

FACTORS ASSOCIATED WITH MENU ACCEPTABILITY IN THE FREE NUTRITIOUS MEAL PROGRAM (MBG) AMONG STUDENTS AT SD NEGERI 6 MACORAWALIE, SIDENRENG RAPPANG REGENCY

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ABSTRACT

This study examined the relationships between menu variety, food taste, portion suitability, and menu acceptability in the Free Nutritious Meal Program (MBG) among students at SD Negeri 6 Macorawalie, Sidenreng Rappang Regency. The study used an analytical observational design with a cross-sectional approach. Of 105 students receiving MBG meals, 83 were selected through simple random sampling. Data were collected using a Likert-scale questionnaire assessing menu variety, food taste, portion suitability, and food acceptability; the instrument underwent content-validity review and reliability testing before use. Univariate analysis and Chi-Square tests were applied at a significance level of 0.05. Menu variety was significantly associated with food acceptability ($\chi^2 = 20.48$; $p < 0.001$), as were food taste ($\chi^2 = 10.07$; $p = 0.002$) and portion suitability ($\chi^2 = 25.71$; $p < 0.001$). Students who perceived the meals as varied, palatable, and appropriately portioned were more likely to report high acceptability. These findings indicate that varied menu cycles, consistent sensory quality, and age-appropriate portion standards are essential for strengthening MBG implementation and reducing plate waste.

Keywords: Food acceptability, menu variety, food taste, portion suitability, Free Nutritious Meal Program (MBG).

INTRODUCTION

The development of quality human resources is a strategic investment for national progress. Human resource quality is strongly influenced by health and nutritional status from an early age, particularly during the school-age period when physical growth, cognitive development, learning behavior, and social maturity develop rapidly. Adequate nutrition supports concentration, school attendance, immunity, and academic performance, while school-based nutrition and food-literacy interventions can strengthen healthier dietary behavior (Ares et al., 2024; Cotton et al., 2020).

Nutritional problems among elementary school children remain a public health concern in Indonesia. The 2023 Indonesian Health Survey reported that among children aged 5–12 years, 3.5% were severely thin, 7.5% were thin, 11.9% were overweight, and 7.8% were obese based on body mass index-for-age. These figures demonstrate a double burden of malnutrition that requires school-based interventions that are nutritionally adequate, acceptable, and responsive to children's dietary contexts (Badan Kebijakan Pembangunan Kesehatan, 2024; Dewi et al., 2024).

The Free Nutritious Meal Program, locally known as Program Makan Bergizi Gratis (MBG), has been initiated as one of the strategies to improve children's nutritional intake through the school environment. In principle, the program provides meals that are expected to meet part of students' daily nutritional needs, reduce inequalities in access to nutritious foods, and support learning readiness. However, the program can only achieve its intended impact when the food served is actually consumed by students. Therefore, acceptability becomes a key indicator because nutritionally balanced menus will not provide physiological benefits if they are rejected, disliked, or left unfinished.

Food acceptability refers to the extent to which consumers are willing to receive, taste, and consume food based on sensory, psychological, and contextual factors. In school feeding programs, it is commonly reflected in hedonic responses, willingness to eat, actual consumption, and plate waste. Evidence shows that acceptability assessment connects menu quality with actual intake and the amount of food discarded (Martins et al., 2021; Santana et al., 2023). Early evidence from Indonesia's MBG implementation likewise indicates that student acceptance is central to program effectiveness (Srimati et al., 2026).

Menu variety is one of the factors that may influence children's interest in consuming school meals. Repeated ingredients, similar colors, and monotonous preparation methods may produce sensory boredom, whereas variation in ingredients, color, texture, and serving form can make meals more attractive. Children's texture preferences and food fussiness further demonstrate the importance of sensory diversity in menu design (Lee et al., 2024; Santana et al., 2023; Srimati et al., 2026).

Food taste is another major determinant of acceptability. Taste in this study encompasses flavor, aroma, appearance, texture, seasoning balance, and serving temperature. Children's food preferences are shaped by sensory sensitivity, familiarity, food neophobia, and developmental changes in food perception; therefore, nutritionally appropriate meals may still be rejected when their sensory characteristics are unattractive or unfamiliar (Cappellotto & Olsen, 2021; Serrano-Gonzalez et al., 2021).

Portion suitability also determines whether meals are consumed optimally. Portions that are too large can produce early satiety and plate waste, whereas portions that are too small can reduce satisfaction and perceived adequacy. Studies across school-lunch settings show that consumption and waste are influenced by portion standards, menu composition, and the match between served food and children's age-related needs (Adjapong et al., 2024; Fitriani & Sulistiyani, 2024; Martins et al., 2021; Petchoo et al., 2022).

Preliminary observations at SD Negeri 6 Macorawalie indicated that the acceptability of MBG menus was not yet optimal. Some students tended to leave certain food components, especially when the menu was perceived as repetitive, less tasty, or not aligned with their appetite. Lower-grade students appeared more likely to leave food when the portion was considered too large, while several upper-grade students expressed the need for more appropriate portions. These field observations indicate that menu

variety, taste, and portion suitability are relevant factors requiring scientific examination in the local implementation of the MBG program.

Although recent studies have examined school-menu acceptability, plate waste, and the effects of national school-feeding programs, the available evidence has largely focused on systematic assessment methods, broader program outcomes, or settings outside Sidenreng Rappang (Pramesthi et al., 2025; Santana et al., 2023). Early MBG research in Indonesia has also been reported in an urban setting in North Jakarta (Srimiati et al., 2026). Consequently, evidence remains limited on how menu variety, food taste, and portion suitability jointly relate to acceptability during early MBG implementation in a public elementary school in Sidenreng Rappang Regency. This study addresses that context-specific gap and provides directly actionable evidence for local menu planning, preparation, and portion management.

Based on this background, this study aimed to analyze the relationships between menu variety, food taste, portion suitability, and the acceptability of MBG meals among students at SD Negeri 6 Macorawalie, Sidenreng Rappang Regency. The results are expected to support program managers, schools, and local stakeholders in improving meal consumption and the nutritional effectiveness of school feeding.

RESEARCH METHOD

This study employed an analytic observational design with a cross-sectional quantitative approach. This design was selected because the study aimed to examine the relationship between independent variables and food acceptability at one point in time without providing any intervention. The cross-sectional approach was appropriate for identifying whether menu variety, food taste, and portion suitability were statistically associated with food acceptability among students receiving the MBG program.

The research was conducted at SD Negeri 6 Macorawalie, Sidenreng Rappang Regency. The population consisted of all 105 students who received meals through the MBG program. A total of 83 respondents were selected using simple random sampling, giving every eligible member of the population an equal opportunity to be included. The sample size was considered adequate to represent the target population and to support bivariate analysis using categorical data.

The variables in this study consisted of menu variety, food taste, portion suitability, and food acceptability. Menu variety referred to students' perceptions of diversity in ingredients, menu rotation, color, texture, and serving form. Food taste referred to students' assessments of flavor, aroma, seasoning, texture, and serving temperature. Portion suitability referred to the perceived match between the amount served and students' appetite or needs. Food acceptability referred to students' willingness to consume the meals and their tendency to finish the food provided.

Data were collected using a structured questionnaire with a Likert scale. The questionnaire was developed based on the research variables and indicators commonly used in the assessment of school meal acceptability. Before data collection, the instrument was reviewed for content validity by considering the suitability of each item with the

construct being measured. Reliability testing was conducted to ensure consistency of responses. Items that met validity and reliability criteria were used in the final questionnaire, while unclear items were revised to improve respondent understanding.

Data analysis was conducted using univariate and bivariate techniques. Univariate analysis was used to describe the frequency and percentage distribution of respondent characteristics and study variables. Bivariate analysis was conducted using the Chi-Square test because the independent and dependent variables were categorical. Statistical interpretation was based on the χ^2 value, p-value, and the decision rule at a significance level of $\alpha = 0.05$. A p-value lower than 0.05 indicated a statistically significant relationship between variables. The results are presented in tables and narrative explanations to facilitate interpretation.

RESULTS AND DISCUSSION

Results

Respondent Characteristics

Respondent characteristics were analyzed to describe the profile of students involved in this study. As shown in Table 1, the characteristics included gender, age, and grade level. These characteristics are important because age and grade level may influence appetite, food preference, and portion needs among elementary school children.

Table 1. Respondent Characteristics by Gender, Age, and Grade Level

Characteristic	N	Percentage (%)
Gender		
Male	45	54.22
Female	38	45.78
Total	83	100
Age		
7 years	12	14.46
8 years	11	13.25
9 years	10	12.05
10 years	16	19.28
11 years	21	25.30
12 years	13	15.66
Total	83	100
Grade Level		
Grade I	12	14.46
Grade II	11	13.25
Grade III	10	12.05
Grade IV	16	19.28
Grade V	21	25.30
Grade VI	13	15.66

Table 1 shows that, of the 83 respondents, 45 students (54.22%) were male and 38 (45.78%) were female. Male students were therefore slightly more represented in the sample.

Based on age, the largest group of respondents was 11 years old, consisting of 21 students (25.30%), followed by 10 years old with 16 students (19.28%). The smallest group was 9 years old, with 10 students (12.05%). This distribution shows that most respondents were in the upper elementary-school age range.

Based on grade level, Grade V had the highest number of respondents, namely 21 students (25.30%), followed by Grade IV with 16 students (19.28%) and Grade VI with 13 students (15.66%). The distribution across grade levels was relatively proportional, although the upper grades were slightly more dominant.

The distribution included students across Grades I–VI, with a slightly larger representation from upper grades. Because appetite, sensory preferences, and energy needs may differ by age and grade level, these characteristics should be considered when interpreting meal acceptability and planning portions.

Research Results

Univariate Analysis

Univariate analysis was conducted to describe the frequency distribution and proportion of each study variable. The distribution of menu variety, food taste, portion suitability, and food acceptability is presented in Table 2.

Table 2. Distribution of Menu Variety, Food Taste, Portion Suitability, and Food Acceptability

Variable	Frequency	Percentage (%)
Menu Variety		
Varied	52	62.7
Less Varied	31	37.3
Total	83	100
Food Taste		
Good	57	68.7
Less Good	26	31.3
Total	83	100
Portion Suitability		
Suitable	45	54.2
Not Suitable	38	45.8
Total	83	100
Food Acceptability		

High	63	75.9
Low	20	24.1
Total	83	100

Source: Primary Data, 2026

Table 2 shows that 52 respondents (62.7%) rated the menu as varied, while 31 respondents (37.3%) rated it as less varied. This indicates that most respondents perceived the menu cycle as sufficiently diverse, although more than one-third still perceived limited variation.

For food taste, 57 respondents (68.7%) rated the taste as good, while 26 respondents (31.3%) rated it as less good. This result indicates that the sensory quality of the meals was generally acceptable, but improvement is still needed in seasoning consistency, aroma, texture, and serving temperature.

Regarding portion suitability, 45 respondents (54.2%) considered the portion suitable, while 38 respondents (45.8%) considered it unsuitable. This nearly balanced distribution shows that portion management remains an important issue because a large proportion of students perceived that the portion size did not fully match their needs or appetite.

Food acceptability was categorized as high among 63 respondents (75.9%) and low among 20 respondents (24.1%). Although most students reported high acceptability, one-quarter still had low acceptability, indicating the need for continued improvement in menu design, sensory quality, and portion management.

Bivariate Analysis

Bivariate analysis was conducted to examine the relationships between menu variety, food taste, portion suitability, and food acceptability among students in the MBG program. The Chi-Square test was used because all analyzed variables were categorical. The results are presented in Table 3, including the χ^2 value, p-value, and statistical decision.

Table 3. Relationship Between Menu Variety, Food Taste, Portion Suitability, and Food Acceptability

Variable	Category	High Acceptability	Low Acceptability	Total	χ^2	p-value
Menu Variety	Varied	48 (92.3%)	4 (7.7%)	52	20.48	<0.001
	Less Varied	15 (48.4%)	16 (51.6%)	31		
	Total	63 (75.9%)	20 (24.1%)	83		
Food Taste	Good	49 (86.0%)	8 (14.0%)	57	10.07	0.002
	Less Good	14 (53.8%)	12 (46.2%)	26		
	Total	63 (75.9%)	20 (24.1%)	83		
Portion	Suitable	44 (97.8%)	1 (2.2%)	45	25.71	<0.001

Suitability	Not Suitable	19 (50.0%)	19 (50.0%)	38
	Total	63 (75.9%)	20 (24.1%)	83

Source: Primary Data, 2026

Table 3 shows a significant relationship between menu variety and food acceptability ($\chi^2 = 20.48$; $p < 0.001$). Among students who rated the menu as varied, 48 respondents (92.3%) had high acceptability, whereas among those who rated the menu as less varied, only 15 respondents (48.4%) had high acceptability. This indicates that more varied menus were associated with higher food acceptability.

Food taste was also significantly related to food acceptability ($\chi^2 = 10.07$; $p = 0.002$). Of the respondents who rated the taste as good, 49 students (86.0%) had high acceptability. In contrast, only 14 students (53.8%) had high acceptability among those who rated the taste as less good. This finding shows that better sensory quality increases students' likelihood of accepting and consuming the meals.

Portion suitability had a significant relationship with food acceptability ($\chi^2 = 25.71$; $p < 0.001$). Among respondents who considered the portion suitable, 44 students (97.8%) had high acceptability, while among those who perceived the portion as unsuitable, only 19 students (50.0%) had high acceptability. This result confirms that appropriate portion size is an important determinant of students' willingness to consume the MBG meals.

Overall, the bivariate analysis demonstrates that menu variety, food taste, and portion suitability were significantly associated with MBG meal acceptability. These results support integrated improvement in menu planning, sensory-quality control, and age-appropriate portion standardization so that meals are not only provided but also consumed.

Discussion

Relationship Between Menu Variety and Food Acceptability

The results of this study showed a significant relationship between menu variety and food acceptability ($\chi^2 = 20.48$; $p < 0.001$). Students who perceived the menu as varied were more likely to have high acceptability than students who perceived the menu as less varied. This finding indicates that menu diversity plays an important role in sustaining students' interest in consuming school meals.

Among elementary-school children, menu variety can reduce sensory boredom caused by repeated ingredients, similar presentation, or monotonous preparation. Variation in staple foods, animal and plant proteins, vegetables, fruit, color, texture, and cooking methods can sustain interest and make meals more appealing. This interpretation is consistent with recent evidence that meal characteristics, menu diversity, and student acceptance influence school-meal consumption (Santana et al., 2023; Srimati et al., 2026). Evidence from an Italian school-canteen study likewise showed that children's liking and familiarity predicted actual consumption and leftovers (Donadini et al., 2022).

The findings suggest that MBG managers should not only follow nutritional standards but also design menu cycles that are attractive to children. A varied menu can help prevent food monotony, increase appetite, and reduce food waste. Therefore, menu planning should involve periodic evaluation of students' preferences while still maintaining nutritional balance and food safety.

Relationship Between Food Taste and Food Acceptability

Food taste was significantly associated with food acceptability ($\chi^2 = 10.07$; $p = 0.002$). Students who rated the food taste as good had a higher proportion of high acceptability compared with those who rated the taste as less good. Taste is a critical factor because children often decide whether to consume food based on their first sensory impression, including aroma, appearance, seasoning, texture, and temperature.

The relationship between food taste and acceptability is supported by evidence that texture acceptance, sensory sensitivity, food neophobia, oral tactile sensitivity, and developmental changes in food perception shape children's food choices (Cappellotto & Olsen, 2021; Lee et al., 2024; Serrano-Gonzalez et al., 2021). Accordingly, meals with familiar and pleasant sensory characteristics are more likely to be consumed, including when they contain ingredients that children do not usually prefer. More recent primary-school evidence also links meal perception and food neophobia with food waste (Piochi et al., 2025).

The implication of this finding is that food preparation standards should be carefully controlled. The use of balanced seasoning, appropriate cooking time, clean aroma, appealing color, and proper serving temperature can increase students' willingness to eat. Taste evaluation should also be conducted periodically because acceptability can decline when food quality is inconsistent from one serving day to another.

Relationship Between Portion Suitability and Food Acceptability

Portion suitability showed the strongest relationship with food acceptability ($\chi^2 = 25.71$; $p < 0.001$). Students who perceived the portion as suitable had a very high proportion of food acceptability. This confirms that the amount of food served should match students' age, grade level, appetite, and stomach capacity.

The importance of portion suitability is consistent with research showing that age-appropriate serving standards, meal composition, and portion size influence consumption and plate waste in school-lunch programs across different settings (Adjapong et al., 2024; Fitriani & Sulistiyani, 2024; Martins et al., 2021; Petchoo et al., 2022). Oversized portions may increase leftovers even when taste is acceptable, whereas undersized portions may reduce satisfaction among older or more active students. Operational and educational factors in Japanese school lunches have also been associated with side-dish leftovers (Nakagiri et al., 2024).

At SD Negeri 6 Macorawalie, differences in grade level may explain variation in portion perceptions. Lower-grade students may need smaller portions because of lower stomach capacity, while upper-grade students may require larger portions to support

growth and activity. Therefore, MBG implementation should consider flexible but measurable portion standards, possibly by adjusting portions according to grade groups while maintaining nutritional adequacy.

Novelty and Practical Implications

Recent research has examined school-menu acceptability through systematic reviews, assessed plate waste and meal characteristics in the United States, evaluated school-lunch adequacy and waste in Europe and Thailand, and investigated broader Indonesian school-feeding outcomes and early MBG implementation in North Jakarta (Adjapong et al., 2024; Martins et al., 2021; Petchoo et al., 2022; Pramesthi et al., 2025; Santana et al., 2023; Srimati et al., 2026). However, those studies do not specifically examine the combined relationships of menu variety, food taste, and portion suitability with MBG meal acceptability among elementary students in Sidenreng Rappang Regency. The novelty of this study therefore lies in providing locally grounded, early-implementation evidence on three modifiable service factors that can be directly addressed by schools and program managers.

The findings have practical and wider relevance for strengthening school-meal programs. Varied menu cycles can reduce monotony, consistent sensory quality can encourage consumption, and age-appropriate portions can limit plate waste. These operational lessons are transferable because international evidence links children's food literacy, the school food environment, meal characteristics, and feeding-program design with healthier and more sustainable dietary outcomes (Ares et al., 2024; Iyassu et al., 2024; Pramesthi et al., 2025). They also complement global policy guidance that positions school meals as investments in nutrition, education, and sustainable food systems (World Food Programme, 2022, 2025). Thus, the study contributes local evidence that can inform monitoring indicators—particularly acceptability and plate waste—within broader school-feeding quality-improvement frameworks.

CONCLUSION

This study concludes that menu variety, food taste, and portion suitability are significantly associated with MBG meal acceptability among students at SD Negeri 6 Macorawalie. Acceptability was higher when students perceived the menu as diverse, the sensory quality as pleasant, and the portion as appropriate, with portion suitability showing the strongest statistical relationship. The findings indicate that the effectiveness of MBG implementation depends not only on nutritional provision but also on child-centered menu planning, consistent preparation standards, and differentiated portions by age or grade. Routine monitoring of student feedback and plate waste is therefore needed to guide continuous improvement, strengthen meal consumption, and reduce avoidable food waste.

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