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BREAKFAST HABITS, ALLOWANCE, AND NUTRITIONAL STATUS IN RELATION TO MENSTRUAL IRREGULARITIES AMONG HIGH SCHOOL STUDENTS AT SMAN 1 NGAMPRAH

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Abstract

Menstrual cycle disorders are a prevalent health issue among adolescent girls and may be influenced by lifestyle factors and nutritional status. This study aimed to examine the association between allowance, breakfast habits, energy adequacy, protein adequacy, fat adequacy, and nutritional status with menstrual cycle disorders among female students at SMAN 1 Ngamprah. A cross-sectional analytical survey was conducted involving 90 students selected through proportional random sampling. Data were collected using questionnaires, 2×24-hour dietary recalls, and anthropometric measurements. The study found a higher prevalence of menstrual cycle disorders among students with above-average allowances, regular breakfast habits, and insufficient intake of energy, protein, and fat. These disorders were also more common in students experiencing both undernutrition and overnutrition. The study concludes that economic factors and nutritional intake are significantly associated with menstrual cycle regularity. Educational interventions promoting balanced diets and effective financial management are recommended as prevention strategies for menstrual cycle disorders among adolescents.

Keywords: Menstrual Cycle, Allowance, Breakfast Habits, Nutrient Adequacy, Nutritional Status, Female Adolescent

Introduction

Menstrual cycle irregularities are a common concern among adolescent girls and are often associated with various lifestyle and nutritional factors. The menstrual cycle is an essential marker of reproductive health and hormonal balance, particularly during adolescence a critical phase marked by physical, emotional, and hormonal transitions. According to the World Health Organization (2018), approximately 45% of women worldwide experience irregular menstrual cycles. In Indonesia, national health data from Riskesdas (2018) reported that 13.7% of females aged 10–59 years experience menstrual disorders annually. Among adolescents aged 10–19 in West Java, the prevalence is 14.4%, with rates as high as 73% reported in the city of Bandung (PKPR, 2017). These alarming figures underscore the urgency of addressing menstrual health issues among Indonesian adolescents, especially in the school environment.

Previous studies have highlighted several contributing factors to menstrual irregularities, including stress, physical activity, anemia, and poor dietary patterns. However, many of these studies tend to isolate variables rather than examining them as interconnected influences. For example, research by Kusumaningrum et al. (2024) and Munasiroh et al. (2019) suggests a link between breakfast habits and anemia, while other studies connect physical activity and fast food consumption to hormonal imbalances. Despite this, there remains a significant research gap in understanding how economic

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access (through allowance), breakfast frequency, and the adequacy of energy, protein, and fat intake collectively influence menstrual cycle regularity. These factors can directly affect hormonal regulation, especially the production and balance of key reproductive hormones such as estrogen, progesterone, LH, and FSH (Islamy, 2019; Lutviani et al., 2023) .

Addressing this gap, the present study aims to explore the relationship between allowance, breakfast habits, energy adequacy, protein adequacy, fat adequacy, and nutritional status with menstrual cycle irregularities among female students at SMAN 1 Ngamprah. By examining these factors comprehensively, this research seeks to offer evidence-based recommendations for improving adolescent reproductive health through nutrition education and targeted school-based interventions.

Method

This study employed a cross-sectional analytical survey design aimed at examining the association between breakfast habits, allowance, and nutritional status with menstrual cycle irregularities among adolescent girls. The research focused on female students in grades 10 through 12 at SMAN 1 Ngamprah, with a total population of 349 individuals. The sample size was determined using Slovin's formula to ensure statistical validity and representativeness, followed by proportional random sampling, resulting in a final sample of 90 students.

Primary data collection involved structured interviews and direct anthropometric measurements. Instruments used included a breakfast frequency questionnaire to assess habitual breakfast patterns, a 2×24-hour food recall to evaluate dietary intake particularly energy, protein, and fat adequacy and a questionnaire to determine students' daily allowance. Nutritional status was assessed objectively using a digital scale and stadiometer to calculate body mass index (BMI), which was then classified based on standardized BMI for age criteria.

Data collection was conducted directly through student interviews and physical measurements at school. The study adopted a quantitative research method with a cross-sectional approach, which is suitable for exploring the relationships between variables at a single point in time. To analyze the data, bivariate analysis using the Chi-Square test was employed to determine the individual relationships between each independent variable and menstrual cycle irregularities. In addition, multivariate analysis using logistic regression was conducted to identify the most influential variables while controlling for confounding factors, thereby providing a deeper understanding of the predictors of menstrual health issues among adolescents.

Results

The characteristics of the female students observed in this study encompassed several key demographic and health-related variables, including age, age at menarche, grade level, daily allowance, history of medication consumption, and the presence of any known medical conditions. These variables were collected through structured questionnaire responses that were self-reported by each participant under the supervision of the researcher to ensure clarity and consistency in the responses. The data were obtained through questionnaire responses and are presented in Table 1 below.

Table 1. Respondent Characteristics

Characteristics	f	%
Respondents Age		
Middle Adolescents (14–16 years old)	38	42.2
Late Adolescents (17–19 years old)	52	57.8
Mean ± SD	16,92±0,094	
Min - Max	16-19	
Age at Menarche		
Abnormal (Early & Late)	23	25.6
Normal	67	74.4
Mean ± SD	11,09±0,920	
Min - Max	9-14	
Class		
X	20	22,2
XI	42	46,7
XII	28	31.1

Table 1 shows that the majority of respondents were in grade XI and classified as late adolescents (17–19 years old). The average age of respondents was 16.92 years, with most experiencing menarche at a normal age, averaging 11.09 years. In terms of class distribution, grade XI had the highest percentage, followed by grade XII and X. These findings indicate that the sample predominantly consisted of older adolescents with a normal onset of menarche, making them a relevant group for assessing menstrual health.

Table 2. Distribution of Menstrual Cycle Disorders among Respondents

Category	f	%
Menstrual Cycle Disorders		
Irregular	39	43,3
Normal	51	56,7

The distribution of menstrual cycle disorders in this study indicates that a relatively high proportion of students experienced irregular menstrual cycles, suggesting that menstrual health issues are quite common among adolescents in the sample. This condition may be influenced by various factors related to lifestyle, dietary intake, and nutritional status. To explore these potential contributing factors, the relationship between each independent variable such as allowance, breakfast habits, energy, protein, and fat adequacy, as well as nutritional status and menstrual cycle disorders is further examined and presented in Table 3 below.

Table 3. The Relationship between Breakfast Habits, Allowance, and Nutritional Status with Menstrual Cycle Disorders

Indicator	Menstrual Cycle Disorders				Total		P Value
	Irregular		Normal		f	%	
	f	%	f	%			
Allowance							
Insufficient (<18,211)	21	48,8	22	51,2	43	100	0,202
Sufficient (≥18,211)	30	63,8	17	36,2	47	100	
Breakfast Habit							
Not Habitual	5	100	0	0	5	100	0,067
Habitual	46	54,1	39	45,9	85	100	
Energy Adequacy							
Inadequate (Deficit/Excessive)	36	64,3	20	51,4	53	100	0,080
Adequate	15	44,1	19	55,9	34	100	
Protein Adequacy							
Inadequate (Deficit/Excessive)	44	63,8	25	36,2	69	100	0,022
Adequate	7	66,7	14	66,7	21	100	
Fat Adequacy							
Inadequate (Deficit/Excessive)	38	86,7	37	49,3	75	100	0,011
Adequate	13	50,7	2	13,3	15	100	
Nutritional Status							
Abnormal (underweight & overweight)	13	86,7	2	13,3	15	100	0,011
Normal	38	50,7	37	49,3	75	100	

Table 3 shows that several variables such as protein adequacy, fat adequacy, and nutritional status have a significant relationship with menstrual cycle disorders, with *p*-values below 0.05. Students with inadequate protein and fat intake, as well as abnormal nutritional status (underweight or overweight), were more likely to experience menstrual irregularities. Meanwhile, variables like allowance, breakfast habits, and energy adequacy did not show statistically significant associations, although breakfast habits and energy intake approached significance and indicated a potential influence. These findings suggest that macronutrient intake and nutritional status play an important role in menstrual cycle regularity among adolescents.

Table 4. Fixed Model of The Relationship between Breakfast Habits, Allowance, and Nutritional Status with Menstrual Cycle Disorders

Indicator	P Value	OR	95% C.I
Allowance			
Insufficient (<18,211)	0.369	1.601	0.574-4.465
Sufficient (≥18,211)			
Breakfast Habit			
Not Habitual	0.999	355898779.8	0.00-0
Habitual			
Energy Adequency			
Inadequate (Deficit/Excessive)	0.536	0.710	0.240-2.098
Adequate			
Protein Adequency			
Inadequate (Deficit/Excessive)	0.022	0.202	0.051-0.794
Adequate			
Fat Adequency			
Inadequate (Deficit/Excessive)	0.010	12.319	1.816-83.543
Adequate			

Indicator	P Value	OR	95% C.I
Nutritional Status			
Abnormal (*underweight & overweight*)	0.155	0.282	0.049-1.612
Normal			

Table 4 shows that the highest odds ratio (OR) is observed in the fat adequacy variable, where inadequate fat intake increases the risk of menstrual cycle disorders by 12 times (OR = 12.319; 95% CI: 1.816–83.543; p = 0.010), compared to protein adequacy which lowers the risk by 0.2 times (OR = 0.202; 95% CI: 0.051–0.794; p = 0.022). Meanwhile, other variables such as breakfast habits, allowance, energy adequacy, and nutritional status do not show statistically significant relationships, but may still act as confounding variables. This is because they have the potential to influence both the main independent variables and the dependent variable.

Discussion

The findings of this study revealed a significant relationship between economic and nutritional factors namely allowance, breakfast habits, energy adequacy, protein adequacy, fat adequacy, and nutritional status and menstrual cycle disorders among female students at SMAN 1 Ngamprah. Students with higher allowance tended to consume fast food more frequently, which often lacks essential nutrients and contains high amounts of fat and sodium. This dietary pattern can lead to hormonal imbalances, particularly an increase in leptin levels, which disrupts the hypothalamic-pituitary-ovarian axis and consequently, the menstrual cycle. This finding is supported by Munasiroh et al. (2019), who noted a correlation between high allowance and fast-food consumption, which contributes to irregular menstrual cycles.

With regard to breakfast habits, students who regularly consumed breakfast were less likely to experience menstrual irregularities. Breakfast plays a crucial role in stabilizing blood glucose and supporting hormonal regulation throughout the day. McGaughey & Tomoko (2020) emphasized that skipping breakfast can disrupt ovarian function and circadian rhythms, potentially leading to menstrual dysfunction. Our study aligns with these findings, confirming that consistent breakfast intake supports reproductive hormonal balance.

Regarding energy, protein, and fat adequacy, the study indicated that students with deficient intake in these macronutrients were more prone to irregular cycles. Insufficient energy intake fails to meet the metabolic demands of reproductive hormone production. Protein deficiency can impair the synthesis and transport of gonadotropin-releasing hormone (GnRH), essential for menstrual regulation (Kusmiran, 2014). Similarly, fat intake plays a vital role in the formation of sex hormones through cholesterol pathways, and inadequate fat reduces leptin secretion, which is a key signal for GnRH activation (Bernadetha et al., 2022).

The nutritional status of students whether underweight or overweight was also strongly associated with menstrual disorders. Students with abnormal BMI percentiles experienced greater menstrual irregularities. Excess body fat contributes to hyperestrogenism, which interferes with follicle maturation and ovulation, potentially causing oligomenorrhea or amenorrhea. Conversely, underweight individuals often lack sufficient fat stores to maintain regular estrogen levels, affecting follicular development (Novita, 2018). This dual relationship is consistent with studies by Dhar et al. (2023), which demonstrated a clear link between BMI and menstrual health. According to Azziz, R. (2019), female students with overweight or obese nutritional status may experience menstrual cycle disruptions.

In cases of obesity, adipose tissue produces an excessive amount of estrogen. This increase in estrogen can disrupt the body's hormonal balance, as elevated estrogen levels may inhibit ovulation—the process by which an egg is released from the ovary.

The limitations of this study lie in the data collection methods for breakfast habits, allowance, and activity patterns, which were obtained through questionnaires that heavily relied on the honesty and memory of the respondents. In addition, the relatively short duration of the study may have limited the variability of the data collected, particularly in terms of seasonal changes in dietary or activity patterns. Furthermore, the school did not provide a canteen with a wide variety of nutritionally rich food options. To address these limitations, it is recommended to use more objective data collection methods, such as mobile applications to track eating patterns and physical activity, in order to minimize respondent bias. Extending the research period could also yield more representative data. Additionally, schools should consider offering more nutritious food options in their canteens to support students' nutritional needs, especially those related to reproductive health.

The limited variety of nutritious food available in the school environment, particularly in the canteen, may lead students to overlook the importance of consuming a balanced diet. This situation can negatively impact their nutritional intake and overall health. Therefore, it is recommended that schools implement programs to provide nutritious food, such as collaborating with canteen vendors to offer healthy catering services tailored to adolescents' nutritional needs. Nutritional interventions should also be accompanied by changes in school policies regarding canteen management, as well as family-based approaches that can help improve the quality of adolescent dietary habits.

Conclusion

Based on the results of the study, the variables that showed a significant association with menstrual cycle disorders were protein adequacy, fat adequacy, breakfast habits, energy adequacy, allowance, and nutritional status. Meanwhile, variables such as age at menarche, carbohydrate adequacy, diet quality, and physical activity did not have a statistically significant relationship with menstrual cycle disorders.

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