An Idea Health Journal
ISSN (Online) 2797-0604
Volume 5, Issue 04, 2025

Eating Behavior and Food Acceptance in the Free Nutritious Meal Program among Elementary School Students

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A R T I C L E I N F O

Article History:
Received :02-07-2026
Revised :06-10-2026
Accepted :07-10-2026

Keywords :
Food Preferences, Eating Behavior, Elementary school.

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A B S T R A C T

Background: The Free Nutritious Meal Program is a government initiative aimed at improving the nutritional well-being of school-aged children. However, the program's success depends not only on providing food but also on students' eating behavior and acceptance of the food. This study aimed to explore eating behavior and food acceptance in the implementation of the Free Nutritious Meal Program and to identify factors influencing program implementation among elementary school students. We conducted a mixed-methods study with 283 elementary school students in Gorontalo City, Indonesia. We assessed food acceptance and meal consumption using the Comstock visual plate waste scale, while collecting qualitative data through observations and in-depth interviews with teachers, parents, and program implementers. We analyzed quantitative data descriptively and qualitative data thematically. The findings showed that most students accepted the program positively; however, selective eating behavior was observed, particularly toward vegetables and certain protein sources. The study also identified food waste and associated it with food preferences, menu variation, and students' eating habits. Teacher involvement and parental support improved food acceptance and program implementation. Eating behavior and food acceptance are key determinants of the Free Nutritious Meal Program's success. To improve the program's implementation and sustainability, develop child-friendly menus and integrate nutrition education.

INTRODUCTION

School-age children are a priority group for nutrition interventions because adequate nutrition supports growth, cognitive development, learning performance, and the accumulation of human capital (1–3). Many countries have implemented school feeding programs to improve children's nutritional well-being, cognitive abilities, and healthy eating habits (4–6). School feeding programs have become an important strategy to address food insecurity and improve children's nutritional well-being worldwide (7). In Indonesia, the Free Nutritious Meal Program (Program Makan Bergizi Gratis) has been introduced as a strategic initiative to improve children's nutritional conditions and support human resource development. The program provides meals designed to meet nutritional requirements and promote balanced dietary intake among school-aged children.

In Gorontalo, children's food acceptance may also be shaped by familiar dietary patterns and local food preferences. Traditional dietary practices in Gorontalo include staple foods such as rice and corn rice, with fish and vegetables commonly consumed as accompanying foods. This local food context matters when examining children's acceptance of meals provided through a school feeding program, especially when the foods served differ from their usual dietary preferences. Despite the potential benefits of school feeding programs, providing nutritious food alone does not guarantee that children will consume the food as intended. Previous studies show that food preferences, eating habits, and social and environmental factors influence children's eating behavior (8–10). Selective eating and low acceptance of certain foods, particularly vegetables and protein sources, may reduce actual nutrient intake and limit the effectiveness of nutrition interventions (11,12).

Food acceptance has become an important component of implementing school feeding programs because the program's nutritional benefits depend on adequate consumption of the food provided. In addition, factors such as menu variation, parental support, and teacher involvement may influence children's willingness to consume school meals (13–15). Understanding these behavioral aspects is essential to improving the implementation and sustainability of school nutrition programs. Although several studies have evaluated the nutritional outcomes of school feeding interventions, evidence regarding eating behavior and food acceptance among children participating in the Free Nutritious Meal Program remains limited, particularly in eastern Indonesia. Exploring these aspects in Gorontalo's local food context may provide valuable information for understanding students' food acceptance and

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improving program implementation (16–18). Therefore, this study aimed to explore eating behavior and food acceptance in the implementation of the Free Nutritious Meal Program and to identify factors influencing program implementation among elementary school students.

METHODS

Study Design

This study used a mixed-methods, convergent design, as described by Stroud et al. (2020), to explore eating behavior and food acceptance during the implementation of the Free Nutritious Meal Program among elementary school students (19).

Sample and Participants

The study was conducted in selected elementary schools in Gorontalo City, Indonesia, from June to August 2025. The study population consisted of all students in grades IV to VI participating in the Free Nutritious Meal Program. Researchers selected 283 students using stratified random sampling. For the qualitative component, teachers, parents, and program implementers were purposively selected based on their involvement in implementing the program.

Data Collection

We collected data on eating behavior and food acceptance through direct observations and in-depth interviews. For the quantitative component, we assessed food consumption and food acceptance using the Comstock visual plate waste scale. The scale uses a 0–4 scoring system based on the estimated proportion of food remaining on the student's plate after the meal. A score of 0 indicates no food remaining (0%), while scores of 1, 2, 3, and 4 indicate approximately 25%, 50%, 75%, and 100% of food remaining, respectively. Trained observers conducted direct observations during the students' meal period. After the meal, trained observers visually estimated and recorded the amount of food remaining on each student's plate using the Comstock scale. Food acceptance was operationally assessed based on the proportion of food remaining, with ≤25% of the meal remaining categorized as acceptable and >25% categorized as high food waste, referring to the food waste criterion described by Moehyi (1992). The observations also documented students' meal consumption patterns, food preferences, selective eating behavior, and food waste. The study conducted in-depth interviews with teachers, parents, and program implementers to explore factors influencing students' eating behavior and food acceptance.

Data Analysis

We analyzed quantitative data descriptively using frequencies and percentages. Qualitative data were analyzed thematically through data reduction, coding, categorization, and theme development, following Braun and Clarke's (2021) approach (20). The findings from both approaches were integrated during interpretation to provide a comprehensive understanding of eating behavior and food acceptance among program participants.

Ethical Clearance

The Health Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Gorontalo, approved the study (No. 017/KEPK-FIKES/VII/2025). The researchers obtained written informed consent from parents or guardians and verbal assent from all participating students before data collection. The study adhered to the principles of confidentiality, anonymity, and voluntary participation throughout the research process.

RESULT AND DISCUSSION

Characteristics of Respondent

A total of 283 elementary school students participated in this study. The characteristics of the respondents are presented in Table 1.

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Table 1. Distribution of Respondent Characteristics (283)

Characteristics	N	%
Age		
8 year	6	2.1
9 year	64	22.6
10 year	82	29.0
11 year	116	41.0
12 year	15	5.3
Total	283	100.0
Gender		
Male	126	44.5
Female	157	55.5
Total	283	100.0

The majority of respondents were aged 11 years (41.0%), followed by those aged 10 years (29.0%). Female students accounted for 55.5% of the participants, while male students represented 44.5%.

Food Acceptance Based on the Comstock Scale

We assessed food acceptance using the Comstock visual plate waste scale, based on the proportion of food remaining after the meal.

Table 2. Presents The Distribution Of Comstock Scores (n=283)

Comstock score	Food remaining	n	Percentage
0	0%	76	26.86
1	25%	159	56.18
2	50%	34	12.01
3	75%	11	3.89
4	100%	3	1.06

The results showed that 26.86% of students consumed all the food provided, leaving no food on their plates. The largest proportion of students (56.18%) left about 25% of the food. Meanwhile, 12.01% had about 50% remaining, 3.89% had about 75% remaining, and 1.06% had all the food remaining. Based on the ≤25% food-remaining criterion, 83.04% of students were categorized as having acceptable food consumption.

Eating Behavior and Food Acceptance

Observations and interviews revealed that students generally accepted the Free Nutritious Meal Program, and teachers and parents viewed it positively. The provision of free meals at school increased students' access to nutritious foods and encouraged regular meal consumption during school hours. However, students showed variation in eating behavior. Some students showed enthusiasm for the meals provided, while others ate selectively and accepted certain menu items to varying degrees. Food preferences and habitual eating patterns appeared to influence students' willingness to consume the meals served. Teachers and parents also reported that continuous encouragement and supervision played an important role in improving students' acceptance of nutritious foods and optimizing program implementation.

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Table 3. Presents the main qualitative findings identified in this study.

Theme	Description
Positive program acceptance	Students generally accepted the meals provided through the program.
Variations in eating behavior	Students showed different preferences and eating habits toward the meals served.
Role of teachers and parents	Support from teachers and parents encouraged meal consumption and healthy eating behavior.

Factors Influencing Food Acceptance

The qualitative findings identified several factors that influenced students' food acceptance, including individual food preferences, habitual eating patterns, menu variety, and support from teachers and parents. These factors were key determinants of students' willingness to consume meals provided through the program.

DISCUSSION

Food Acceptance and Eating Behavior in the Free Nutritious Meal Program

The findings indicate that elementary school students generally accept the Free Nutritious Meal Program and that teachers and parents view it positively. This finding suggests that school feeding programs can improve access to nutritious foods and establish regular eating patterns among school-aged children. Previous studies report that school feeding interventions improve children's nutritional well-being and encourage healthy dietary behaviors by increasing access to nutritious meals during school hours (4,5,21). School feeding interventions also support children's nutritional well-being and healthy dietary behaviors, which may, in turn, support academic achievement (22). Despite overall positive acceptance, students showed variation in eating behavior. Some students showed greater enthusiasm for the meals provided, while others exhibited selective eating and varied acceptance of certain menu items. These findings indicate that providing nutritious foods alone may not guarantee optimal food consumption among children. Previous studies show that children's food preferences and established eating habits strongly influence their willingness to eat school meals and shape actual nutrient intake (8–10,23). Individual differences in taste preferences and previous dietary experiences may explain selective eating behavior observed in this study. Children tend to prefer familiar foods and may reject foods that differ from their usual eating patterns. Mauer et al. (2022) reported similar findings, finding that children's participation in school meal programs is influenced by meal acceptability and individual food preferences (13). Therefore, improving menu acceptability and considering students' preferences may increase participation and meal consumption in school feeding programs.

Factors Influencing Food Acceptance

This study identifies food preferences, eating habits, menu variation, and support from teachers and parents as important determinants of food acceptance among students. These findings support the socio-ecological perspective that interactions between individual, family, and school environments shape children's eating behaviors. Teachers and parents play important roles in encouraging children to consume nutritious foods and develop healthy eating behaviors. The findings also suggest that family and school support are essential components of successful school feeding interventions. Previous studies show that parental involvement and positive school environments support better dietary practices and increase children's willingness to eat healthy foods (14,15,24). Therefore, strengthening collaboration between schools and families may enhance the effectiveness and sustainability of the Free Nutritious Meal Program (11,18). These findings support the socio-ecological perspective that children's eating behaviors are shaped by interactions between individual, family, and school environments (8,15).

Implications for Program Implementation

The findings suggest that the success of the Free Nutritious Meal Program should be assessed not only by food provision but also by students' acceptance and consumption of the meals. Improving menu variety, tailoring meals to children's preferences, and integrating nutrition education into school activities may increase food acceptance and promote healthier eating behaviors among students. In addition, continuous monitoring of

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students' eating behaviors and active involvement of teachers and parents are necessary to optimize program implementation. These strategies may help maximize the nutritional benefits of school feeding programs and ensure their long-term sustainability (18,21,25). These findings highlight the importance of considering behavioral factors when implementing school feeding programs. Improving food acceptance and encouraging healthy eating behaviors are essential to maximizing the Free Nutritious Meal Program's potential benefits among elementary school students.

CONCLUSION

Elementary students respond well to the Free Nutritious Meal Program, and teachers and parents view it positively. However, students' eating behaviors and food acceptance vary by preference, habits, menu variety, and support from teachers and parents. These results show that the success of school feeding programs depends on both nutritious food and the behavioral and environmental factors that shape children's eating habits. To strengthen implementation and sustainability, we recommend increasing menu variety; offering child-friendly meals with suitable textures, familiar flavors, appealing presentation, and age-appropriate portions; and strengthening nutrition education through school and family involvement. Future research should include quantitative assessments of food acceptance and consumption patterns to better evaluate program effectiveness.

ACKNOWLEDGEMENT

The authors sincerely thank all Participan in research.

AUTHOR'S CONTRIBUTION STATEMENT

NADM: Contributed to study conceptualization, data collection, data analysis, and manuscript drafting. SM: Contributed to research supervision, methodological design, manuscript review, and critical revision of the article. RYW: Contributed to data interpretation, statistical analysis, and manuscript editing. SAD: Contributed to literature review, data management, and final manuscript preparation. NADM, SM ,SAD : Analisys data, final manuscript preparation. NA : statistical analysis, manuscript editing.

CONFLICT OF INTEREST

The authors declare no conflict of interest

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors acknowledge the use of Grammarly to support language improvement.

FUNDING

This research was funded by the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia through the Beginner Lecturer Research Grant (*Penelitian Dosen Pemula*) 2025.

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