JPEHS
Journal of Physical Education and Health Science

E-ISSN. XXXX-XXXX
https://journal.sainspenapublisher.com/jpehs

ORIGINAL ARTICLE

Analysis of the Free Nutritious Food Program (MBG) in Addressing Stunting Among Lower-Grade Students at SDN 042 Tarakan

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Received : 12 December 2025
Revision : 19 December 2025
Accepted : 22 December 2025

Abstract:
Stunting remains a major nutritional challenge affecting children in many developing countries, including Indonesia. The Free Nutritious Food Program (MBG) implemented at SDN 042 Tarakan aims to address this issue by providing nutrient-dense meals to lower-grade students (grades 1–3). This qualitative study seeks to examine the effectiveness of the MBG program in improving students' nutritional status and reducing stunting cases. Data were gathered through semi-structured interviews, focus group discussions (FGDs), participatory observations, and document analysis involving six homeroom teachers, the school principal, the MBG coordinator, and parents. The findings reveal notable improvements in students' weight and height after participating in the program. Most students developed healthier eating habits, although challenges remain concerning the consistency of these habits at home. The study also highlights logistical and budgetary constraints that hinder optimal program implementation. Despite these limitations, the MBG program demonstrates strong potential in enhancing students' health and overall well-being. Further research using quantitative methods is recommended to assess the long-term impact of MBG and its scalability to other schools facing similar nutritional issues.
Keywords: Free Nutritious Food Program (MBG); Nutritional Status; Stunting;

1. Introduction

Stunting is a growth impairment condition caused by chronic nutritional deficiencies in children. This phenomenon remains a major public health concern in many developing countries, including Indonesia. Beyond affecting a child's height, stunting can also hinder cognitive development, learning capacity, and overall quality of life (Rumlah, 2022). Although various nutrition programs have been introduced to reduce stunting in Indonesia, the problem continues to persist in many regions (Sunarya, 2023).

At the elementary school level, particularly in areas with limited economic resources and poor access to nutritious food, stunting is still frequently encountered. One of the initiatives implemented to address this issue is the Free Nutritious Food Program (MBG), which is carried out in several schools, including SDN 042 Tarakan an elementary school located in a region with a relatively high prevalence of stunting.

According to the Indonesian Nutritional Status Report, the national prevalence of stunting reached 24.4%, with several regions outside Java reporting even higher rates (Aldi & Alkaff, 2022). In cities such as Tarakan, situated in North Kalimantan, the prevalence exceeds the national average. These data underscore the urgent need for targeted nutritional interventions to combat stunting effectively.

SDN 042 Tarakan has also reported an increase in the number of students with poor nutritional status, which has negatively affected their academic performance. In response, the school introduced the Free Nutritious Food Program (MBG) to provide healthy meals for lower-grade students (grades 1–3) with the aim of improving their nutritional status and preventing stunting. Although the program has been running for several years, a systematic evaluation of its effects on students' physical development and nutritional condition has yet to be conducted.

Stunting can be prevented by ensuring adequate nutritional intake, especially during the first 1,000 days of life, which is a critical window for child development (Ariesta et al., 2024). School-based nutrition interventions, such as MBG, have been recognized as an effective strategy to enhance nutrient intake and reduce stunting (Qomarrullah et al., 2025). This concept is supported by the School Nutrition Intervention Theory, which posits that providing nutritious meals at school can improve children's nutritional status and reduce the incidence of stunting and other growth disorders (Nurhalisa et al., 2025).

Previous research on school nutrition programs for example, Rahmah et al. (2025) n various developing countries shows that well-implemented interventions can lower stunting prevalence and improve students' academic performance. However, despite its potential, the MBG program in Indonesia has rarely been evaluated comprehensively, particularly in high-risk regions where stunting remains prevalent (Marissa, 2024).

SDN 042 Tarakan was selected as the research site because it represents typical conditions of elementary schools located in areas with high stunting prevalence. The ongoing MBG program provides an opportunity to assess its real-world effectiveness. With a considerable number of students and diverse backgrounds, the school offers a meaningful context for examining the challenges encountered in implementing school-based nutrition initiatives.

Although numerous studies discuss school nutrition interventions, research specifically analyzing the effectiveness of MBG in addressing stunting in Indonesian elementary schools remains limited (Saleh et al., 2025). Many existing studies focus on programs in other countries or in urban settings, where contextual factors may differ significantly. Therefore, this study aims to fill this gap by examining how the MBG program influences nutritional status and contributes to stunting reduction in elementary schools located in high-prevalence areas.

The novelty of this study lies in its in depth qualitative evaluation of the Free Nutritious Food Program (MBG) implemented in a public elementary school located in a high stunting prevalence area in North Kalimantan, Indonesia. Unlike most previous studies that focus on urban settings, quantitative outcomes, or nutrition programs in different national contexts, this research explores the real world implementation of MBG through the perspectives of teachers, school administrators, program coordinators, and parents. By concentrating on lower-grade students (grades 1–3), a critical period for both physical and cognitive development, this study provides contextualized evidence on how school-based nutrition programs operate in resource-limited settings and identifies practical challenges related to sustainability, parental involvement, and program logistics. This contribution enriches the

existing literature by offering localized, experience-based insights that can inform future policy development and school-based nutrition interventions in similar high-risk regions.

This study offers a key novelty by evaluating the MBG program at SDN 042 Tarakan an area with a significantly high stunting rate that has received limited academic attention. The research also highlights the direct impact of MBG on lower-grade students, a developmental stage that is critical for both physical and cognitive growth. Using a qualitative approach enables a deeper exploration of participants' perspectives and lived experiences, including those of students, teachers, and parents involved in the program's implementation.

2. Materials and Methods

This study employed a qualitative research design with a case study approach to evaluate the effectiveness of the Free Nutritious Food Program (MBG) in addressing stunting among lower-grade students (grades 1–3) at SDN 042 Tarakan. A qualitative approach was chosen to gain an in-depth understanding of the implementation process, perceived outcomes, and contextual challenges of the MBG program within a real school setting. The study aimed to explore how the MBG program influences students' nutritional status and contributes to efforts to reduce stunting (Cole, 2024).

The research participants consisted of six homeroom teachers from grades 1 to 3 (representing learning groups A and B in each grade), the school principal, the MBG program coordinator, the head of the school committee, the head of SPPG Juata Laut, and parents of students participating in the program. These participants were selected purposively because of their direct involvement in the planning, implementation, and monitoring of the MBG program.

Data were collected through multiple qualitative techniques to ensure depth and credibility. Semi-structured interviews were conducted with homeroom teachers, the school principal, the MBG coordinator, and parents to gather detailed information regarding their experiences, perceptions, and assessments of the program's impact on students' health and nutritional status. In addition, focus group discussions (FGDs) were held with teachers and parents to facilitate collective reflection and to capture shared perspectives on changes in students' eating behaviors and learning readiness.

To complement the interview and FGD data, participatory observations were carried out during the distribution and consumption of nutritious meals at school. These observations focused on students' engagement with the program, meal acceptance, and the overall implementation process (Pyo et al., 2023). Furthermore, document analysis was conducted by reviewing student health records and school documentation related to nutritional status before and after participation in the MBG program.

Data analysis was performed using thematic analysis, involving data reduction, coding, categorization, and theme development to identify recurring patterns related to nutritional status improvement, changes in eating habits, and physical development. To enhance the trustworthiness and validity of the findings, data triangulation was applied through:

1. Source triangulation, by comparing information obtained from teachers, parents, and school administrators;
2. Method triangulation, by integrating interviews, fgds, observations, and document analysis; and
3. Time triangulation, by collecting data at different stages of program implementation. This triangulation process ensured consistency, reduced bias, and strengthened the credibility of the study findings (Manouilidou et al., 2024).

3. Results

This study aimed to evaluate the effectiveness of the Free Nutritious Food Program (MBG) at SDN 042 Tarakan, particularly in addressing stunting among lower-grade students (grades 1–3). Based on the analysis of data collected from interviews, focus group discussions (FGD), observations, and document review, the main findings can be summarized as follows:

Improvement in Students' Nutritional Status

One of the key findings of this study is a marked improvement in students' nutritional status after their participation in the MBG program. Observational data show that more than 75% of participating students experienced an increase in both body weight and height after one semester of program implementation. These quantitative trends were corroborated by homeroom teachers, who reported visible positive physical changes among their students.

Table 1. Average Weight and Height Before and After MBG Program Participation

Class	Average Weight Before (kg)	Average Weight After (kg)	Average Height Before (cm)	Average Height After (cm)
Grade 1	18.5	19.3	100.5	102.0
Grade 2	20.1	21.0	105.0	106.5
Grade 3	21.0	22.2	110.2	112.0

These data suggest that the MBG program contributes positively to students' physical growth over the observed period. From a theoretical perspective, these findings are consistent with School-Based Nutrition Intervention Theory, which posits that regular access to balanced and nutrient-dense meals within the school environment can directly improve children's anthropometric outcomes and support optimal growth (Flores-Vázquez et al., 2024). According to this framework, schools serve as strategic settings for nutritional interventions because they provide structured meal schedules, standardized food quality, and equal access for students from diverse socio-economic backgrounds. Adequate intake of macronutrients and micronutrients through school feeding programs has been shown to support linear growth, weight gain, and overall physical development, particularly among children in early primary grades who are still within critical growth periods (Savarino et al., 2021). Therefore, the observed improvements in students' weight and height in this study can be theoretically explained as the result of consistent nutritional intake facilitated by the MBG program

Changes in Students' Eating Habits

Interviews with homeroom teachers and parents indicate a positive shift in students' eating habits. Many students who previously paid little attention to healthy eating began to get used to consuming nutritious food provided through the MBG program at school. Thus, the program not only brought physical benefits but also functioned as a form of nutrition education, introducing students to the importance of a balanced diet.

However, maintaining these healthy habits outside the school setting remains a challenge. Some parents reported that, although their children received nutritious meals at school, they were still exposed to less healthy food options at home or in their neighborhood. This finding highlights the need for complementary interventions targeting the home environment to ensure that the benefits of the MBG program are more sustainable.

From a theoretical standpoint, these findings align with Behavioral Nutrition Theory, which emphasizes that eating habits are shaped through repeated exposure, environmental cues, and social reinforcement (Case, 2023). School-based feeding programs such as MBG create a structured eating environment where children are repeatedly exposed to healthy food choices, thereby facilitating habit formation over time. According to this theory, consistent provision of nutritious meals can gradually influence children's food preferences and attitudes toward healthy eating, particularly when introduced at an early age (Barnhill & Bonotti, 2021). However, the theory also stresses that behavioral change is more likely to be sustained when similar cues and reinforcements are present in the home environment. In the absence of supportive household practices, the continuity of healthy eating behaviors developed at school may be weakened, which helps explain the challenges identified in this study.

Role of Parents in Supporting the MBG Program

Parents play a crucial role in supporting the success of the MBG program. FGDs with parents revealed that most of them welcomed the program, as they perceived it as helpful in improving their children's health. At the same time, some parents expressed concern about their ability to consistently provide healthy foods at home due to economic constraints and limited access to nutritious ingredients.

Despite these concerns, more than 60% of parents reported noticeable improvements in their children's energy levels, physical activity, and concentration in learning after joining the MBG program. This suggests that school-based nutrition interventions can generate short-term benefits not only for physical health but also for students' cognitive and learning readiness.

From a theoretical and empirical perspective, these findings are consistent with the Ecological Model of Child Nutrition, which emphasizes that children's nutritional outcomes are shaped by interactions between individual, family, school, and community environments (Oudat et al., 2025). Within this framework, parental support functions as a critical reinforcing factor that determines whether school-based nutrition interventions can produce sustained benefits. Parental engagement in nutrition-related practices significantly enhances the effectiveness of school feeding programs, particularly in low-income settings (Baxter et

al., 2022). These studies highlight that when parents are informed and involved, improvements in children's dietary intake and learning readiness are more likely to persist beyond the school environment. Thus, the present findings reinforce the importance of positioning parents as active partners in the MBG program rather than passive recipients of its outcomes.

MBG Challenges in Implementing the MBG Program

Although the MBG program produced encouraging outcomes, several implementation challenges were identified. The MBG coordinator and the principal noted constraints related to budget limitations and logistical issues in ensuring timely food distribution. There were occasions when the meals prepared for students were delivered later than scheduled, and despite efforts to provide nutritious options, the diversity of menu items remained limited.

Budget restrictions for procuring high-quality nutritious ingredients were also highlighted as a major barrier to sustaining and optimizing the program. Some homeroom teachers felt that the program had not yet reached its full potential because the variety of food served to students was still relatively limited, even though the overall nutritional benefits were perceived as positive.

From an implementation perspective, these challenges are consistent with the Program Implementation Theory, which emphasizes that the success of public health and education interventions is strongly influenced by resource availability, administrative capacity, and logistical efficiency. According to this framework, even well-designed nutrition programs may fail to achieve optimal outcomes when financial and operational constraints limit food quality, menu diversity, and delivery consistency.

Increased Engagement of Teachers and School Staff

Over time, the implementation of the MBG program led to greater involvement of teachers and school staff. Homeroom teachers reported feeling more engaged in supervising students' food consumption during school hours and in reinforcing messages about healthy eating. They also observed that students appeared more enthusiastic and focused during lessons after receiving nutritious meals.

Nevertheless, several teachers pointed out difficulties in encouraging students to maintain healthy eating behaviors at home, which remains a critical factor for ensuring the long-term impact of the program. These findings suggest that a more comprehensive approach one that involves not only schools but also families and the surrounding community is needed to achieve sustainable improvements in students' nutritional status and overall well-being.

From a theoretical perspective, these findings align with the Whole School Approach to Health Promotion, which emphasizes the role of teachers and school staff as key agents in reinforcing health-related behaviors among students. This approach posits that when educators actively participate in health and nutrition programs, they can positively influence students' attitudes, motivation, and daily practices through consistent guidance and role modeling (Organization, 2021). Demonstrating that teacher involvement in school feeding

and nutrition education programs is associated with improved student engagement, learning concentration, and adherence to healthy routines during school hours (Sharma, 2021). However, these studies also highlight that the effectiveness of teacher-led initiatives is maximized when reinforced by family and community support, reinforcing the need for a collaborative, multi-stakeholder approach as identified in this study.

4. Discussion

This study aimed to evaluate the effectiveness of the Free Nutritious Food Program (MBG) in addressing stunting among lower-grade students at SDN 042 Tarakan. The findings demonstrate that the MBG program has a positive impact on students' nutritional status, as evidenced by measurable improvements in body weight and height following program participation. These results reinforce existing evidence that school-based nutrition interventions play a crucial role in supporting child growth and reducing the risk of stunting, particularly in resource limited settings.

Improvement in Students' Nutritional Status

The observed increase in students' weight and height after participating in the MBG program indicates that regular access to nutritious meals at school can significantly improve children's nutritional outcomes. This finding is consistent with previous studies by Puspito et al. (2025) which reported that school nutrition programs enhance nutrient intake and contribute to stunting reduction among elementary school students (Setyaningsih & Mustikaningrum, 2025).Pinto et.al (2023) emphasize that adequate and balanced nutrition is a fundamental determinant of optimal physical growth and cognitive development in children.

However, when compared with findings from other contexts, the results of this study also highlight important limitations. While improvements were evident at school, some students continued to show delayed growth, suggesting that school-based nutrition alone may not fully address chronic nutritional deficiencies. This observation aligns with Duncan et al. (2022) , who noted that the effectiveness of nutrition interventions is strongly influenced by household food security and dietary practices at home. Therefore, the results of this study underscore the importance of positioning the MBG program as part of a broader, integrated nutrition strategy rather than as a standalone solution.

Moreover, similar outcomes have been documented in other school-based nutrition intervention studies conducted in developing country contexts. Herniati et al. (2025) reported that consistent provision of balanced meals at school led to measurable improvements in children's anthropometric indicators, particularly weight-for-age and height-for-age scores. However, their study also emphasized that the magnitude of improvement was greater when school interventions were complemented by nutrition support at the household level. That although school feeding programs significantly contributed to short-term nutritional gains, their long-term effectiveness depended on sustained dietary adequacy and parental awareness of balanced nutrition. These comparative findings reinforce the conclusion that the MBG program plays a critical role in improving students' nutritional status but must be integrated

with family- and community-based interventions to achieve optimal and lasting outcomes (Agustini, 2025).

Changes in Students' Eating Patterns

Interviews with homeroom teachers and parents revealed that students began consuming nutritious foods more regularly after participating in the MBG program. This behavioral shift was also reflected in observed improvements in students' energy levels, concentration, and active participation in class. Nevertheless, several teachers and parents reported difficulties in maintaining healthy eating habits at home, which are largely influenced by socio-economic conditions and family food culture.

These findings are in line with Utama et al. (2025), who highlighted that school-based nutrition programs can foster healthier eating habits and positively affect students' physical and cognitive performance. However, this study adds important contextual insight by revealing that sustaining these behavioral changes outside the school environment remains a challenge. Socioeconomic constraints and family food culture were identified as major barriers, a finding that echoes previous studies emphasizing the critical role of parental involvement and community support in ensuring the long-term success of nutrition interventions. This comparison highlights that the MBG program's impact is maximized when supported by complementary nutrition education and active engagement of families (Wahyuniar & Pustakasari, 2025).

Challenges in Implementing the MBG Program

In addition to positive outcomes, this study identified significant logistical and financial challenges in the implementation of the MBG program. Issues related to budget limitations, meal variety, and timely food distribution were frequently reported by school administrators and program coordinators. These challenges are consistent with the findings of Koswara et al. (2025), who observed that financial constraints often limit the sustainability and scalability of school nutrition programs in public education systems.

These issues reflect broader structural challenges in financing nutrition programs in public schools, where budgets are often constrained by limited government funding. Tambunan et al. (2025) similarly highlight that, while school nutrition programs can help reduce stunting, financial constraints frequently hinder their scalability and overall impact. In the case of SDN 042 Tarakan, teachers also pointed out that the variety of food provided was still limited, which may affect students' acceptance and long-term adherence to healthier eating habits.

Compared to studies conducted in better-resourced settings, the challenges identified at SDN 042 Tarakan highlight the structural vulnerabilities faced by schools in high-stunting regions. Limited menu diversity may affect students' long-term acceptance of nutritious food, while logistical delays can reduce program effectiveness. These findings emphasize the need for stronger institutional support, improved funding mechanisms, and better coordination between schools and external stakeholders to ensure consistent program delivery (Pancani & Ningsih, 2025).

Practical Implications and Study Limitations

The findings of this study have important practical implications. First, they demonstrate that the MBG program can be an effective school-based strategy to improve students' nutritional status in areas with high stunting prevalence. Second, the results highlight the necessity of integrating school nutrition programs with family-based and community-level interventions to ensure sustainable impact.

Nevertheless, this study has several limitations. The qualitative research design relies on participants' perceptions and experiences, which may limit the generalizability of the findings to other contexts. In addition, the absence of long-term follow-up data restricts the ability to assess whether the observed improvements in nutritional status are sustained over time. Despite these limitations, the study provides valuable, context-specific insights into the real-world implementation and outcomes of the MBG program in a public elementary school located in a high-stunting prevalence area.

Directions for Future Research

Future studies are recommended to adopt quantitative or mixed-method designs that allow for more precise measurement of changes in students' nutritional status over a longer period. Further research could also explore external factors that influence the success of MBG, such as family involvement, government policy support, and logistical constraints in food provision.

Larger-scale studies with broader and more diverse samples are also needed to evaluate the long-term effectiveness and scalability of MBG programs in regions with high stunting prevalence. Such research would not only deepen understanding of how school-based nutrition interventions work in different contexts but also provide evidence-based guidance for policymakers and practitioners aiming to expand similar programs in other schools and districts.

5. Conclusions

This study demonstrates that the Free Nutritious Food Program (MBG) at SDN 042 Tarakan is effective in improving students' nutritional status, as evidenced by measurable increases in both body weight and height following program implementation. In addition to physical growth, the program also contributed to positive changes in students' eating patterns by encouraging the consumption of healthier and more nutritious foods during school hours. Nevertheless, the sustainability of these healthy behaviors outside the school environment remains a significant challenge and requires consistent parental involvement.

Despite its positive outcomes, the effectiveness of the MBG program is constrained by limited funding and logistical challenges related to food procurement, menu variety, and timely distribution. These findings highlight the importance of stronger institutional support and cross-sector collaboration to ensure program sustainability. From a policy perspective, this study underscores the need for government authorities to strengthen funding mechanisms and coordination frameworks for school-based nutrition programs, particularly in regions with high stunting prevalence.

As a practical implication, schools are encouraged to integrate nutrition education into daily learning activities and actively engage parents in promoting healthy eating habits at home to maximize program impact. Future research is recommended to employ quantitative or mixed-method approaches to evaluate the long term effects of the MBG program and to assess its scalability across different educational contexts. The findings of this study are expected to contribute to evidence-based education and public health policies aimed at reducing stunting and strengthening school-based nutrition interventions at the primary school level.

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