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Association of Breakfast Habits and Nutritional Status with Dysmenorrhea Among Adolescent Girls in SMAN 8 Surabaya

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ABSTRACT

Dysmenorrhea is a common condition among adolescent girls, often linked to poor nutritional status and breakfast skipping. Despite its high prevalence and impact on academic performance, studies exploring its association with lifestyle factors in Indonesian high school students remain limited. This study aims to analyze the association between breakfast habits and nutritional status with the incidence of dysmenorrhea among adolescent girls at SMAN 8 Surabaya.

This study used a cross-sectional design involving 68 female students selected through proportional random sampling. Data were collected using anthropometric measurements, a validated FFQ for breakfast habits, and a dysmenorrhea questionnaire, then analyzed using Spearman correlation with a significance level of $p < 0.05$.

The majority of respondents were 17 years old and reported experiencing mild dysmenorrhea. The majority had normal nutritional status but rarely ate breakfast. Spearman test showed no significant relationship between breakfast habits and dysmenorrhea ($p = 0.948$), while nutritional status showed a significant relationship with dysmenorrhea ($p = 0.004$).

INTRODUCTION

Dysmenorrhea refers to menstrual pain characterized by discomfort in the lower abdomen, lower back, and cramping sensations. If not properly managed, it can reduce quality of life and interfere with daily functioning[1,2]. Primary dysmenorrhea is often associated with various physiological and lifestyle-related factors that influence the onset of pain. Several studies have identified contributing risk factors, such as poor nutritional status, maternal history of dysmenorrhea, early menarche (before age 12), and breakfast skipping behavior[3].

Globally, an estimated 30% to 60% of adolescent girls experience dysmenorrhea, with 7% to 15% unable to participate in physical activities such as attending school or work[4]. In Surabaya, the prevalence of primary dysmenorrhea has been reported at 71.3%, based on research by Ammar, U.R. (2016)[5]. Additionally, a study across six major Indonesian cities, including Surabaya, found that 14% to 25% of adolescents skip breakfast[6]. Dysmenorrhea has been associated with reduced concentration, decreased academic performance, and increased school absenteeism[7–9].

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The high prevalence and adverse impact of dysmenorrhea among adolescents underscore the importance of addressing modifiable lifestyle factors such as breakfast habits and nutritional status. However, limited studies have explored these associations specifically among high school students in Indonesia.

Understanding this relationship is essential to inform preventive strategies that support adolescent health and academic performance. Therefore, this study aims to analyze the association between breakfast habits and nutritional status with the prevalence of dysmenorrhea among adolescent girls at SMAN 8 Surabaya.

MATERIALS AND METHODS

This research is an analytical observational study with a cross-sectional design, which aims to examine the relationship between risk factors and outcomes by collecting data at a single point in time. The study was conducted at SMAN 8 Surabaya from October 2023 to March 2024. The target population consisted of 11th-grade female students, totaling 210 individuals.

A total of 68 students were selected as respondents using proportional random sampling. In this method, samples were randomly selected from each class proportionally to its size, ensuring that each subgroup within the population was adequately represented.

Data collection involved several steps. First, respondents completed an informed consent form. Then, anthropometric measurements were taken to assess nutritional status using height and weight. Interviews were conducted using a validated Food Frequency Questionnaire (FFQ) to assess breakfast habits. To determine the level of primary dysmenorrhea, a structured dysmenorrhea questionnaire was used, which asked respondents to report their symptoms during menstruation. The severity of pain was then categorized into four levels: degree 0 (no pain), degree 1 (mild), degree 2 (moderate), and degree 3 (severe).

The study received ethical approval, the collected data were analyzed using bivariate analysis with the Spearman correlation test, which is suitable for ordinal or non-parametric data. A significance level of $p < 0.05$ was used to determine whether a statistically significant relationship existed between the variables.

RESULTS

Table 1. Frequency Distribution of Respondents' Characteristics of Respondents in Grade 11 at SMAN 8 Surabaya Year 2024

Variables	n	%
Age		
16 Years	12	17.7
17 Years	50	73.5
18 Years	3	4.4
19 Years	3	4.4
Total	68	100

Source: Primary Data, 2024

Based on Table 1, the majority of respondents were 17 years old, (50 students) of the total sample. Meanwhile, 16-year-old students made up 17.7% (12 students), and both 18- and 19-year-old students comprised 4.4% (3 students each). This indicates that most participants were in the middle phase of adolescence, which is a critical period for experiencing menstrual-related disorders such as dysmenorrhea.

Table 2. Frequency Distribution of Primary Dysmenorrhoea of Respondents in Grade 11 at SMAN 8 Surabaya in 2024

Variables	n	%
Degree 0 (No Pain)	7	10.3
1st Degree (mild pain)	41	60.3
2nd Degree (moderate pain)	16	23.5
3rd Degree (severe pain)	4	5.9
Total	68	100

Source: Primary Data, 2024

Based on Table 2, most respondents experienced primary dysmenorrhea at the 1st degree (mild pain), totaling 41 students (60.3%). This was followed by 16 students (23.5%) who reported 2nd degree (moderate pain), 7 students (10.3%) with no pain (degree 0), and 4 students (5.9%) who experienced severe pain (3rd degree). These findings indicate that while dysmenorrhea is common among the respondents, the majority experience it at a mild level.

Table 3. Frequency Distribution of Nutritional Status of Respondents in Grade 11 at SMAN 8 Surabaya Year 2024

Variables	n	%
Underweight	14	20.6
Normal	30	44.1
Overweight	13	19.1
Obesity 1	10	14.7
Obesity 2	1	1.5
Total	68	100

Source: Primary Data, 2024

Based on Table 3, the majority of respondents had normal nutritional status, accounting for 44.1% (30 students). Meanwhile, 20.6% (14 students) were underweight, 19.1% (13 students) were overweight, 14.7% (10 students) had obesity grade 1, and 1.5% (1 student) had obesity grade 2. These results show that although most students were within the normal range, a considerable

proportion had either undernutrition or overnutrition, which may influence their risk of experiencing dysmenorrhea.

Table 4. Frequency Distribution of Breakfast Habits of Respondents in Grade 11 at SMAN 8 Surabaya Year 2024

Variables	n	%
Rare	43	63.2
Often	25	36.8
Total	68	100

Source: Primary Data, 2024

Based on Table 4, the majority of respondents had a habit of rarely eating breakfast, with 63.2% (43 students), while only 36.8% (25 students) reported having breakfast often. This indicates that breakfast skipping is a common behavior among the students, which may potentially affect their nutritional status and menstrual health.

Table 5. Cross Tabulation of the Relationship between Breakfast Habits and Primary Dysmenorrhea of Respondents in Grade 11 at SMAN 8 Surabaya Year 2024

Breakfast Habits	Dysmenorrhea								Total		*p-value*
	Degree 0		1st Degree		2nd Degree		3rd Degree				
	n	%	n	%	n	%	n	%	n	%	
Rare	6	8.8	23	33.8	2	7.6	2	2.9	43	63.2	0.948
Often	1	1.5	18	26.5	4	5.9	2	2.9	25	36.8	
Total	7	10,3	41	60.3	16	23.5	4	5.9	68	100	

Source: Primary Data, 2024

Based on the cross-tabulation in Table 5, the highest proportion of respondents with mild dysmenorrhea (1st degree) was found among those who rarely had breakfast, totaling 23 students (33.8%). However, the Spearman correlation test showed a p-value of 0.948 ($p > 0.05$), indicating no significant relationship between breakfast habits and the incidence of primary dysmenorrhea among the respondents.

Table 6. Cross tabulation of the relationship between nutritional status and primary dysmenorrhea of respondents in class 11 at SMAN 8 Surabaya in 2024.

Nutrition Status	Dysmenorrhea								Total		*p-value*
	Degree 0		1st Degree		2nd Degree		3rd Degree				
	n	%	n	%	n	%	n	%	n	%	
Underweight	1	1.5	9	13.2	3	4.4	1	1.5	14	20.6	0.004
Normal	5	7.4	23	33.8	2	2.9	0	0	30	44.1	
Overweight	0	0	8	11.8	4	5.9	1	1.5	13	19.1	
Obesitas 1	1	1.5	1	1.5	7	10.3	1	1.5	10	14.7	
Obesitas 2	0	0	0	0	0	0	1	1.5	1	1.5	
Total	7	10.3	41	60.3	16	23.5	4	5.9	68	100	

Source: Primary Data, 2024

Based on Table 6, the majority of respondents with mild dysmenorrhea (1st degree) had normal nutritional status (33.8%), followed by those who were underweight (13.2%) and overweight (11.8%). Severe pain (3rd degree) was more common in respondents with overweight and obesity. The Spearman correlation test showed a p-value of 0.004 ($p < 0.05$), indicating a significant relationship between nutritional status and the incidence of primary dysmenorrhea.

DISCUSSION

Primary Dysmenorrhea

Based on the research conducted with respondents at SMAN 8 Surabaya, it was found that the majority of adolescent girls experienced degree 1 (mild pain) with 41 respondents (60.3%). In contrast, 7 respondents (10.3%) had degree 0 (no pain), 16 respondents (23.5%) had degree 2 (moderate pain), and 4 respondents (5.9%) experienced degree 3 (severe pain). This is supported by the theory of Tjokronegoro (2011) that one of the factors that can cause dysmenorrhea includes nutritional status[10]. Low nutritional status can be caused by poor food intake. Low nutritional status may result from inadequate food intake, whereas over-nutrition can contribute to dysmenorrhea due to excess fat tissue, which can lead to hyperplasia of blood vessels and increased pain during menstruation[11]. The degree of mild dysmenorrhea felt by adolescent girls can be seen from high activity and fulfilled nutritional status needs. Better nutritional status is associated with milder dysmenorrhea symptoms.

Breakfast Habits

The research results reveal that, among adolescent girls at SMAN 8 Surabaya, the majority have a habit of rarely having breakfast (64.7%), while a smaller proportion have the habit of frequently having breakfast (36.8%). The reasons for rarely having breakfast at SMAN 8 Surabaya vary from fear of being late, fear of being sleepy, fear of oversleeping. Skipping breakfast is the main cause of malnutrition in adolescents. To be able to do activities, enough energy is needed, one of which is obtained through breakfast. However, most adolescents do not have time or even do not want to eat breakfast which will lead to insufficient intake of daily nutritional intake[12].

Unmet nutritional intake can affect changes in hormonal levels due to decreased energy levels. Both undernutrition and overnutrition can cause dysmenorrhea. A balanced nutritional intake and regular breakfast is highly recommended as it is ideal for better metabolism and can lower the risk of dysmenorrhoea[13].

Nutrition Status

Based on the results of research conducted on respondents, it can be seen that the nutritional status of adolescent girls at SMAN 8 Surabaya the majority of adolescent girls have normal nutritional status 30 respondents (44.1%), while underweight 14 respondents (20.6%), overweight 13 respondents (19.1%), obesity 1 10 respondents (14.7%), and obesity 2 1 respondent (1.5%).

Nutritional status is an assessment of the body based on the energy that comes in from food with energy that comes out through activity. Individuals who have abnormal nutritional status tend to experience an imbalance in energy intake and expenditure. Individuals who have low nutritional status, experience an energy imbalance, namely energy expended is greater than the incoming energy, as well as vice versa with individuals who have more nutritional status with greater energy intake when compared to energy expended so that there is a buildup of fat. In addition to physical activity, there are various factors that affect nutritional status[14].

Relationship between Breakfast Habits and Primary Dysmenorrhea

The correlation between breakfast habits and primary dysmenorrhea yielded a significance level (Sign. (2-tailed)) of 0.948, which is greater than the standard threshold of 0.05. This means that the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected, indicating that there is no significant relationship between breakfast habits and primary dysmenorrhea. Although there is a general assumption that breakfast habits can affect primary dysmenorrhoea, the results of this study failed to find a significant correlation between the two variables. This is because primary dysmenorrhea is influenced by factors beyond just breakfast habits. Factors such as consuming foods with preservatives, artificial sweeteners, excessive fats, fried foods, and spicy foods can also contribute to the condition[15].

This study aligns with the research by Zafra et al. (2020), which found no statistically significant association between skipping breakfast and the incidence of primary dysmenorrhea in students[16]. However, it contrasts with the findings of Gagua et al. (2012), which indicated that breakfast behavior is a risk factor for primary dysmenorrhea, showing that individuals who skip breakfast have a 4.014 times higher risk of experiencing the condition[17].

Relationship between Nutritional Status and Primary Dysmenorrhea

The results of the correlation between nutritional status and primary dysmenorrhea showed a significance level (Sign. (2-tailed)) of 0.004, which is below the standard threshold of 0.05. This indicates that the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted, confirming a significant relationship between nutritional status and primary dysmenorrhea. Poor nutritional status affects the function and growth of organs so that it can cause reproductive system disorders, and the incidence of dysmenorrhea is one of the disorders that can occur[18,19]. Overnutrition status is a condition caused by the accumulation of fat resulting from an imbalance of lower energy expenditure compared to energy intake[20]. This can cause problems in the body, one of which is the incidence of dysmenorrhea. A person with a nutritional status is more at risk of developing dysmenorrhea because of the presence of excess fat tissue and causes the pressure of blood vessels

in the female reproductive tissue[21–23]. Hyperplasia of these blood vessels causes symptoms such as pain experienced during menstruation (dysmenorrhea)[24].

Research indicates that nutritional status is related to primary dysmenorrhea. This finding is consistent with Wirawanti's (2019) study, which also demonstrated a significant relationship between nutritional status and the occurrence of dysmenorrhea[25]. This research is further supported by the study conducted by Nurwana, Yusuf, and Andi (2017), which analyzed factors associated with dysmenorrhea in adolescent girls at SMA Negeri 8 Kendari. Their findings indicated that nutritional status is a contributing factor to the incidence of dysmenorrhea[14].

This study may be subject to several potential biases. First, the use of self-reported questionnaires to assess breakfast habits and menstrual pain levels could introduce recall bias or subjective interpretation among respondents. Participants may underreport or overreport the severity of dysmenorrhea due to individual pain tolerance or memory limitations. In addition, social desirability bias may have influenced some students to report healthier behaviors, such as more frequent breakfast consumption. These biases can affect the accuracy and objectivity of the collected data and should be considered in interpreting the results.

The study was limited to female students in grade 11 at a single school (SMAN 8 Surabaya), which may restrict the generalizability of the findings to other age groups, school levels, or geographic regions. The cross-sectional design also limits the ability to establish causality between nutritional status, breakfast habits, and dysmenorrhea, as it only captures data at one point in time. Furthermore, other influencing factors such as stress, physical activity, hormonal levels, and dietary quality beyond breakfast intake were not assessed in this research, even though they may contribute to the occurrence and severity of dysmenorrhea.

CONCLUSIONS

This study concludes that most adolescent girls at SMAN 8 Surabaya experience mild dysmenorrhea, have normal nutritional status, and tend to skip breakfast. There is no significant relationship between breakfast habits and the incidence of primary dysmenorrhea, but there is a significant relationship between nutritional status and primary dysmenorrhea. These findings highlight the importance of maintaining a healthy nutritional status to help reduce the severity of menstrual pain in adolescents. A suggestion for future research is to consider using a longitudinal design to observe long-term patterns, and to include additional variables such as overall daily nutritional intake, physical activity levels, and psychological factors like stress, which may also influence the incidence of dysmenorrhea. This would provide more comprehensive and applicable findings for preventive efforts.

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