PMS symptoms. Saraei et al. found that more educated nurses were more aware of PMS and reported it more often. 11 The majority of participants (75%) were married, which is consistent with research by Simarjeet et al. that shows marital status influences premenstrual symptoms and that married women have higher levels of mental and physical pain.12 This is likely due to added responsibilities and sources of stress associated with marriage, affecting symptom perceptions and severity. The findings indicate that the majority of participants (58%) had menarche between the ages of 13 and 16, which is consistent with the study by Ramraj et al. that discussed the correlations between menarche age and generational disparities. 13

Participants reported different durations of menstrual cycles, and the most common cycle observed among them was a 28-day cycle (57%), followed by 24-day (23%), and 10% were experiencing either a 23-day or 35-day cycle. The findings of the Apple Women's Health Study Team are consistent with the results that the duration of a menstrual cycle can vary according to the factors such as age, weight, race, and ethnicity. The research of OHVL found that 28-day cycles are typical and that shorter and longer cycles are prevalent due to similar physiological causes and lifestyle factors. 14 Participants in the current study had 23-day and 35-day cycles, which supports the idea that ovulatory cycles vary and can affect a person's demographic characteristics and medical issues. These differences highlight the importance of individualized menstrual health evaluations and the recognition of cycle irregularity.

The high percentage (86%) of participants with a family history of PMS, with mothers (52%) being the most affected, supports the inherited basis of PMS. Bemina and Mathias's contribution to familial correlations in PMS severity confirms the role of shared environmental and genetic factors in symptom expression.15 Similarly, Lakshmi et al. reported that PMS is prevalent among women of reproductive age and may be due to a strong family history.16 60% of subjects followed a mixed diet, 24% were vegetarians, and 16% of the subjects were non-vegetarians in the dietary patterns of the current study.

Ghosh et al. (2023) demonstrated the involvement of eating habits in the severity of PMS, as they reported that the intensity of PMS symptoms varies between vegetarian and non-vegetarian women.17 Additionally, their study suggests that hormonal balance and PMS symptoms can be affected by dietary composition, specifically the variations in nutrient intakes. These combined dietary patterns emphasize the importance of adequate intake of nutrient-rich foods that contain various vitamins and nutrients associated with preventing PMS symptoms. 83% of individuals reported having regular food cravings, with sweets accounting for 54% of these urges. According to Hantsoo et al. (2022), another significant premenstrual symptom is sweet cravings, which most likely result from hormonal changes that alter serotonin levels.18 The high frequency of sweet desires previously noted in both investigations proves that PMS-related neurobiological processes contribute to changing dietary preferences.

The data from this study shows a statistically significant rise in both systolic and diastolic blood pressure in the luteal phase as compared to the follicular phase, with mean SBP taking a jump from116.68 mmHg to 131.56 mmHg (p < 0.001) and mean DBP moving from 80.53 mmHg to 85.08 mmHg (p < 0.001). These results align with those of Singh et al. (2024), who also examined significant fluctuations in blood pressure detection between menstrual phases. They attributed the rise in the luteal phase to changes in hormones within a cycle, specifically in progesterone and estrogen levels.19 The findings in the present study show a significant increase in PMS scores in the luteal phase compared to the follicular phase, with mean PMS scores rising from 129.98 to 146.56 (p < 0.001). Such finding is consistent with the study by Henz et al. (2018), which also reported an aggravation of PMS during the luteal phase, assessed with validated tools such as the DRSP and PSST. 20

Our study showed a significant positive correlation between PMS scores and systolic blood pressure (SBP) for both the follicular (r = 0.787, p < 0.001) and luteal phases (r = 0.809, p < 0.001). Likewise, moderate positive correlations were between PMS scores and DBP during both phases (r = 0.614 and r = 0.633, respectively, p < 0.001). Additionally, the results of this study indicate a physiological association between the cardiovascular response and the intensity of PMS during the menstrual cycle, with higher PMS scores predicting higher blood pressure throughout the period. However, a comparison is made with those of Kulshreshtha et al. (2021), that their study showed no significant differences in SBP and DBP between follicular and luteal phases. 21 Cases SBP elevated from 115.91 ± 7.30 mmHg during the follicular phase to 117.08 ± 6.77 mmHg during the luteal phase, and DBP increased slightly from 74.41 ± 5.98 mmHg to 75.25 ± 5.10 mmHg (P < 0.001 for both). These changes were not markedly different from the control group in which both SBP and DBP levels were stable across both phases. Despite the significant differences between these two studies, it appears that PMS does raise blood pressure, albeit the extent of the effect varies depending on the topic, the technique used to measure blood pressure, and the severity of PMS.

When compared to women with less severe PMS, those with more severe PMS had higher systolic and diastolic blood pressure readings (systolic BP: χ² = 47.395, df = 4, p < 0.001; diastolic BP: χ² = 13.880, df = 4, p = 0.008), with significant associations upon stratifying analysis for all menstrual phases, but with a considerably stronger association observed in the luteal phase of the cycle. The follicular phase revealed a strong association, even with a moderating influence (χ² = 14.562, df = 2, p = 0.001 for systolic BP; χ² = 21.722, df = 2, p < 0.001 for diastolic BP). Unlike Kulshreshtha et al., in their study, they found no difference in systolic and diastolic BP between PMS cases and controls during the follicular or the luteal phases. However, the current study found a clear trend of increased and hypertensive BP in severe cases of PMS, especially in the luteal phase.21

Although Kulshreshtha et al. do not fully document blood pressure changes, the range in the data indicates that the severity of PMS affects these changes. The results of this study are more in line with Bertone-Johnson et al. (2016), who found that diastolic blood pressure is considerably higher in PMS cases (72.3 mmHg vs. 69.1 mmHg in controls, p = 0.02) and even higher in women with severe PMS symptoms (77.7 mmHg, p = 0.007).22

The findings of this study underscore the significant variations in systolic and diastolic blood pressure across menstrual phases, particularly among individuals with severe PMS. The strong positive correlation between PMS scores and blood pressure highlights the physiological link between PMS severity and cardiovascular responses, emphasizing the role of hormonal fluctuations in vascular changes. These results further support existing literature suggesting that PMS may contribute to cardiovascular risk, particularly in women with a family history of the condition. The study also revealed that demographic factors such as age, education level, marital status, and dietary habits influence PMS severity, reinforcing the need for a holistic approach to symptom management.

**Conclusion**

Our study highlights a significant rise in blood pressure during the luteal phase among women with PMS, emphasizing the physiological influence of menstrual cycle hormones on cardiovascular function. The strong correlation between PMS severity and blood pressure variations suggests that targeted interventions may be necessary to prevent potential cardiovascular complications in this population. These findings contribute to the growing literature on menstrual cycle-related cardiovascular health and warrant further exploration in future studies. Future research should explore the long-term cardiovascular effects of PMS and assess targeted interventions, such as mindfulness-based cognitive therapy, to alleviate its psychological and physiological burden. Additionally, incorporating stress levels and sleep patterns—factors not examined in this study—could provide deeper insights into the physiological impact of PMS. Understanding their role may help refine intervention strategies, leading to more comprehensive approaches for managing PMS symptoms.

**Consent**

Written informed consent was obtained from all participants, ensuring confidentiality.

**Ethical Approval:**

The study was approved by the Ethics Committee of ESIC Medical College and Hospital, Kalaburagi.

Disclaimer (Artificial intelligence)

I hereby declare that no generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have not been used during the writing or editing of this manuscript.

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