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Article

Breakfast Habits, Free Nutritious Meal Acceptance, and Nutritional Status Among Students of Sinar Harapan Private Senior High School

Pretty Siagian [1,*], Putri Aisyah[2] and Haripin Togap Sinaga[3]

[1] Nutrition study program, Medan Health Polytechnic, Indonesia; prettysiagian5@gmail.com
[2] Nutrition study program, Medan Health Polytechnic, Indonesia; putriaisyah201918@gmail.com
[3] Nutrition study program, Medan Health Polytechnic, Indonesia; haripinsinaga71@gmail.com
* Correspondence: prettysiagian5@gmail.com

Abstract

Background: Breakfast contributes to the fulfillment of daily energy and nutrient requirements among adolescents. The Free Nutritious Meal (Makan Bergizi Gratis/MBG) program is expected to support students' nutritional intake at school, particularly among those who do not consume breakfast at home. **Objective:** This study aimed to describe breakfast habits, acceptance of the MBG program, and nutritional status among students of Sinar Harapan Private Senior High School. **Methods:** A descriptive quantitative study with a cross-sectional design was conducted among 83 students in grades X and XI. Data were collected using structured questionnaires, food-waste weighing, and anthropometric measurements. Breakfast habits were assessed based on frequency, timing, and food type. MBG acceptance was assessed using a five-point hedonic test and food-waste observation for five days. Nutritional status was assessed based on body mass index-for-age (BMI/A) and height-for-age (HAZ). Data were analyzed descriptively using frequency distributions and percentages. **Results:** A total of 42 students (50.6%) did not consume breakfast, while 28 (33.7%) had good breakfast habits and 13 (15.7%) had less good habits. Most students liked the MBG menu (84.3%). During the five-day observation, an average of 92.6% of students consumed the meals completely. Most students had normal nutritional status based on BMI/A (78.3%) and HAZ (81.9%). **Conclusions:** Breakfast habits among students were still inadequate, whereas acceptance of the MBG program was good, as indicated by the high level of food liking and low proportion of uneaten food. Most students had normal nutritional

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1. Introduction

Adolescence is a period of rapid growth and development that requires adequate energy and nutrient intake. During this period, eating habits are established and may contribute to nutritional conditions and health. Breakfast is one of the important eating habits because it contributes to meeting daily energy and nutrient requirements. Previous research has shown that breakfast contributes to energy and nutrient intake among Indonesian adolescents, indicating the importance of maintaining adequate breakfast quality [1].

However, inadequate breakfast habits remain a nutritional concern among adolescents. Factors such as eating habits, food availability, environmental conditions, and activities before school may influence breakfast behavior. Poor breakfast habits may also be associated with inadequate nutritional intake and nutritional status among adolescents [2].Therefore, describing breakfast habits among school students is important as part of efforts to support adequate nutritional intake during adolescence.

One of the government efforts to support students' nutritional intake is the Free Nutritious Meal (Makan Bergizi Gratis/MBG) program. The program provides meals to students while they are at school. The implementation of a school meal program does not depend only on food availability but also on students' acceptance of the meals provided. Food acceptance can be assessed through students' liking of the menu and the amount of food consumed. Previous research on food service has indicated that food preferences are related to food waste, making food liking and plate waste useful indicators for describing food acceptance [3].Research on the implementation of the MBG program at the senior high school level has also examined breakfast habits and food acceptance [4] .

In addition to food acceptance, nutritional status is an important indicator for describing the nutritional condition of students. Adolescents may experience both undernutrition and overnutrition as a result of an imbalance between nutrient requirements and intake. Previous research among adolescents has reported variations in nutritional status, including normal nutritional status as well as nutritional problems [5]. Therefore, observing breakfast habits, acceptance of school-provided meals, and nutritional status is important to obtain a more comprehensive description of students' nutritional conditions.

An initial survey conducted at Sinar Harapan Private Senior High School on March 2, 2026, among 15 students found that 5 students regularly consumed breakfast, 3 students rarely consumed breakfast, and 7 students never consumed breakfast before leaving for school. The school had also implemented the MBG program, which was provided at 09.30 WIB. However, studies that simultaneously describe breakfast habits, food acceptance based on a hedonic test and food-waste weighing, and nutritional status among senior high school students remain limited. Therefore, this study was conducted to describe breakfast habits, acceptance of the Free Nutritious Meal program, and nutritional status among students of Sinar Harapan Private Senior High School.

2. Materials and Methods

2.1 Study Design and Setting

This study employed a descriptive quantitative approach with a cross-sectional design. The study was conducted at Sinar Harapan Private Senior High School, Beringin, Deli Serdang Regency, Indonesia. Data collection was carried out from April 24 to 30, 2026. The study aimed to describe breakfast habits, acceptance of the Free Nutritious Meal (MBG) Program, and nutritional status among students in grades X and XI.

2.2 Population and Sampling

The study population consisted of all students in grades X and XI at Sinar Harapan Private Senior High School, totaling 104 students. The sample size was calculated using the Slovin formula with a 5% margin of error, resulting in 83 students. An additional 10% was included in the recruitment plan to anticipate potential dropout, resulting in a target of 91 students.

Proportional allocation was applied to determine the number of participants from each class, followed by simple random sampling using the student attendance list as the sampling frame. Students in grades X and XI who were willing to participate and present at school during data collection were included. Students who declined participation or were absent due to illness were excluded. After data collection and completeness checks, 83 students with complete research data were included in the final analysis.

2.3 Data Collection

Primary data were collected through structured questionnaires, food-waste weighing, and anthropometric measurements. Secondary data were obtained from school records, including the number of students and information regarding the implementation of the MBG Program. Data collection was assisted by five sixth-semester nutrition students.

Breakfast habits were assessed using a structured questionnaire covering breakfast frequency over five school days, breakfast timing, and types of food consumed. The questionnaire was used to obtain information on students' breakfast practices during the study period.

Acceptance of the MBG meals was assessed using a five-point hedonic scale and food-waste weighing. The hedonic assessment evaluated the color, aroma, texture, shape, and taste of the food served. Food waste was measured for staple foods, animal-based side dishes, plant-based side dishes, vegetables, and fruit over five observation days.

Anthropometric measurements included body weight and height. Body weight was measured using a digital weighing scale, while height

was measured using a stadiometer. These measurements were used to determine body mass index-for-age and height-for-age nutritional status.

2.4 Variables and Operational Definitions

The main variables in this study were breakfast habits, acceptance of the MBG Program, and nutritional status. Because this was a descriptive study, no independent or dependent variables were specified for hypothesis testing. Breakfast habits were assessed based on three indicators: frequency, timing, and food composition. Breakfast frequency was scored as 2 for consumption on at least three of five school days and 1 for consumption on fewer than three days. Breakfast timing was scored as 2 when breakfast was consumed between 06:00 and 09:00 and 1 when consumed after 09:00. Breakfast composition was scored as 2 when the meal consisted of a staple food, a side dish, and vegetables or fruit, and 1 when these components were incomplete. The total score ranged from 3 to 6, with scores of 5–6 classified as good breakfast habits and scores of 3–4 classified as less good breakfast habits. Students who did not consume breakfast were classified separately as not consuming breakfast.

Acceptance of the MBG meals was defined as students' responses to the food served, assessed using the mean hedonic score. Scores were categorized as like (3.68–5.00), moderately like (2.34–3.67), and dislike (1.00–2.33). Food waste was operationally defined as the proportion of food served that remained uneaten, calculated as the weight of leftover food divided by the weight of food served, multiplied by 100%.

Nutritional status was assessed using body mass index-for-age (BMI-for-age) and height-for-age. BMI-for-age was calculated by dividing body weight in kilograms by height in meters squared and classified according to Indonesian child anthropometric standards. Height-for-age was used to assess linear growth and categorized according to the applicable Indonesian anthropometric standards.

2.5 Data Analysis

The collected data were checked for completeness and consistency before coding, processing, and tabulation. Descriptive statistical analysis was performed using frequency distributions and percentages to describe respondents' characteristics, breakfast habits, MBG acceptance, food waste, and nutritional status.

The results were presented in tables and descriptive narratives. No bivariate or multivariate statistical tests were performed because the study aimed to describe the distribution of the research variables rather than examine associations or causal relationships.

2.6 Ethical Considerations

Participation in this study was voluntary. Students were informed about the purpose and procedures of the research before data collection, and participation was limited to students who agreed to participate.

3. Results

The study involved 83 students of Sinar Harapan Private Senior High School. The results are presented descriptively, covering respondent characteristics, breakfast habits, acceptance of the Free Nutritious Meal (MBG) Program, and nutritional status based on BMI-for-age and height-for-age.

3.1. Characteristics of Respondents

The results showed that the respondents were aged 14–18 years, with the majority aged 16 years (45.8%), followed by those aged 15 years (32.5%). Most respondents were female (69.9%), while males accounted for 30.1%. Based on class distribution, grade XI accounted for the largest proportion (37.3%), followed by grade X-2 (33.7%) and grade X-1 (28.9%). The distribution of respondent characteristics is presented in Table 1.

Table 1. Characteristics of respondents

Variable	Category	n	%
Age	14 years	1	1.2
	15 years	27	32.5
	16 years	38	45.8
	17 years	12	14.5
	18 years	5	6.0
Sex	Male	25	30.1
	Female	58	69.9
Class	X-1	24	28.9
	X-2	28	33.7
	XI	31	37.3
Total		**83**	**100.0**

3.2. Breakfast Habits

The distribution of breakfast habits showed that more than half of the respondents (50.6%) did not consume breakfast before school. Meanwhile, 33.7% had good breakfast habits, and 15.7% had less good breakfast habits. These findings indicate that the proportion of students who did not consume breakfast was higher than that of students who reported good or less good breakfast habits. The distribution of breakfast habits is presented in Table 2.

Table 2. Breakfast habits among respondents

Breakfast Habit	N	%
Good	28	33.7
Less Good	13	15.7
Did Not Consume Breakfast	42	50.6
Total	**83**	**100.0**

3.3. Acceptance of the Free Nutritious Meal (MBG) Program

The acceptance of the MBG Program was assessed based on food liking, food consumption during five observation days, portion adequacy, and meal timing. The results showed that most respondents liked the MBG menu, with 84.3% categorized as like, 13.3% as moderately like, and 2.4% as dislike. Regarding food consumption, the average proportion of respondents who consumed the meals completely over five observation days was 92.6%, while 7.4% did not consume the meals completely.

In terms of portion adequacy, 79.5% of respondents considered the portions adequate, 16.9% considered them insufficient, and 3.6% considered them excessive. Furthermore, 74.7% of respondents considered the meal timing appropriate, while 25.3% considered it inappropriate. The distribution of MBG acceptance is presented in Tables 3–5.

Table 3. Acceptance of MBG menu based on food liking

Food Liking Category	N	%
Like	70	84.3
Moderately Like	11	13.3
Dislike	2	2.4
Total	83	100.0

3.4. Food Consumption During the MBG Observation Period

The results of food consumption monitoring over five observation days showed that the proportion of respondents who consumed the MBG meals completely ranged from 89.2% to 96.4%. The highest proportion was recorded on Day 4 (96.4%), while the lowest was recorded on Day 2 (89.2%). Overall, the average proportion of complete food consumption was 92.6%, while 7.4% of respondents did not consume the meals completely, as presented in Table 4.

Table 4. Food consumption during five days of MBG observation

Observation Day	Food Consumed Completely (%)	Food Not Consumed Completely (%)
Day 1	90.4	9.6
Day 2	89.2	10.8
Day 3	92.8	7.2
Day 4	96.4	3.6
Day 5	94.0	6.0
Average	**92.6**	**7.4**

3.5. MBG Portion Adequacy

The results showed that most respondents considered the portion of MBG meals adequate, accounting for 79.5% of the total respondents. Meanwhile, 16.9% considered the portions insufficient, and 3.6% considered them excessive. The distribution of MBG portion adequacy is presented in Table 5.

Table 5. MBG portion and meal timing

Variable	Category	N	%
Portion	Adequate	66	79.5
	Less	14	16.9
	Too Much	3	3.6
Meal Timing	Appropriate	62	74.7
	Inappropriate	21	25.3

3.6. Nutritional Status of Respondents

The assessment of nutritional status showed that most respondents had normal nutritional status based on BMI-for-age (78.3%), while 10.8% were obese, 9.6% were overweight, and 1.2% were thin. Based on height-for-age, 81.9% of respondents had normal height-for-age, while 18.1% were categorized as short. The nutritional status distribution is presented in Tables 6 and 7.

Table 6. Nutritional status based on BMI-for-age

BMI-For-Age Category	N	%
Thin	1	1.2
Normal	65	78.3
Overweight	8	9.6
Obese	9	10.8
Total	**83**	**100.0**

Table 7. Nutritional status based on height-for-age

Height-For-Age Category	N	%
Normal	68	81.9
Short	15	18.1
Total	**83**	**100.0**

4. Discussion

The findings showed that 50.6% of students did not consume breakfast before leaving for school. This indicates that breakfast habits among the students were still inadequate. Breakfast is an important component of adolescents' daily dietary intake because it contributes to energy and nutrient intake before school activities. Previous research among Indonesian adolescents has also emphasized the contribution of breakfast to daily nutrient intake [1].

The high proportion of students who did not consume breakfast may be associated with various conditions, including limited time in the morning, waking up late, lack of breakfast habits, and individual food preferences. The MBG meal provided at approximately 09.30 WIB may also represent a school food environment in which students receive food after arriving at school. However, because this study was descriptive and did not analyze causal relationships, the presence of MBG cannot be stated as a direct cause of students' breakfast behavior.

The acceptance of the MBG menu was generally good, with 84.3% of students categorized as liking the menu. Food acceptance may be influenced by sensory characteristics such as taste, aroma, color, texture, and appearance. Research on food service has shown that taste and food presentation can influence satisfaction with meals [6]. Therefore, maintaining the sensory quality of MBG menus is important to support students' willingness to consume the meals provided.

Food acceptance was also reflected in the relatively low proportion of food that was not consumed completely. During the five-day observation, an average of 92.6% of students consumed the meals completely. The highest proportion occurred on Day 4 (96.4%), whereas the lowest occurred on Day 2 (89.2%). Food waste can be influenced by sensory quality, portion size, menu variation, hunger, and individual eating habits. Food waste has also been used as an indicator of food acceptance in food service settings [3].

The results also showed that 79.5% of students considered the MBG portion adequate and 74.7% considered the meal timing appropriate. These findings indicate that, in addition to menu liking and food consumption, most students perceived the portion and timing of meals positively. Nevertheless, a proportion of students reported inadequate or excessive portions and inappropriate meal timing. Regular evaluation of menu characteristics, portion size, and meal schedules is therefore important in school meal implementation [4].

Most students had normal nutritional status according to BMI-for-age (78.3%), while 9.6% were overweight, 10.8% were obese, and 1.2% were thin. The predominance of normal nutritional status indicates that most students had a nutritional status within the normal category at the time of measurement. However, the presence of both undernutrition and overnutrition indicates that nutritional problems still existed among the study population. Nutritional status is influenced by various factors, including overall dietary intake, physical activity, growth, and individual characteristics, and therefore cannot be attributed to breakfast or MBG alone [7].

Based on height-for-age, 81.9% of students were in the normal category, while 18.1% were categorized as short. Height-for-age reflects linear growth over a longer period and may be influenced by long-term nutritional adequacy, health history, and growth factors. Therefore, the presence of short stature in this study cannot be directly attributed to breakfast habits or MBG implementation [8].

Overall, the study indicates that although acceptance of the MBG program was good and most students had normal nutritional status, breakfast habits remained a concern. The high proportion of students who did not consume breakfast highlights the importance of continuing nutrition education regarding breakfast and balanced dietary practices. At the same time, maintaining students' acceptance of MBG through appropriate menu selection, portioning, meal timing, and regular evaluation may support the consumption of the food provided at school [9].

5. Conclusions

This study showed that 50.6% of students did not consume breakfast, indicating that breakfast habits remained inadequate. Acceptance of the Free Nutritious Meal program was generally good, as demonstrated by the high proportion of students who liked the menu (84.3%), considered the portion adequate (79.5%), and considered the meal timing appropriate (74.7%). During five days of observation, an average of 92.6% of students consumed the meals completely. Most students had normal nutritional status based on BMI-for-age (78.3%) and height-for-age (81.9%), although thinness, overweight, obesity, and short stature were still identified. The implementation of MBG should therefore be maintained while continuing nutrition education on breakfast and balanced dietary practices and monitoring students' nutritional status regularly.

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7. Conflicts of Interest

The authors declare no conflict of interest.

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