

# Association Between Premenstrual Syndrome (PMS), Menstruation-Related Symptoms (MRS), and Physical Activity Participation Among Young Adult Women

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## ABSTRACT

**Background:** Premenstrual syndrome (PMS) and menstrual-related symptoms (MRS) can have an unpleasant effect on women that negatively influence their ability to carry out regular activities including physical activity, exercise, and sport participation. Therefore, this article aims to investigate the prevalence and association of PMS and MRS toward young adult women's physical activity participation. **Methods:** This is a cross-sectional study that surveyed 131 young female adults aged 18-30 years old using a web-based online questionnaire made up of the sociodemographic section, and items from the Premenstrual Syndrome Questionnaire (PMS-Q), Menstrual Symptom Questionnaire (MSQ), and International Physical Activity Questionnaire - Short Form (IPAQ-SF). **Results:** Majority of the participants experienced mild degree of PMS severity (85.5%) and moderate degree of MRS frequency (66.4%). Higher severity of PMS was found, significant but weakly associated with higher physical activity participation ( $r = 0.184$ ,  $p < 0.05$ ). However, frequency of MRS was not associated with levels of physical activity participation ( $r = -0.093$ ,  $p > 0.05$ ). **Conclusion:** Our findings show association between both PMS and MRS toward the young female adults' physical activity participation levels. Further investigation with bigger sampling and wider age groups should be conducted to ascertain the findings.

## Keywords:

premenstrual syndrome; menstrual-related symptoms; physical activity participation; young adults

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## INTRODUCTION

Almost 1.8 billion adults, representing about 31% of the world's adult population are not physically active with women being less active than men (Strain et al., 2024). Numerous factors have been identified as determinants of adults' participation in physical activity, and these are generally categorized as biological, behavioral, psychological, social, or physical determinants (Aleksavska et al., 2019; Condello et al., 2017; Cortis et al., 2017; O'Donoghue et al., 2018; Kärmeniemi et al. 2018). For women, an important biological determinant of physical activity participation is the menstrual cycle, particularly the symptoms experienced during the premenstrual and menstrual phases (Gopalan, Mann, & Rhodes, 2024). Globally, 47.8% of women of reproductive age are affected by premenstrual syndrome (PMS). Among these women, about 20% experience symptoms severe enough to disrupt their daily activities, while the rest report mild to moderate symptoms (Direkvand-Moghadam et al., 2014).

PMS symptoms can affect women in multiple ways, including impairing physical and psychological functioning, and significantly disrupting productivity in their personal, social, and professional lives (Delara et al., 2012; Gudipally

& Sharma, 2022; Loukazadeh et al., 2024; Schoep et al. 2019). PMS and MRS can have unpleasant effects on women challenging their ability to carry out regular activities including physical activity, exercise, and sport participation. However, the limited evidence available in the literature indicates that the impact of menstrual cycle-related symptoms on physical activity remains inconclusive (Kim et al., 2022). Prior studies have focused on examining the impact of physical activity levels on PMS and MRS among non-athlete populations (Shi et al., 2023; Sanchez et al., 2023; Romadona, 2021; Azhary et al., 2022; Bougault et al., 2023) as well as the effect of PMS and MRS on the sport and exercise performance among athletes (Carmichael et al., 2021; Brown et al., 2021; Bruinvels et al., 2021; Lima Trostdorf, 2021). Thus, the objective of this study is to investigate the prevalence and effect of PMS and MRS on physical activity participation among non-athlete young adult women.

## MATERIALS AND METHODS

### Study design

This is a cross-sectional study that surveyed the influence of PMS and MRS on physical activity participation among

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young adult women aged 18 to 30. Ethics was approved by the university research ethics committee. Sample size calculated with significant level and power set at 0.05 and 80%, respectively, was 123. Participants were recruited using convenience sampling among undergraduate university students. The web-based online questionnaire was distributed through social media platforms such as WhatsApp and Telegram. Candidates were considered eligible if they were young adult women aged 18 to 30 years and had experienced regular menstrual cycles for at least the past three months. Participants were excluded if they are currently pregnant or have chronic medical conditions affecting physical activity participation. Informed consent was obtained from participants by agreeing to proceed after reading consent statement on the first page of the web-based online questionnaire.

### Research instruments

The web-based questionnaire consisted of four parts: a sociodemographic section, the Premenstrual Syndrome Questionnaire (PMS-Q), the Menstrual Symptom Questionnaire (MSQ), and the International Physical Activity Questionnaire–Short Form (IPAQ-SF). Sociodemographic data collected from all participants included age, height (cm), weight (kg), current contraceptive use, history of contraceptive pill use, and duration (in years) of contraceptive pill intake.

#### Premenstrual syndrome questionnaire (PMS-Q)

PMS-Q is a self-reported questionnaire used for measuring the severity of premenstrual symptoms (Kundu et al., 2019). The questionnaire comprised 26 items categorized into five domains of premenstrual symptoms, corresponding to the premenstrual tension (PMT) subgroups: anxiety, cravings, depression, hyperhydration, and other symptoms. (ElDeeb, Atta, & Osman, 2020; Hargrove & Abraham, 1982). Each item was rated on a three-point Likert scale: 1 (mild), 2 (moderate), and 3 (severe). The PMS-Q assesses the timing of symptoms, specifically whether they occur a week before menstruation, a week after, or at another time. To meet the diagnostic criteria for PMS, symptoms must develop a week before the period and diminish within a few days of the start of menstruation. No reliability or validity data is available for PMS-Q.

#### Menstrual symptom questionnaire (MSQ)

MSQ is a self-report measure aimed to evaluate menstruation symptoms including pain (Negriff et al., 2009). The questionnaire comprised 24 items, with participants selecting one of five response options to

indicate the extent to which they experienced each symptom. Each item was scored on a scale from 1 (never) to 5 (always), with higher total scores indicating greater severity of menstrual symptoms. (Alkhatib et al., 2022). In this study, some items were excluded due to overlap with the PMS-Q, resulting in only 13 items being retained in the survey questionnaire. The MSQ has been reported as a reliable tool, with a Cronbach's alpha of 0.90 for the total scale and test–retest reliability ranging from 0.80 to 0.90 (Alkhatib et al., 2022; Li et al., 2023).

#### International physical activity questionnaire-short form (IPAQ-SF)

IPAQ-SF is a self-measure tool that consisted of seven items to quantify physical activity participation at four different intensity levels including vigorous-intensity activity, moderate-intensity activity, walking, and sitting (Craig et al., 2003). The frequency (measured in days per week) and duration (measured in time per day) of each specific type of activity are reported based on activities performed in the last seven days. Subsequently, Metabolic Equivalent of Task (MET) was calculated in accordance with the IPAQ recommendations. IPAQ-SF is reported to have a good to excellent test-retest reliability but low to moderate concurrent validity when compared to objective monitoring tools (Ács et al., 2021; Sand et al., 2017; Lee et al., 2011).

#### Data analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) software (version 29.0). A p-value of less than 0.05 was considered statistically significant. As for descriptive statistics, the frequency, valid percent, and cumulative frequency were used to present all the independent variables. For inferential statistics, Spearman's correlation test was used to analyze the association between variables, as the data were ordinal.

## RESULTS

#### Participants characteristics

The sociodemographic profiles of the participants (N=131) who took part in this study are presented in Table 1. The majority of female participants were between 21 and 25 years of age (80.9%), not using any methods of contraception (93.9%), and reported no prior contraceptive pill use (97.7%).

**Table 1: Sociodemographic Profiles of the Participants (N=131)**

Baseline Characteristic	n	%
<b>Age</b>		
≤ 20	7	5.3
21 - 25	106	80.9
≥ 26	18	13.8
<b>Present</b>		
Contraception Pill	3	2.3
Other <sup>a</sup>	5	3.8
None	123	93.9
<b>History of Contraceptive Pills</b>		
No	128	97.7
Yes	3	2.3

Note. <sup>a</sup>Other contraceptive method: condom, female condom or diaphragm.

## Menstrual symptom questionnaire (MSQ)

The majority of participants reported a moderate frequency of menstrual symptoms (66.4%), while 35 participants (26.7%) and 9 participants (6.9%) reported low and high frequencies, respectively (Figure 2). Among the menstrual symptoms reported, nearly one-quarter (24.4%) responded to having always experienced tenderness on the first day of period at the lower back, abdomen, and inner thighs. More than one-third of the participants responded that they often experienced cramps and backache on the first day of menstruation (34.4% and 32.8%, respectively). Nearly one-third rarely experienced diarrhoea (28.2%), and feeling weak and dizziness (27.5%), during menstruation. Most participants did not use prescribed medication (40.5%) or aspirin (43.5%) during menstruation (Table 3).

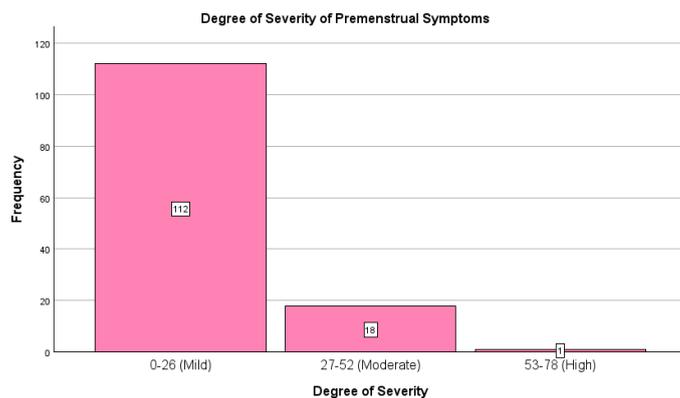
**Table 2: Premenstrual Symptoms and Its Severity Experienced by Female Undergraduate Students**

Symptoms	Degree of severity						Total
	Mild		Moderate		Severe		
	n	%	n	%	n	%	
Anxiety	14	10.7	19	14.5	6	4.6	39
Irritability	12	9.2	27	20.6	15	11.5	54
Mood swings	6	4.6	48	36.6	16	12.2	70
Nervous tension	15	11.5	15	11.5	16	12.2	46
Appetite increase	10	7.6	36	27.5	24	18.3	70
Headache	16	12.2	29	22.1	16	12.2	61
Fatigue	14	10.7	32	24.4	14	10.7	60
Dizziness/fainting	17	13.0	14	10.7	16	12.2	47
Pounding heart	11	8.4	13	9.9	7	5.3	31
Depression	13	9.9	13	9.9	10	7.6	36
Crying	14	10.7	35	26.7	18	13.7	67
Forgetfulness	11	8.4	17	13.0	6	4.6	34
Confusion	8	6.1	16	12.2	5	3.8	29
Insomnia	6	4.6	14	10.7	4	3.1	34
Fluid retention	4	3.1	14	10.7	7	5.3	25
Weight gain	10	7.6	21	16.0	3	2.3	34
Swollen limbs	3	2.3	12	9.2	7	5.3	22
Breast tenderness	12	9.2	26	19.8	9	6.9	47
Abdominal bloating	12	9.2	22	16.8	10	7.6	44
Oily skin	8	6.1	24	18.3	4	3.1	36
Acne	8	6.1	29	22.1	11	8.4	48
Constipation	7	5.3	17	13.0	7	5.3	31
Diarrhea	7	5.3	8	6.1	2	1.5	17
Backache	8	6.1	34	26.0	12	9.2	54
Hives	2	1.5	10	7.6	4	3.1	16
Weakness & radiation down thighs	3	2.3	11	8.4	7	5.3	21

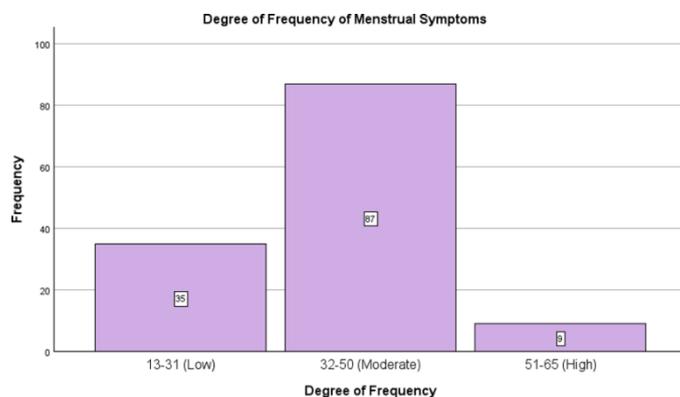
Note. All the symptoms and their severity were selected based on their occurrence one week prior to the start of period.

## Premenstrual syndrome questionnaire (PMS-Q)

The majority of the participants experienced mild degree of premenstrual symptoms (PMS) severity (85.5%) with only 18 (13.7%) and 1 (0.8%) experienced moderate and severe level of PMS severity, respectively (Figure 1). Among those who responded as having mild degree of PMS severity, dizziness/fainting, headache, nervous tension, anxiety, and fatigue, were the most reported symptoms for PMS. Among participants who reported moderate and severe levels of PMS severity, the most frequently reported symptoms were mood swings (36.6%) and increased appetite (18.3%), respectively (Table 2).



**Figure 1: Degree of Severity of PMS Experienced by Female Undergraduate Students**



**Figure 2: Degree of Frequency of Menstrual Symptoms Encountered by Female Undergraduate Students**

## Association between PMS, Menstrual Symptoms, and Physical Activity Participation

The Spearman's correlation coefficient between the severity of PMS and the level of physical activity was 0.184 ( $p < 0.05$ ). This indicates a significant although weak positive correlation, suggesting that there was a slight tendency for higher severity of premenstrual symptoms to be associated with higher physical activity participation (Table 4).

**Table 3: Menstrual Symptoms and Its Frequency Encountered by Female Undergraduate Students**

Symptoms	Degree of Frequency									
	Never		Rarely		Sometimes		Often		Always	
	n	%	n	%	n	%	n	%	n	%
I have cramps that begins on the first day of my period.	6	4.6	23	4.6	30	22.9	45	34.4	27	20.6
I only know that My period is coming by looking at the calendar.	10	7.6	18	13.7	57	43.5	28	21.4	18	13.7
I take a prescription drug for the pain during my period.	53	40.5	35	26.7	19	14.5	16	12.2	8	6.1
I feel weak & dizzy during my period.	13	9.9	36	27.5	37	28.2	29	22.1	16	12.2
I have diarrhea during my period.	36	27.5	37	28.2	34	26.0	15	11.5	9	6.9
I take aspirin for the pain during my period.	57	43.5	25	19.1	29	22.1	15	11.5	5	3.8
My lower back, abdomen & inner sides of my thighs begin to hurt or tender on the first day of period.	12	9.2	30	22.9	36	27.5	21	16.0	32	24.4
During the first day or so of my period, I feel like curling up in bed or taking a hot bath.	14	10.7	22	16.8	35	26.7	34	26.0	26	19.8
I am constipated during my period.	32	24.4	32	24.4	39	29.8	18	13.7	10	7.6
Beginning on the first day of my period, I have pain which may disappear for several minutes and then reappear.	6	4.6	30	22.9	38	29.0	33	25.2	24	18.3
The pain I have with my period is not intense but a continuous dull aching.	8	6.1	29	22.1	44	33.6	35	26.7	15	11.5
I have backaches which begin the same day as my period.	8	6.1	21	16.0	36	27.5	43	32.8	23	17.6
I have nauseous during the first day or so of my period.	27	20.6	23	17.6	39	29.8	29	22.1	13	9.9

**Table 4: Association between premenstrual symptoms and physical activity participation.**

Variable	Severity of PMS	Level of physical activity
Severity of PMS	-	0.184*
Level of physical activity		-

Note. N=131. Spearman's rho reported. \*p<0.05.

The Spearman's correlation coefficient between the frequency of menstrual symptoms and the level of physical activity was -0.093 (p>0.05), indicating no statistically significant association. This indicates that higher frequency of menstrual symptoms was not associated with lower levels of physical activity (Table 5).

**Table 5: Association between menstrual-related symptoms and physical activity participation**

Variable	Severity of menstrual symptom	Level of physical activity
Severity of menstrual symptom	-	-0.093
Level of physical activity		-

Note. N=131. Spearman's rho reported. \*p<0.05.

## DISCUSSION

This study aimed to investigate the prevalence and association between PMS and MRS towards young adult women's physical activity participation. The majority of the participants were reported to have mild degree of PMS severity (85.5%) and moderate degree of menstrual symptoms frequency (66.4%). These findings are higher as compared with other studies that reported mild PMS severity ranges between 37% and 67.5% (Tolossa et al., 2014; Bhandari et al., 2023), and moderate menstrual symptoms frequency ranges between 29.8% and 56% (Teul et al., 2014; Karout et al., 2021), respectively.

Higher severity of premenstrual symptoms was found to be significantly, though weakly, associated with higher physical activity. This is in contrast with studies which reported that PMS did not directly influence physical activity participation among adult women but indirectly affected their quality of life. It was reported that PMS significantly reduced the quality of life of adult women aged 18-23 but not on physical activity participation (Elvan, 2023; Bhuvaneswari et al., 2019; Pinar et al., 2011). In contrast to this study, Shehata and colleagues (2024) reported that the severity of PMS was significantly associated with lower physical activity participation among adult women aged 20-35 compared to those with moderate or high physical activity participation. A similar significant association between PMS severity and physical activity participation among adult women aged 18-35 was reported by Sevak et al. (2024). These findings suggest that among adult women, severe PMS may act as a barrier to physical activity participation, as PMS severity measured by the Premenstrual Syndrome Scale (PMSS) was found to significantly influence the exercise barriers subscale score of the Exercise Benefits/Barriers Scale (EBBS) (Kiloatar & Kurt, 2024). The differing findings in this study may suggest that young adults use physical activity as a coping strategy to alleviate PMS severity (Yang et al., 2024; Dehnavi et al., 2018).

This study found no statistically significant association between the frequency of menstrual symptoms and levels of physical activity, in contrast to previous literature. In the study by Prince and Annison (2022), 90% of adult women aged 18-59 reported that menstruation negatively affected their participation in adventurous activities such as mountaineering, camping, swimming, running, climbing, kayaking, mountain biking, and canoeing. Similarly, Bruinvels et al. (2021) reported that higher MRS scores, as measured by the Menstrual Symptom Index (MSi), were associated with a greater likelihood of missing or modifying physical activity participation among adult women with a mean age of 38.3 years. Nearly half of adult

women with a mean age of 24.1 years had to refrain from planned physical activity due to MRS particularly menstrual pain (Linda et al., 2022). In addition, menstruation patterns also may influence physical activity participation. Adult women with a mean age of 24.1 years and regular menstruation pattern have been reported to have higher physical activity participation compared to those with irregular menstruation patterns (Kim, Kang, & Jeong, 2022). The combined menstrual irregularity and MRS may further complicate physical activity participation among adult women of reproductive age.

This study had few limitations. The data obtained and analyzed was self-reported using questionnaires and may be influenced by recall bias. Other confounding factors such as menstrual cycle regularity was not assessed in this study that may result in different physical activity participation. It is recommended that future research include larger samples while accounting for individual variability, such as menstrual cycle regularity and its effect on physical activity participation.

## CONCLUSION

In this study, the majority of participants reported mild PMS severity and a moderate frequency of menstrual symptoms. A significant, though weak, positive association was observed between PMS severity and physical activity, suggesting that young adults may use physical activity as a coping strategy to alleviate PMS symptoms (Yang et al., 2024; Dehnavi et al., 2018). No association was found between menstrual symptoms severity and levels of physical activity. Therefore, tailored education should be strategised to facilitate young adults on managing menstrual health and maintaining physical activity, encouraging positive outcomes of both physical and mental well-being.

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