

Charting the Monthly Waves: An Observational Study on the Dynamics of Premenstrual Syndrome

Akshaya Radhakrishnan^{1*}, Nidhi Sharma¹, B.N. Surya²

¹Department of Obstetrics and Gynaecology, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, India

²Department of Community Medicine, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, 603103, Tamil Nadu, India

Abstract

Premenstrual syndrome (PMS) is an assortment of painful symptoms that occur around the period of menstruation and they are related to hormonal changes that have been known by physicians for millennia, potentially leading to difficulties in daily functioning and a poor quality of living. The Moos Menstrual Distress Questionnaire (MDQ) was used to gather data in this cross-sectional research with 200 participants in Chennai. ANOVA and T-tests were used to examine the data using SPSS software. Participants were provided with PMS reporting diaries to document symptoms for two consecutive menstrual cycles. The 168 total sample sizes were calculated using the equation of power analysis. There were no irregular menstrual periods among the girls. The average age of the participants was 20.3 years and their average menarche age was 13.5 years. Notably, 124 (73.8%) of individuals reported having considerable blood flow during their menstrual cycle, with 142 (84.5%) of the individuals reported having menstrual cramps. There was no discernible correlation found between the prevalence of PMS and the use concerning junk food, physical activity, sugar, salt, or citrus fruits. Although menstruation is a natural physiological process, many individuals experience menstrual abnormalities and PMS, which require treatment. It is recognized that a significant portion of people have irregular periods and PMS highlights the need for efficient treatment approaches, even though menstruation is a normal physiological function.

Keywords: Adolescence, Menarche, Menstrual Periods, Premenstrual Symptoms.

Introduction

Premenstrual syndrome (PMS) is a complex and misdiagnosed condition that affects many women, impacting their physical, mental and emotional well-being in the days leading up to their menstrual cycle [1]. Its defining feature is the recurrence of symptoms during the luteal phase, typically two weeks before menstruation, marked by hormonal variations such as decreased progesterone and estrogen levels [2]. Hormonal changes can contribute to PMS symptoms, yet the learning is proceeding [3]. Physically, women with PMS could experience symptoms such as bloating, headaches, breast soreness and changes in

appetite, swelling, periods pain, depression, and irritation, show as figure 1. Anxiety and disrupted sleep cycles are common, exacerbating the overall discomfort [4]. Emotionally, PMS can take a toll on everyday life with mood swings, irritability, anxiety and emotions of melancholy or despair. The combination of emotional and physical symptoms poses challenges for both the affected individuals and those around them [5]. It is crucial to recognize that PMS symptoms vary in intensity and presentation among individuals and their severity can fluctuate from one menstrual cycle to the next [6]. While some could experience mild discomfort, others face

more severe symptoms that impact their quality of life, extending beyond personal well-being to

affect social interactions, work productivity and general health [7].

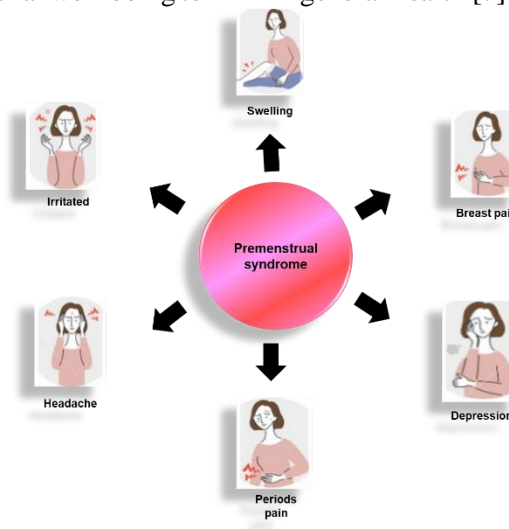


Figure 1. PMS Symptom

Scientists and medical experts have identified various risk factors contributing to the onset and intensity of PMS, including age, heredity, lifestyle choices and underlying medical conditions. Stress, in particular, worsens PMS symptoms, highlighting the intricate relationship between hormonal changes and mental health. Managing PMS involves a multifaceted approach, incorporating lifestyle changes like regular exercise, a healthy diet and stress-reduction methods. Medical therapies, such as antidepressants and hormone treatment, can be considered for more troublesome symptoms, with the treatment plan tailored to the individual's specific symptoms and their impact on daily life [8]. Despite being a common and challenging condition, it is crucial to distinguish PMS from more serious menstrual problems, such as premenstrual dysphoric disorder (PMDD), characterized by severe mood swings that hinder daily functioning. Making this distinction is essential for providing appropriate care and support [8]. This observational study aims to investigate the relationship between various lifestyle factors along with the prevalence and severity of Premenstrual Syndrome (PMS) among a diverse population of women.

Contributions of this Study

1. To reducing the emotional and physical symptoms associated with PMS and irregular menstruation improves the standard of life generally. Improved mental stability, physical health, and overall well-being are all correlated with regular menstrual cycles and fewer PMS symptoms.
2. To adverse effects on mental health, such as elevated stress, anxiety, and mood swings, lead to severe PMS and irregular menstruation. By reducing women's burdens and encouraging a more steady and optimistic emotional state, treating these difficulties improves the mental health results.
3. Reducing the impact of PMS on everyday activities and relieving its symptoms that are the primary goals of treatment. Premenstrual syndrome was traditionally treated with pharmacotherapy, although the more recent studies have indicated that combination therapy provides greater advantages.

Method and Material

This observational study was conducted in the Department of Obstetrics and Gynaecology at a tertiary care center from July 2023 to January 2024, spanning 6 months. The study population comprised women aged 18 to 25 years attending the Obstetrics and Gynaecology outpatient department (OPD) during the study period. A total of 168 participants were selected based on power analysis calculations.

Informed consent was obtained from all participants after providing them with detailed information about the study's objectives and importance. Participants were instructed on how to maintain a premenstrual syndrome (PMS) diary, which was provided for recording symptoms over two consecutive menstrual cycles. The questionnaire collected sociodemographic data, including age, education, religion, socioeconomic status, parental education, employment, family size, and residence. Additional questions addressed concerns related to menstruation, dietary patterns, and levels of physical activity.

Participants were required to maintain a PMS symptom diary for two menstrual cycles, documenting their symptoms in accordance with the provided diary guidelines. The study also involved evaluating treatment approaches for PMS, emphasizing the importance of conducting thorough physical examinations and obtaining comprehensive patient histories. Specific diagnostic tests were recommended to rule out conditions with similar symptomatology. The study aimed to analyze the broad spectrum of PMS symptoms, understand the underlying pathophysiological mechanisms, and assess the effectiveness of various management strategies for PMS.

Measures

The Moos Menstrual Distress Questionnaire (MDQ), comprising 14 symptoms such as pimples, breast tenderness, abdominal bloating, abdominal pain, nausea, leg pain, moodiness, anger, depression, irritation, vomiting,

backache, fatigue, and headache, served as the primary outcome measure in the study. Participants scored the intensity of these symptoms daily over one menstrual cycle, with a range of 0–4 for each symptom. The daily repetition of symptom scoring allowed for a comprehensive assessment of the degree and fluctuation of menstrual discomfort throughout the entire menstrual cycle. This scoring method facilitated a quantifiable evaluation of each participant's symptom intensity, enabling the use of statistical analysis to identify patterns and connections in the data and gain a more nuanced understanding of the participants' experiences.

Inclusion Criteria

To provide a foundation for comprehending menstrual cycles and associated symptoms, the criteria also included individuals who had achieved menarche. The study considered individuals from various family structures and religious backgrounds to ensure broad representation. Focus on the intended age range was maintained, potential confounding factors were reduced, and sample homogeneity was achieved by including individuals who were not married and who had not experienced irregular menstrual cycles. It was determined that the final sample size of 168 individuals would be adequate for significant statistical analysis and the extrapolation of results to the designated age group in Chennai.

Exclusion Criteria

The exclusion criteria for the cross-sectional study were established to ensure the accuracy and consistency of the gathered data. Participants reporting chronic medical illnesses, including endocrine diseases or anomalies of the reproductive system, were excluded to eliminate potential confounding variables that could influence menstrual patterns and PMS. Additionally, individuals currently using hormonal drugs or contraceptives or with a history of mental

illnesses were excluded to maintain homogeneity within the research group. Pregnant or nursing women were not allowed to participate due to the potential influence of hormone changes during these physiological states. Participants providing insufficient or incorrect data on the MDQ were also excluded to preserve the validity of the gathered information. In total, 32 individuals were excluded based on these criteria, resulting in a final sample size of 168 participants for analysis. This exclusion process was essential to ensure the study's internal validity and eliminate potential confounding variables.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS) program was used to code and analyze the data. To examine continuous and categorical data, frequency as well as descriptive analyses were utilized. T-tests and

ANOVA were used to evaluate the association between PMS symptoms, eating habits and socio-demographic characteristics. Basic linear regression models, both univariate and multivariate, were used to investigate the relationships between PMS, psychosocial status and hours of physical activity. Multivariate linear regression analysis and the Pearson correlation test were carried out to investigate the relationship between PMS and other factors. The goal of this analysis was to determine how BMI and psychosocial status markers relate to PMS symptoms.

Results and Discussion

In this cross-sectional study, a total sample size of 168 was calculated using the equation for power analysis. The Moos MDQ was then employed to collect data. Their ages varied from 18 to 24, with a mean of 20.3 years for each participant, shown as in Table 1.

Table 1. Study Participant Distribution Based on Menarche Age

Age in years had finished	N %
18	45(26.8%)
19	30(18%)
20	35(20.9)
21	12(7.2%)
22	23(13.7%)
24	23(13.7%)
Total	168(100)

Most were Christians 67(40%) and Hindus 32(19.1%). The majority of them 71(42.3%) were from nuclear families. None of the females had gotten married. All of the females

had reached menarche. Figure 2 and Table 2 illustrate that the mean age at periods was 13.5 years, along with the lowest age at periods being 11 years and the greatest being 17 years.

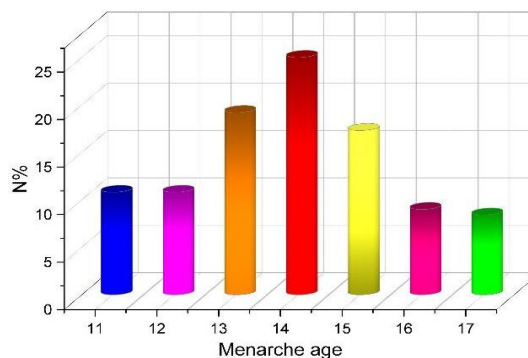


Figure 2. Distribution of Study Participants According to Menarche Age

Table 2. Study Participant Distribution Based on Menarche Age

Menarche age	N%
11	18(10.8%)
12	18(10.8%)
13	32(19.2%)
14	42(25%)
15	29(17.3%)
16	15(9%)
17	14(8.4%)
Total	168 (100)

Out of the 168 samples, none reported irregular menstrual periods. Significantly, 124 individuals (73.8%) experienced substantial blood flow during their menstrual cycles, while 142 individuals (84.5%) reported experiencing menstrual cramps.

Of the 20 participants (12%), 2 utilized homoeopathic medicines and 1 girl used fenugreek seeds. Reportedly, medication was used for pain relief. A variety of physical and mental manifestations were described in a large research that examined the incidence of premenstrual symptoms among participants. Among the physical complaints, stomach discomfort was the most common, affecting a significant 18% of the research sample. Irritation was expressed by 19.05% of participants, showing the strong influence of emotional changes during the premenstrual period. Anger was closely followed, impacting 17% of individuals, underscoring the

participants' diverse emotional issues. Abdominal bloating and leg pain were experienced by 5.3% and 12% of the participants, respectively, adding to the wide range of physical discomfort associated with pre-menstruation. Meanwhile, moodiness (4%), melancholy (4.2%) and pimple eruptions (6%) were indicated as emotional symptoms, highlighting the diverse character of premenstrual experiences. Interestingly, vomiting was one of the fewest reported symptoms (2%), indicating a decreased incidence in the research group. This research provides light on the delicate interaction between physical and emotional symptoms that women might encounter throughout their premenstrual period, underlining the need for nuanced knowledge and a holistic approach in addressing these many manifestations as shown in Table 3 and Figure 3.

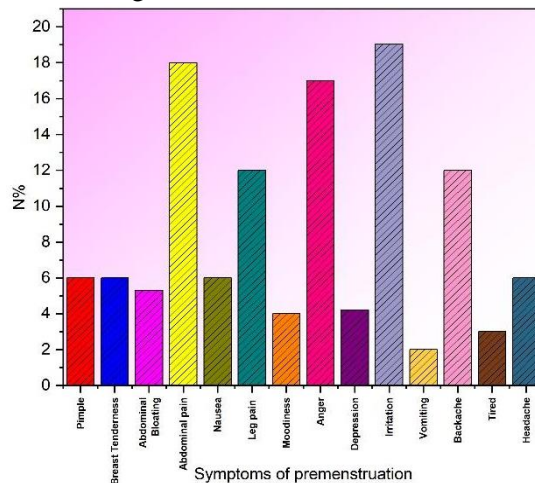


Figure 3. Prevalence of Premenstrual Symptoms in Research Participants

Table 3. Percentage of Research Participants' in PMS

Symptoms of pre-menstruation	N%
Pimple	10(6%)
Breast Tenderness	10(6%)
Abdominal Bloating	9(5.3%)
Abdominal Pain	30(18%)
Nausea	10(6%)
Leg Pain	20(12%)
Moodiness	6(4%)
Anger	28(17%)
Depression	7(4.2%)
Irritation	32(19.05%)
Vomiting	3(2%)
Backache	20(12%)
Tired	5(3%)
Headache	10(6%)

When queried whether they had any previous knowledge of menstruation, 120 girls indicated they had, with their mothers as the main source and school health instruction coming in second and third. When it came to their perspectives on menstruation, most of them thought it was a sign of maturity, a normal occurrence, and the flow of impure blood.

Participants were asked to describe their premenstrual symptoms and the answers ranged from one to four symptoms. 58 (34.5%) of the 168 research participants said they had

experienced one or more symptoms during two menstrual cycles. Entries in the PMS journal revealed that the most reported symptom was abdominal discomfort, which was followed by annoyance and fury. Premenstrual symptoms were missing in 60 (35.7%) girls, sporadic in 28 (16.6%) participants, and incomplete in the PMS diaries of 22 (13.09%) girls. The disturbing finding shown in Table 4 demonstrates that there was a lack of association between the prevalence of PMS and junk food consumption.

Table 4. Exercise and Food Habits are Related to the Development of PMS

Occurrence of premenstrual symptoms				
	Absent (n=58)	Present (n=110)	Total	p-value
Consumption of junk food				
Greater frequency (1 or time in a week)	30(51.8%)	75(68.4%)	105	0.02
Low frequency (once in a month)	28(48.5%)	35(31.9%)	63	
Consumption of fruit				
Greater frequency (>1 each week)(1)	20(34.5%)	50(45.5%)	70	0.10
Low frequency (</=1 each week) (0)	38(65.6%)	60(54.6%)	98	
Consumption of extra sugar				
Greater frequency (>1 each week)(1)	35(60.4%)	65(59.1%)	100	0.75
Low frequency (</=1 each week) (0)	23(39.8%)	45(41.1%)	68	
Exercise				
Greater frequency (>1 each week)(1)	18(31.2%)	40(36.4%)	58	0.45
Low frequency (</=1 each week) (0)	40(69.1%)	70(63.7%)	110	

According to Table 4, sugar, physical exercise and citrus fruit consumption did not exacerbate premenstrual symptoms. Moreover, there was no significant association found between the frequency of dysmenorrhea and junk food, citrus fruits, consumption of sugar, or exercise. However the frequency of dysmenorrhea and PMS didn't show any significant association.

Menstruation is a natural physiological process. Most women realize pain and other symptoms that occur before and during menstruation as a natural occurrence, or they don't bring ahead these concerns due to timidity and shyness. Even though it is a physiological process, it has a profound influence on the lives of women.

The cross-sectional research [9] examined the connection between PMS and sleep quality in 768 Egyptian women of reproductive age. Participants filled out a questionnaire that included demographic information, a PMS scale, and the Pittsburgh Sleep Quality Index. The main objectives were PMS prevalence/severity and sleep quality, with an emphasis on the relationship between PMS and sleep. Secondary results investigated demographic characteristics that influence PMS and sleep quality. One of the limitations was the dependence on self-reported data.

The purpose of the research [10] was to determine if the Edinburgh Postnatal Depression Scale (EPDS) scores predicted postpartum severe premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD). At 1 year postpartum, 19.0% of women with high-EPDS scores had PMS/PMDD, compared to 5.6% in the low-EPDS group ($p = 0.07$). Early EPDS screening might improve early diagnosis and patient quality of life, but further study was necessary.

The purpose of the cross-sectional research [11] in Sharjah, UAE, was to investigate the prevalence of PMS among 300 female university students (mean age 20.07). The findings revealed a 35.3% prevalence of PMS,

with smoking that was connected with elevated psychological and behavioral symptoms. A high calorie/fat/sugar/salt diet raised the probability of physical symptoms, but fruit consumption reduced the chance of behavioral symptoms. The dependence on self-reported data, as well as inherent biases, was limitations.

The observational study [12] looked at the relationship between 100 menstrual women's dietary practices and PMS. The PMS scale examined the severity of PMS, while a "food frequency questionnaire (FFQ)" analyzed eating patterns. There were no significant connections with other food groups. Since it was an observational study, correlation rather than causation was shown. To assess the connection between PMS and overall food consumption, more research was required.

The incidence of PMS and PMDD was assessed in 1,115 undergraduates in a cross-sectional study [13]. PMS was prevalent in 46.9% of women, whereas PMDD was prevalent in 11.1%, with physical symptoms as the most frequent. More than 30% of respondents experienced "moderate-to-severe hindrances in social and academic activities". Depression, alcohol use and early college semesters were risk factors for PMS. It was critical to identify these variables for symptom prevention and impact minimization. Self-reporting and probable recollection bias were the two limitations.

The purpose of the double-blind clinical experiment [14], which included 95 female students, was to examine the effect of aromatherapy using Rosa Damascena and Citrus Aurantium essential oils on premenstrual syndrome symptoms. Both essential oil groups showed significant decreases in mental symptoms, with the Rosa Damascena group exhibiting greater improvement in psychological, physical and social aspects. Potential placebo effects were one of the limitations. This study emphasized aromatherapy's potential usefulness in reducing premenstrual discomfort.

The research [15] in Sabah, North Borneo, examined menstrual features and morbidities in 757 teenage females (mean age 17). The average menarche age was 12.2 years. 85.7% had dysmenorrhoea, with 42.1% having moderate (pain score 4.81) and 11.2% having severe (pain score 7.86) dysmenorrhoea. During menstruation, more than 70% of women experienced fatigue, headaches, and changes in appetite. They gave vital insights into menstrual health in this underdeveloped region, but it was limited by its emphasis on government high schools and a narrow age range.

In the first study [16], conducted in Korean young adult women, 151 students in nursing with regular periods, 69% of whom had a mean age of 23.93 years, were found. The retrospective prevalence of PMS was 42.4%, while the prospective prevalence was 22.4%, emphasizing the predictive significance of retrospective Daily Record of Severity of Problems (DRSP).

In a Kathmandu-based cross-sectional research [17], 72.3% of 285 female students at a teaching hospital experienced moderate to severe PMS symptoms, with 2.1% meeting the criteria for Premenstrual Dysphoric Disorder. The mean age was not explicitly mentioned. A Karachi-based cross-sectional study [18] examined the influence of PMS symptoms on women, with a mean age of 23.93 years \pm 9.41 years. Dysmenorrhea (63%), weariness (32%), bloating (18.9%), and back discomfort (13.3%) were prevalent complaints affecting everyday activities. The research [19] on Indian students found that 71.3% of 330 individuals had PMS, with severity correlated with body fat percentage and BMI. In a study [20] conducted in Tangerang City, 120 teenage girls (aged 13-15) were examined, emphasizing the impact of improper diets and stress on PMS. While the mean age was not explicitly stated, the findings underscored the importance of maintaining a good diet and managing stress in preventing and treating PMS in female teenagers.

In our study, Participants were asked to describe their premenstrual symptoms and the answers ranged from one to four symptoms. 58 (34.5%) of the 168 research participants said they had experienced one or more symptoms during two menstrual cycles. Entries in the PMS journal revealed that the most reported symptom was abdominal discomfort, which was followed by annoyance and fury. Premenstrual symptoms were missing in 60 (35.7%) girls, sporadic in 28 (16.6%) participants and incomplete in the PMS diaries of 22 (13.09%) girls.

Studies based on observation can discover relationships between variables, but they are unable to demonstrate causality. Establishing a clear cause-and-effect link between a particular stimulus and the onset or intensity of PMS can prove difficult. The natural course of PMS, including the variables determining its onset, duration and resolution, can be better understood through long-term observational studies that follow people over a prolonged period.

Conclusion

The cross-sectional study, done in Chennai with 200 participants, aims to investigate the prevalence and possible correlations of PMS using the MDQ. The study found that, on average, people exhibited PMS at an average age of 20.3 years, with a menstruation age of 13.5 years. Notably, a large percentage of women (73.8%) reported considerable blood flow and menstrual pains (84.5%) throughout their periods of menstruation. Contrary to expectations, Lifestyle variables including junk food, exercise, sugar, salt and citrus fruits did not influence PMS. Furthermore, all subjects reported normal menstrual cycles, excluding the possibility of irregular menstrual cycles in the research sample. Although menstruation is a normal physiological occurrence, this study emphasizes the prevalence of PMS among young women and the need for appropriate treatment techniques. The results highlight the

necessity of treating menstrual irregularities and PMS to improve the overall quality of life for those who suffer from these symptoms. More study and education are needed to discover effective treatment techniques for PMS and associated menstruation disorders, therefore improving the well-being of persons suffering from these prevalent but debilitating diseases.

References

- [1]. Barker-Smith, H., 2020, Navigating the menstrual landscapes: From the darkness to the light. *Psychotherapy and Politics International*, 18(2), e1533. <https://doi.org/10.1002/ppi.1533>.
- [2]. Hamidovic, A., Karapetyan, K., Serdarevic, F., Choi, S.H., Eisenlohr-Moul, T., & Pinna, G., 2020, Higher circulating cortisol in the follicular vs. luteal phase of the menstrual cycle: A meta-analysis. *Frontiers in Endocrinology*, 11, 311. <https://doi.org/10.3389/fendo.2020.00311>.
- [3]. Tiranini, L., & Nappi, R.E., 2022, Recent advances in understanding/management of premenstrual dysphoric disorder/premenstrual syndrome. *Faculty Reviews*, 11. <https://doi.org/10.12703/r/11-9>.
- [4]. Abbas, K., Usman, G., Ahmed, M., Qazi, R., Asghar, A., Shah, A.M., Rizvi, A., Abid, K., Haq, K.U., Tahir, A., & Usama, S.M., 2020, Physical and psychological symptoms associated with premenstrual syndrome and their impact on the daily routine of women in a low socioeconomic status locality. *Cureus*, 12(10). <https://doi.org/10.7759/cureus.1111>.
- [5]. Akm, Ö., & Erbil, N., 2023, Investigation of coping behaviors and premenstrual syndrome among university students. *Current Psychology*, 1-11. <https://doi.org/10.1007/s12144-023-03892-5>
- [6]. Chan, K., Rubtsova, A.A., & Clark, C.J., 2023, Exploring diagnosis and treatment of premenstrual dysphoric disorder in the US healthcare system: A qualitative investigation. *BMC Women's Health*, 23(1), 1-9. <https://doi.org/10.1186/s12905-023-02222-0>.

Acknowledgement

We sincerely acknowledge all participants for their invaluable contributions.

Conflict of Interest

Nil.

- [7]. Batool, S., & Haleem, M., 2022, Unveiling the social studies panorama: Unveiling the interconnectedness of human phenomena. *Social Sciences Spectrum*, 1(1), 21-29.
- [8]. Collatuzzo, G., & Boffetta, P., 2022, Application of P4 (predictive, preventive, personalized, participatory) approach to occupational medicine. *La Medicina del Lavoro*, 113(1). <https://doi.org/10.23749/mdl.v113i1.11939>.
- [9]. Kamel, D.M., Tantawy, S.A., Alsayed, N., Bekhet, A.H., Elbkery, N., & Khairy, A., 2021, The relationship between premenstrual syndrome and the quality of sleep among Egyptian women: An observational study. *Archives of the Balkan Medical Union*, 56(2), 172-178.
- [10]. Takayama, E., Tanaka, H., Kamimoto, Y., Sugiyama, T., Okano, T., Kondo, E., & Ikeda, T., 2020, Relationship between a high Edinburgh Postnatal Depression Scale score and premenstrual syndrome: A prospective, observational study. *Taiwanese Journal of Obstetrics and Gynecology*, 59(3), 356-360. <https://doi.org/10.1016/j.tjog.2020.03.001>.
- [11]. Hashim, M.S., Obaideen, A.A., Jahrami, H.A., Radwan, H., Hamad, H.J., Owais, A.A., Alardah, L.G., Qiblawi, S., Al-Yateem, N., & Faris, M.E.A.I.E., 2019, Premenstrual syndrome is associated with dietary and lifestyle behaviors among university students: A cross-sectional study from Sharjah, UAE. *Nutrients*, 11(8), 1939. <https://doi.org/10.3390/nu11081939>.
- [12]. Helmy, N.A., Kamel, D.M., Gabr, A.A., & Shehata, M.A. Does dietary habits/food consumption affect the premenstrual syndrome incidence among a cohort of Egyptian females: An observational study.

- [13]. Rezende, A.P.R., Alvarenga, F.R., Ramos, M., Franken, D.L., Costa, J.S.D.D., Pattussi, M.P., & Paniz, V.M.V., 2022, Prevalence of premenstrual syndrome and associated factors among academics of a university in midwest Brazil. *Revista Brasileira de Ginecologia e Obstetrícia*, 44, 133-141. <https://doi.org/10.1055/s-0041-1739560>.
- [14]. Heydari, N., Abootalebi, M., Tayebi, N., Hassanzadeh, F., Kasraeian, M., Emamghoreishi, M., & Akbarzadeh, M., 2019, The effect of aromatherapy on mental, physical symptoms, and social functions of females with premenstrual syndrome: A randomized clinical trial. *Journal of Family Medicine and Primary Care*, 8(9), 2990. https://doi.org/10.4103/jfmipc.jfmipc_472_19.
- [15]. Azhary, J.M.K., Leng, L.K., Razali, N., Sulaiman, S., Wahab, A.V.A., Adlan, A.S.A., & Hassan, J., 2022, The prevalence of menstrual disorders and premenstrual syndrome among adolescent girls living in North Borneo, Malaysia: A questionnaire-based study. *BMC Women's Health*, 22(1), 1-9. <https://doi.org/10.1186/s12905-022-01714-7>.
- [16]. Kim, Y.J., & Park, Y.J., 2020, Menstrual cycle characteristics and premenstrual syndrome prevalence based on the daily record of severity of problems in Korean young adult women. *Journal of Korean Academy of Nursing*, 50(1), 147-157. <https://doi.org/10.4040/jkan.2020.50.1.147>.
- [17]. Shrestha, D.B., Shrestha, S., Dangol, D., Aryal, B.B., Shrestha, S., Sapkota, B., & Rai, S., 2019, Premenstrual syndrome in students of a teaching hospital. *Journal of Nepal Health Research Council*, 17(2), 253-257. <https://doi.org/10.33314/jnhrc.v17i2.1996>.
- [18]. Abbas, K., Usman, G., Ahmed, M., Qazi, R., Asghar, A., Shah, A.M., Rizvi, A., Abid, K., Haq, K.U., Tahir, A., & Usama, S.M., 2020, Physical and psychological symptoms associated with premenstrual syndrome and their impact on the daily routine of women in a low socioeconomic status locality. *Cureus*, 12(10). <https://doi.org/10.7759/cureus.11110>.
- [19]. Thakur, H., Pareek, P., Sayyad, M.G., & Otiv, S., 2022, Association of premenstrual syndrome with adiposity and nutrient intake among young Indian women. *International Journal of Women's Health*, 665-675. <https://doi.org/10.2147/IJWH.S344383>.
- [20]. Huwaida, D.Z., & Dewi, Y.L.R., 2022, Unhealthy diet and stress are correlated with premenstrual syndrome in adolescent girls in Tangerang. *Media Gizi Indonesia*, 17(2). <https://doi.org/10.20473/mgi.v17i2.61-67>.