

The relationship between nutritional status and the incidence of Premenstrual Syndrome (PMS) among female adolescents at MAN 1 Sleman

Nasya Nabillah*, Siti Fadhilatun Nashriyah, Nor Eka Noviani

Study Program of Nutrition, Faculty of Health Sciences, Universitas Aisyiyah Yogyakarta, Yogyakarta, Indonesia

*Email: nasyanabila006@gmail.com; sfnashriyah@unisayogya.ac.id; norekanoviani@unisayogya.ac.id

Abstract

Premenstrual syndrome (PMS) is a collection of physical, emotional, and behavioral symptoms that occur repeatedly before menstruation, usually in the luteal phase of the menstrual cycle, and subside after menstruation begins. The symptoms of PMS that often occur include anxiety, fatigue, difficulty concentrating, sleep disturbances, loss of energy, headaches, abdominal pain, and breast tenderness. PMS can cause discomfort in the form of physical symptoms, psychological symptoms and changes in behavior. This study aims to determine the relationship between nutritional status and the incidence of premenstrual syndrome in adolescent girls at MAN 1 Sleman. This study is a quantitative study using an analytical research design with a cross-sectional approach. The sampling technique used is purposive sampling. Data collection on nutritional status variables by measuring the height and weight of adolescent girls. Classification of nutritional status is based on the BMI/U z-score table value. Measurement of PMS variables using the Shortened Premenstrual Assessment Form (SPAF) questionnaire. Data analysis using the Fisher's exact. The results of the study showed that out of a total of 44 respondents, the majority were in the normal nutritional status category of 38 people (82.61%), followed by the over-nutrition category of 7 people (15.22%), and only 1 person (2.17%) was included in the under-nutrition category. Respondents with 28 people (60.87%) experienced severe PMS, while 18 people (39.13%) experienced mild PMS. The p value between the two variables is 0,220. It can be concluded that there is no significant relationship between nutritional status and PMS in adolescent girls at MAN 1 Sleman.

Keywords: nutritional status; premenstrual syndrome

1. Introduction

Premenstrual Syndrome (PMS) is a collection of physical, psychological, and behavioral symptoms that appear cyclically before menstruation, particularly during the luteal phase, and typically subside once menstruation begins. According to a report by the World Health Organization (WHO, 2020), the global number of women of reproductive age is estimated at 1.78 billion, and approximately 75% of them experience PMS symptoms of varying intensities. This figure does not reach 100% because PMS is a subjective and multifactorial condition, meaning not all women experience it. Individual biological variations, hormonal adaptations, healthy lifestyles, stress levels, and dietary patterns are among the factors that influence the presence or absence of PMS symptoms (Modzelewski et al., 2024; Agustin & Zulala, 2023). In addition, differences in symptom perception and a lack of awareness of this condition often result in PMS going undiagnosed in some women.

In Indonesia, data from the Central Bureau of Statistics (BPS, 2020) show that approximately 21,562 adolescent girls aged 10–19 years experience PMS, with a prevalence estimated at 60–75%. In East Java, the trend of PMS incidence has increased over the years, from 55.6% in 2018 to 68.6% in 2021. A local study by Kurnia et al. (2024) in Yogyakarta also reported that 32.87% of adolescent girls exhibited PMS symptoms, indicating that PMS remains a significant health issue, especially among adolescents.

PMS can affect various aspects of an adolescent's life, including physical symptoms (such as abdominal pain, headaches, and fatigue), psychological symptoms (such as anxiety and irritability), and social aspects (such as disrupted activities, decreased academic performance, and impaired interpersonal relationships). Kırca & Kızılkaya (2022) stated that PMS can reduce adolescents' quality of life and mental well-being. The risk factors for PMS are diverse and include hormonal factors (fluctuations in estrogen and progesterone), psychological factors (such as stress), lifestyle factors (such as lack of exercise and poor dietary habits), and nutritional status. Suboptimal nutritional status—whether due to deficiency or excess—can disrupt hormonal balance and aggravate PMS symptoms. Adolescents with a high Body Mass Index (BMI), particularly those classified as obese, are at increased risk of inflammation, which may worsen PMS symptoms (Hanum et al., 2020). Meanwhile, deficiencies

in micronutrients such as vitamin B6, calcium, and magnesium have also been associated with more severe PMS symptoms (Abebe, 2024).

Several factors contribute to the increased risk of PMS. One major factor is genetics, where individuals with a family history of PMS are more susceptible to experiencing similar symptoms. Additionally, adolescence is a vulnerable period, as the body undergoes physiological hormonal changes during the menstrual cycle (Astikasari & Kofi, 2022). Psychological factors, such as stress, may also contribute to increased severity of PMS. An unsupportive lifestyle, including physical inactivity and unbalanced dietary intake, can influence hormonal balance and overall body function. In particular, deficiencies in essential micronutrients—such as vitamin B6, calcium, and magnesium—can worsen the clinical manifestations of PMS (Abebe et al., 2024). Physiologically, PMS is closely related to fluctuations in reproductive hormones, especially estrogen and progesterone, during the luteal phase of the menstrual cycle. These fluctuations affect neurotransmitters such as serotonin and GABA, leading to mood changes, pain, and emotional or cognitive disturbances (Agustin & Zulala, 2023). Among adolescents with normal nutritional status, regular menstrual cycles cause consistent hormonal fluctuations, increasing the likelihood of PMS symptoms. Conversely, in those with undernutrition, ovulatory disorders or anovulation may disrupt these hormonal fluctuations, resulting in milder or absent PMS symptoms (Modzelewski et al., 2024; Wijaya et al., 2024).

PMS is commonly experienced by adolescent girls, especially due to high physical activity levels combined with inconsistent dietary patterns. Active adolescents tend to experience milder PMS symptoms than those who are less active (Barus et al., 2024). Damayanti & Damaria (2021) noted that nutritional status is one of the factors known to increase the risk of PMS among adolescents. Generally, nutritional status is assessed using Body Mass Index (BMI), a standard method for evaluating nutritional conditions, including overweight and obesity, in both children and adults (Hanum et al., 2020). Individuals with overweight or obesity may experience inflammatory processes that are strongly associated with the intensification of PMS symptoms.

Considering these factors, there is a need for research examining the relationship between nutritional status and the incidence of PMS among adolescent girls, in order to gain a deeper understanding of its impact on their daily activities and quality of life. PMS has been shown to cause both physical and emotional disturbances. Therefore, the researcher has chosen the following study title: "The Relationship Between Nutritional Status and the Incidence of Premenstrual Syndrome (PMS) Among Adolescent Girls at MAN 1 Sleman."

2. Methods

This study is a quantitative study using an analytical observational design with a **cross-sectional** approach, in which data collection was conducted at a single point in time without any intervention on the variables studied. The aim of this study was to determine the relationship between nutritional status (as the independent variable) and the incidence of Premenstrual Syndrome (PMS) (as the dependent variable) among adolescent girls at MAN 1 Sleman.

The study obtained ethical approval from the Health Research Ethics Committee of the Faculty of Health Sciences, 'Aisyiyah University of Yogyakarta, with an official approval letter issued prior to data collection. All data collection procedures adhered to ethical research principles, including written informed consent from participants, maintenance of anonymity and data confidentiality, and the right of participants to withdraw from the study at any time without any consequences.

The population in this study consisted of all female students at MAN 1 Sleman who had experienced menarche. The sampling technique used was purposive sampling, in which participants were selected based on predetermined inclusion and exclusion criteria. The inclusion criteria included adolescent girls who had experienced menarche, were willing to participate by signing the consent form, were able to read and independently complete the questionnaire, and had a menstrual cycle within the past month. The exclusion criteria included participants who were seriously ill or had been medically diagnosed with hormonal disorders. A total of 44 participants met the eligibility criteria and were included in the study.

Data collection was carried out in two main stages. First, for the nutritional status variable, data were obtained through direct measurements of body weight and height using standard weighing scales and a microtoise. These measurements were used to calculate the Body Mass Index (BMI), which was

then classified based on BMI-for-age z-scores (BMI/A) in accordance with WHO standards. Nutritional status categories included undernutrition, normal nutrition, and overnutrition.

Second, the PMS variable was measured using the Shortened Premenstrual Assessment Form (SPAF) questionnaire. The validity of this instrument was not re-tested, as it had previously been validated by Pertiwi (2016) using the Product Moment Correlation formula, yielding a correlation coefficient (r) of 0.738, which is greater than the critical value of 0.312, indicating that the instrument is valid. The reliability test also showed a Cronbach's Alpha value of 0.873, indicating high reliability. This questionnaire includes items related to physical, psychological, and behavioral symptoms, and PMS was classified into mild and severe based on the total symptom scores reported.

After all data were collected, the process of editing, coding, and data tabulation was carried out, followed by analysis using a computer-based statistical software. The statistical test used was Fisher's Exact Test, as the data were categorical and the sample size was relatively small. This test was used to determine whether there was a statistically significant relationship between nutritional status and the incidence of PMS among adolescent girls. The results were considered statistically significant if the p-value < 0.05.

3. Results and Discussion

3.1. Results

3.1.1. Univariate Analysis

The characteristics of the respondents in this study were categorized based on age, family history, menstrual cycle, and nutritional status. The results of the frequency distribution of respondents' characteristics are presented in Table 1 as follows:

Table 1. Frequency Distribution of Respondents' Characteristics Based on Age

Characteristics Age	Frequency (n)	Percentage (%)
15 years old	7	15.91
16 years old	20	45.45
17 years old	7	38.64
Amount	44	100

Based on the respondents' characteristics data, it can be concluded that the majority of adolescent girls in this study were 16 years old (45.45%), followed by 17 years old (38.64%), and 15 years old (15.91%).

Table 2. Frequency Distribution of Respondents' Characteristics Based on Family History of PMS

Characteristics Family history	Frequency (n)	Percentage (%)
Yes	0	0
No	44	100
Amount	44	100

Based on the results of the study, all respondents (100%) had no family history of premenstrual syndrome (PMS).

Table 3. Frequency Distribution of Respondents' Characteristics Based on Menstrual Cycle

Characteristics Siklus menstruasi	Frequency (n)	Percentage (%)
Regular	33	75.00
Irregular	11	25.00
Amount	44	100

Referring to the table above, this study found that 33 respondents (75%) had regular menstrual cycles. Meanwhile, 11 respondents (25%) experienced irregular menstrual cycles.

Table 4. Frequency Distribution of Respondents' Characteristics Based on Nutritional Status

Characteristics Status gizi	Frequency (n)	Percentage (%)
Abnormal nutritional	7	15.91
Normal nutritional	37	84.04
Amount	44	100

Referring to the nutritional status data above, the majority have a normal nutritional status, amounting to 37 individuals (84.09%). Meanwhile, 7 respondents (15.91%) fall into the category of abnormal nutritional status.

3.1.2. Bivariate Analysis

Table 5. Frequency Distribution of Respondents Based on the Relationship Between Nutritional Status and Premenstrual Syndrome (PMS) Among Female Students at MAN 1 Sleman

Nutritional status	PMS Severe		Mild		Amount		Or	p value
	n	(%)	n	(%)	n	(%)		
Abnormal	6	85.7	1	14.3	7	100	4.57	0.220
Normal	21	56.8	16	43.2	37	100		
Amount	27	61.4	17	38.6	44	100		

Based on the analysis results in the table, the Fisher's Exact test yielded a p-value of 0.220, indicating that there is no significant relationship between nutritional status and the incidence of PMS among adolescent girls at MAN 1 Sleman. The results also showed that adolescent girls with abnormal nutritional status were 4.57 times more likely to experience severe PMS compared to those with normal nutritional status.

3.2. Discussion

This study revealed that all female adolescent respondents at MAN 1 Sleman experienced PMS, with the majority (61.3%) experiencing severe PMS. Most respondents had normal nutritional status (84.09%), followed by overweight and underweight categories. Although it was found that abnormal nutritional status had an odds ratio of 4.57 for severe PMS, this result was not statistically significant ($p = 0.220$), indicating no meaningful relationship between nutritional status (based on BMI) and the severity of PMS.

A regular menstrual cycle was found in most respondents (75%) and was associated with hormonal fluctuations that can trigger PMS. However, no genetic factors were identified, as none of the respondents reported a family history of PMS.

The use of BMI as the sole indicator of nutritional status is considered insufficient to represent body composition, which affects hormonal regulation. In addition to nutritional status, external factors such as stress, sleep patterns, physical activity, and dietary habits contribute to worsening PMS symptoms.

This study emphasizes the importance of a holistic approach to managing PMS, not only focusing on macronutrient intake but also addressing stress management, reproductive health education, sleep quality, physical activity, and adequate micronutrient intake. Limitations in variables and measurement indicators are important considerations for future research.

4. Conclusion

This study analyzed the relationship between nutritional status and PMS in female adolescents at MAN 1 Sleman. Among the 44 respondents, 61.36% experienced severe PMS and 38.64% experienced mild PMS. The majority had normal nutritional status (84.1%), while the rest had abnormal nutritional status (15.9%). Fisher's Exact test ($p = 0.220$) showed no significant association. An odds ratio (OR) of 4.57 indicated that those with abnormal nutritional status were 4.57 times more likely to experience severe PMS compared to those with normal status, but the difference was not statistically significant. PMS is likely influenced by other factors such as stress, sleep, physical activity, and micronutrient intake.

5. Acknowledgement

First of all, I would like to thank the school for allowing me to conduct research at MAN 1 Sleman School and to the teachers and parents who have helped me when collecting data and to my siblings and friends who have helped me collect data and prepare this thesis.

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