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Association between participation in the free nutritious meal program and nutritional status among junior high school students

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Abstract

Background: Adolescents are a demographic that may face nutritional challenges, which can impact their growth, health, focus, and academic success. Based on the 2023 Indonesian Health Survey, 7.6% of adolescents aged 13–15 years were thin or severely thin, 12.1% were overweight, and 4.1% were obese. The Free Nutritious Food Program or Makan Bergizi Gratis (MBG) aims to address the nutritional needs of school-age children; however, variations in students' consumption patterns may influence the outcomes.

Purpose: To determine the association between Free Nutritious Meal Program (MBG) consumption and the nutritional status of junior high school students.

Method: This study employs an observational analytical design utilizing a cross-sectional approach. The research sample included 100 students who were chosen through a simple random sampling method. Data were collected through structured questionnaires, measurement of weight and height, and determination of BMI/U based on z-score.

Results: The analysis of the data was conducted using Fisher's Exact test. The research findings indicated that 77 students, representing 77.0%, exhibited good nutritional status. According to MBG consumption data, 60 students, representing 60.0%, were categorized as frequent consumers, while 40 students, or 40.0%, were classified as infrequent consumers. A total of 44 students (73.3%) in the frequent consumption group and 33 students (82.5%) in the infrequent consumption group exhibited good nutritional status. The Fisher's Exact test results indicate a significant relationship between MBG consumption and students' nutritional status, with a p value = 0.011.

Conclusion: MBG consumption frequency was significantly associated with nutritional status; however, frequent consumption was not consistently associated with a higher proportion of normal nutritional status. Longitudinal studies accounting for total dietary intake and physical activity are required.

Keywords: Adolescents; Free Nutritious Meal Program (MBG); Nutritional Status; School Feeding Program.

INTRODUCTION

Adolescence is a critical stage of rapid growth that requires adequate nutritional intake to support physical development, health, concentration, and academic performance. Nutritional imbalance during this period may interfere with growth and increase the risk of chronic diseases later in life (Hartanti, Harwati, & Arswinda, 2024). Globally, nutritional problems among children and adolescents remain a major

concern, including undernutrition, micronutrient deficiencies, overweight, and obesity (Rahmah, Anggraini, Nilasari, & Salsabilla, 2025).

In Indonesia, issues of adolescent nutrition exemplify a dual burden of malnutrition. The 2018 Basic Health Research indicated that 25.7% of adolescents aged 13 to 15 years were categorized as stunted or severely stunted (Handayani, Angelina, &

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Putri, 2023). The 2023 Indonesian Health Survey also showed that adolescents in the same age group experienced various nutritional problems, including thinness or severe thinness at 7.6%, overweight at 12.1%, and obesity at 4.1% (Desfita, Azzahra, Zulriyanti, Putri, & Anggraini, 2024). Similar conditions are also found at the local level. In Lampung Province, the prevalence of underweight was reported at 6.78%, while overweight reached 9.42% based on BMI-for-age indicators (Wati, 2024).

The Free Nutritious Meal Program, known as MBG, was introduced as one of the interventions to support the fulfillment of energy, protein, and micronutrient needs among school-aged children. This program is expected to contribute to reducing the double burden of malnutrition (Syamsu, Putry, & Widyadhana, 2025). However, the success of the program is not solely determined by food availability. It is also influenced by students' food consumption levels, menu acceptance, eating habits, and food safety (Aurora, Darmawan, Kusdiyah, Suzan, Syauqy, & Gading, 2025). Previous studies have shown that school feeding programs may improve nutritional status, increase BMI-for-age, and reduce the prevalence of wasting and anemia (Mohammed, Belachew, Kadir, & Abate, 2023; Desiani & Syafiq, 2025).

Despite the implementation of the Free Nutritious Meal Program in Indonesia, evidence regarding the relationship between students' consumption of the program and their nutritional status remains limited, particularly among junior high school students. Therefore, this study aimed to determine the association between MBG consumption and nutritional status among students participating in the program.

RESEARCH METHOD

This study employed an analytical observational design with a cross-sectional approach to determine the association between Free Nutritious Meal Program (Makan Bergizi Gratis/MBG) consumption and nutritional status among junior high school

students. The study was conducted at SMP Negeri "X" in Bandar Lampung, Indonesia, in March 2026.

The study population consisted of all students who participated in the MBG program, totaling 980 students. A sample of 100 students was selected using a simple random sampling technique. The sample size was calculated using the Slovin formula with an additional 10% to anticipate incomplete responses.

The inclusion criteria were students aged 11–15 years who received meals through the MBG program, were present during data collection, were able to communicate adequately, and agreed to participate in the study. Students who were absent, ill during the data collection period, or unwilling to participate were excluded from the study.

The independent variable in this study was the frequency of MBG consumption, which was categorized as frequent and infrequent consumption based on responses obtained from a structured questionnaire. The dependent variable was nutritional status, which was assessed using the Body Mass Index-for-Age (BMI-for-age) z-score according to the World Health Organization growth reference for children and adolescents aged 5-19 years.

Data were collected through a structured questionnaire to assess MBG consumption patterns and anthropometric measurements, including body weight and height. Body weight was measured using a calibrated digital scale, while height was measured using a stadiometer. Nutritional status was subsequently classified as underweight, normal, or overweight based on BMI-for-age z-score categories.

Data analysis was performed using univariate and bivariate analyses. Univariate analysis was used to describe the characteristics of respondents and was presented as frequencies, percentages, means, and standard deviations. Bivariate analysis was conducted using Fisher's Exact test to examine the association between MBG consumption and nutritional status. Statistical significance was determined at a p-value of less than 0.05.

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RESEARCH RESULTS

Table 1. Characteristics of Respondent (N=100)

Variable	Results	P-value
Age (Mean±SD) (Years) (Range)	(13.51±0.79) (11-15)	
11	1/1.0	
12	4/4.0	
13	45/45.0	
14	43/43.0	
15	7/7.0	
Gender (n/%)		
Male	47/47.0	
Female	53/53.0	
Free Nutritious Food Consumption (n/%)		0.011
Frequent	60/60.0	
Infrequent	40/40.0	
Nutritional Status (n/%)		
Underweight	7/7.0	
Normal	77/77.0	
Overweight	16/16.0	

Based on Table 1, most respondents were aged 13-14 years, with the highest proportion found among 13-year-old students at 45.0% and 14-year-old students at 43.0%. The distribution of respondents by sex was relatively balanced, consisting of 53.0% female students and 47.0% male students. The majority of respondents consumed MBG frequently, with 60 students or 60.0% included in this category. Meanwhile, 40 students or 40.0% were categorized as infrequent consumers. This finding indicates that most students had participated in and consumed meals provided through the MBG program. Most respondents had normal nutritional status, namely 77 students or 77.0%. Meanwhile, 7 students or 7.0% were classified as underweight, and 16 students or 16.0% were classified as overweight. These findings indicate that although most students had normal nutritional status, nutritional problems in the form of underweight and overweight were still found among respondents. The Fisher's Exact test showed a p-value of 0.011. Since this value was lower than 0.05, there was a significant association between MBG consumption and students' nutritional status.

DISCUSSION

The Fisher's Exact test yielded a p-value of 0.011, indicating a statistically significant association between consumption of the Free Nutritious Meal Program (MBG) and students' nutritional status. In the group with frequent MBG consumption, 44 students (73.3%) had normal nutritional status, whereas in the infrequent consumption group, normal nutritional status was observed in 33 students (82.5%). Although normal nutritional status was found in both groups, this distribution suggests that students' nutritional status is not solely attributable to MBG consumption. Other factors, such as dietary intake at home, snack consumption, physical activity patterns, and individual health conditions, may also contribute to nutritional outcomes (Askar, Muhammad, Fikri, & Darmawan, 2025).

From a nutritional standpoint, MBG remains a relevant intervention, particularly because adolescents aged 13-15 years are undergoing a phase of rapid growth. During this period, adequate intake of energy, protein, and micronutrients is required to support skeletal growth, muscle

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development, hormonal regulation, and cognitive function (Hartanto & Lestari, 2025). According to the Indonesian Recommended Dietary Allowances, boys aged 13–15 years require approximately 2,400 kcal of energy and 70 grams of protein per day, while girls in the same age group require around 2,050 kcal of energy and 65 grams of protein per day (Ministry of Health of the Republic of Indonesia, 2019). The estimated energy content of one MBG serving, approximately 570–600 kcal, contributes about 24–25% of daily energy requirements for boys and 28–29% for girls. Therefore, MBG provides a meaningful contribution to students' nutritional intake during school hours, although it cannot fulfill total daily nutritional requirements. Consequently, food intake at home and dietary behavior outside school remain important determinants of students' nutritional status (National Nutrition Agency, 2025).

The identification of 7 students (7.0%) with underweight indicates that some students may still experience inadequate and inconsistent intake of energy and protein. In adolescence, underweight may impair immune function, growth, physical endurance, concentration, and the ability to participate effectively in learning activities (Bani, Aspatia, & Gustam, 2025). Conversely, the presence of 16 students (16.0%) with overweight demonstrates that nutritional problems among students are not limited to insufficient intake, but also include excessive energy intake. The proportion of overweight was higher among students who frequently consumed MBG, with 14 students (23.3%) included in this category. This finding may indicate that MBG functioned as an additional source of energy among students who also consumed meals from home or calorie-dense snacks outside the program (Moridu, Kasim, Paramata, Karim, & Daud, 2025).

These results illustrate the existence of a double burden of malnutrition, characterized by the coexistence of underweight and overweight within the same student population. This condition suggests that school-based nutrition interventions should not rely only on uniform food provision for all students. Students with underweight require improved and consistent nutrient intake, whereas students with overweight require energy balance, appropriate food choices, and adequate physical activity (Andini, 2025). The findings of this study are consistent with

another research who reported that school feeding programs were associated with improvements in nutritional status indicators among school-aged children (Mohammed et al., 2023). Similarly, another study found that nutritious school meal programs may improve dietary diversity, increase BMI-for-age, and reduce wasting and anemia (Desiani & Syafiq, 2025).

Nevertheless, the effectiveness of MBG depends not only on the availability of meals, but also on the extent to which the meals are actually consumed by students (Santana, Batista, Maynard, Ginani, Zandonadi, & Botelho, 2023). Meals that are not fully consumed or are replaced with snacks may cause actual nutrient intake to be lower than the nutritional value planned in the menu (Petchoo, Kaewchutima, & Tangsuphoom, 2022). This issue is particularly important for students with underweight, as they require sustained improvements in energy and protein intake to support growth and learning performance (Bani et al., 2025). In contrast, among students with overweight, MBG consumption should be evaluated together with food intake outside the program, especially snacks high in sugar, fat, and calories, which may increase total daily energy intake (Anwar & Putri, 2024).

Therefore, MBG should not be interpreted merely as a food distribution program, but rather as part of a broader school-based nutrition monitoring system. Its implementation would be more effective if accompanied by regular evaluation of meal completion, menu acceptance, food safety, snack availability, and periodic monitoring of BMI-for-age. This study has several limitations, as it did not assess total daily dietary intake, plate waste, snacking behavior, physical activity, history of illness, or family socioeconomic status. These factors are important because they may explain why some students with infrequent MBG consumption still had normal nutritional status, while some students with frequent MBG consumption were classified as overweight. Future studies should consider using a longitudinal design and include assessments of daily food intake, plate waste, physical activity, and menu acceptance to provide a more comprehensive evaluation of the effect of MBG on changes in students' nutritional status.

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CONCLUSION

There is a significant association between Free Nutritious Meal Program (MBG) consumption and nutritional status among junior high school students. However, nutritional status is also influenced by dietary intake, snacking behavior, physical activity, and family-related factors. Continuous monitoring of nutritional status is therefore required to optimize the implementation of the MBG program.

SUGGESTION

Schools should monitor students' nutritional status based on BMI-for-age and prioritize follow-up for underweight students, while providing nutrition education and physical activity guidance for overweight students. MBG providers should regularly evaluate menu acceptance, food waste, hygiene, and digestive complaints to improve program quality. Students are encouraged to consume MBG appropriately, report any food-related problems, choose healthier snacks, and stay physically active. Future studies should include daily intake, food waste, snacking habits, and physical activity, preferably using a longitudinal design.

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