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Effectiveness of PMT on Toddler Growth and Maternal Knowledge in Bulo, Sidrap Regency

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ABSTRACT

Nutritional problems among toddlers remain a significant public health concern in Indonesia, including in Bulo Village, which has shown a fluctuating trend of undernutrition and overnutrition over a three-month period. This study aims to evaluate the effectiveness of the Supplementary Feeding Program (PMT) in improving the nutritional status of toddlers in Bulo Village. This research employed a quantitative method with a quasi-experimental design using a pre-test and post-test approach without a control group. The sample consisted of 116 toddlers aged 12–59 months who received supplementary feeding for four months. Data were collected through anthropometric measurements (weight and height) and a questionnaire assessing mothers' nutritional knowledge, both before and after the intervention. Data analysis was conducted using paired t-tests for normally distributed variables and the Wilcoxon signed-rank test for non-normally distributed variables. The results showed a statistically significant increase in toddlers' height (mean increase of approximately 2.5 cm, p = 0.000) and weight (mean increase of approximately 1.6 kg, p = 0.000). Additionally, maternal nutritional knowledge significantly improved post-intervention (p = 0.000), with most mothers shifting from a "poor" to "good" knowledge category. These findings suggest that the Supplementary Feeding Program is effective in enhancing both the nutritional status of toddlers and the awareness of mothers in Bulo Village. This intervention should be considered for long-term implementation to address nutritional issues among children.

Keywords *: Toddler ; Supplementary Feeding ; Nutritional Status*

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INTRODUCTION

Nutritional problems among toddlers remain a global challenge and continue to be a serious public health concern. Globally in 2022, 149 million children under 5 were estimated to be stunted (too short for age), 45 million were estimated to be wasted (too thin for height), and 37 million were overweight or living with obesity (1). At the national level, Indonesia also bears a significant nutritional burden. Based on the Indonesian Nutritional Status Survey (SSGI) in 2022, the stunting prevalence was 21.6%, showing a decrease from 24.4% in 2021 (2). However, this figure is still far from the national target of 14% by 2024, as mandated by Presidential Regulation No. 72 of 2021 concerning the Acceleration of Stunting Reduction (3).

South Sulawesi, one of the provinces in Indonesia, had a stunting prevalence of 27.2% in 2022, which is higher than the national average (2). Sidenreng Rappang Regency is among the regions experiencing a double burden of malnutrition, where children face both undernutrition and overnutrition. Based on e-PPGBM reports from the Rappang Health Center from August to October 2024, Bulo Village exhibited a complex nutritional profile among toddlers, including cases of undernutrition, at-risk overnutrition, and obesity—all of which require serious attention and appropriate interventions (4).

The Supplementary Feeding Program (PMT) is one of the nutritional intervention strategies implemented by the Indonesian government to improve the nutritional status of toddlers, particularly those at risk of undernutrition or stunting. PMT aims not only to provide additional nutritious food but also to educate the community on the importance of balanced diets utilizing local food resources (5). Previous studies have shown that PMT is effective in increasing both weight and height in toddlers; however, most of these studies have been short-term and have not deeply explored local contextual factors (6).

While Bulo Village presents both undernutrition and overnutrition among toddlers, this study focuses specifically on evaluating the effectiveness of the PMT intervention in addressing undernutrition—namely improvements in height and weight. Although cases of overnutrition and obesity were identified in the initial assessments, they are included in this study as contextual background rather than primary targets of the intervention. The design and objectives of the PMT program in this study were tailored toward enhancing growth in children with suboptimal anthropometric indicators and improving maternal nutritional knowledge.

Unlike previous research, this study focuses on Bulo Village, which possesses unique geographical, social, and cultural characteristics and reflects a dual nutritional problem among toddlers. This research is essential as it provides up-to-date insights into the effectiveness of a locally based PMT program in a village context and offers recommendations for future improvements. Furthermore, the involvement of mothers in the PMT program is also examined to assess how much their nutritional knowledge changes following the intervention.

The objective of this study is to evaluate the effectiveness of the Supplementary Feeding Program (PMT) in improving the height, weight, and nutritional knowledge of mothers with toddlers in Bulo Village.

METHODS

This study is a quantitative research using a quasi-experimental design with a pre-test and post-test approach without a control group. The research was conducted in Bulo Village, Pancarijang District, Sidenreng Rappang Regency over a four-month period, from December 2024 to March 2025. The population consisted of all toddlers aged 12–59 months in Bulo Village who participated in the Supplementary Feeding Program (PMT), totaling 116 children. The PMT intervention was conducted over a four-month period (December 2024 to March 2025) and consisted of daily provision of locally prepared nutritious meals,

including fortified porridge, eggs, steamed bananas, and mung bean-based snacks. These foods were selected based on local availability and designed to meet age-appropriate caloric and micronutrient needs, emphasizing protein, iron, and vitamin A. Supplementary feeding was administered by trained community health workers and Posyandu cadres under the supervision of local health center staff.

In addition to the feeding intervention, mothers participated in weekly nutrition education sessions. These sessions were delivered in group formats at the Posyandu and covered key topics such as balanced meal planning using local foods, appropriate feeding practices, hygiene and sanitation, and child growth monitoring. The materials used included visual aids, flipcharts, and interactive discussions to enhance understanding and engagement. This dual approach—nutritional supplementation and maternal education—was intended to address both immediate and underlying factors contributing to malnutrition. The sampling technique used was total sampling, in which the entire population was included as the research sample. Data collection was carried out through anthropometric measurements (weight and height) and questionnaires to assess mothers' nutritional knowledge before and after the intervention. The instruments used included a calibrated digital scale and stadiometer, along with structured questionnaires designed to evaluate knowledge levels. The data were analyzed using paired t-tests for normally distributed variables and the Wilcoxon Signed Rank Test for non-normally distributed variables. The results were presented in tables and descriptive narratives to illustrate changes in nutritional status and maternal knowledge before and after the PMT program implementation.

RESULTS

This section presents the main findings of the study on the effectiveness of the Supplementary Feeding Program (PMT) on the nutritional status of children under five in Bulo Village. The results are organized based on the characteristics of the respondents, as

well as univariate, bivariate, and multivariate analyses (if relevant), and are explained with sufficient supporting data.

Based on e-PPGBM data from August to October 2024, the nutritional status of toddlers in Bulo Village showed an increasing trend in undernutrition cases that warrants serious attention. In August, there were no recorded cases of toddlers with either severe or moderate undernutrition. However, by September, one child was identified as undernourished, and this number increased to two children in October. Although the number of cases appears small in absolute terms, this increase indicates a growing vulnerability among toddlers that may have previously gone undetected. The decrease in the number of children classified as having normal nutritional status from 190 in August to 185 in October further reinforces the concern that some children experienced a decline in nutritional condition within a relatively short period.

These findings underscore the importance of implementing the Supplementary Feeding Program (PMT) in Bulo Village as a targeted intervention to address undernutrition. PMT is expected to enhance energy and essential nutrient intake such as protein, iron, and vitamin A which are critical for supporting children's growth and development. In addition to providing nutritious food, the program should also include nutrition education for parents, particularly mothers, to ensure that meeting children's nutritional needs becomes a sustainable part of daily family eating habits. Therefore, e-PPGBM data can serve as an early detection tool for identifying and responding to undernutrition cases in a timely and continuous manner.

Respondent Characteristics

This study involved 116 children aged 12–59 months in Bulo Village. The majority of the respondents were male, totaling 66 children (56.90%), while the number of female respondents was 50 children (43.10%). Based on age groups, the largest number of respondents were in the 24–35 months group, totaling 34 children (29.31%), followed by

36–47 months with 31 children (26.72%), 12–23 months with 29 children (25.00%), and 48–60 months with 22 children (18.97%).

Table 1. Respondent Characteristics

Characteristics	Number	Percentage (%)
Male	66	56.90
Female	50	43.10
Age 12–23 months	29	25.00
Age 24–35 months	34	29.31
Age 36–47 months	31	26.72
Age 48–60 months	22	18.97

Source : Primary Data, 2025

Data Distribution and Normality Test

Before conducting further analysis, a normality test was performed using the Kolmogorov-Smirnov test. Height and weight data were normally distributed ($p > 0.05$), while maternal knowledge data were not normally distributed ($p < 0.05$).

Table 2. Data Normality Test

Variable	Statistic	Sig. (Kolmogorov-Smirnov)
Height Pre-Test	0.078	0.078
Height Post-Test	0.076	0.105
Weight Pre-Test	0.071	0.200
Weight Post-Test	0.070	0.200
Maternal Knowledge Pre-Test	0.318	0.000
Maternal Knowledge Post-Test	0.467	0.000

Source : Primary Data, 2025

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Height Change

The results of the paired t-test showed a significant difference in the height of children before and after the provision of supplementary feeding (PMT). A p-value of 0.000 indicates that the intervention had a significant impact on children's linear growth.

Table 3. Paired t-test for Height

Variable	t Value	Sig. (2-tailed)
Height Pre-Test vs Post-Test	-12.394	0.000

Source : Primary Data, 2025

This change indicates the success of the medium-term intervention on long-term growth indicators such as height. It also reinforces previous research findings that consistently implemented PMT programs have a positive impact on stunting prevention.

Weight Change

The analysis using the paired t-test showed a significant increase in weight after the provision of supplementary feeding (PMT). The p-value of 0.000 confirms that the intervention successfully improved short-term nutritional status.

Table 4. Paired t-test for Weight

Variable	t Value	Sig. (2-tailed)
Weight Pre-Test vs Post-Test	-11.982	0.000

Source : Primary Data, 2025

Children's weight tends to respond quickly to changes in nutrient intake, and this increase indicates the effectiveness of the four-month PMT program in meeting the daily energy needs of toddlers.

Change in Maternal Knowledge

The results of the Wilcoxon Signed Rank test showed a significant increase in maternal knowledge after the intervention. The p-value of 0.000 indicates a meaningful difference between the pre- and post-intervention conditions.

Table 5. Wilcoxon Test for Maternal Knowledge

Variable	Z	Sig. (2-tailed)
Maternal Knowledge Pre-Test vs Post-Test	-5.584	0.000

Source : Primary Data, 2025

This improvement reflects the success of the nutrition education component within the PMT program. Enhanced maternal knowledge contributes directly to better feeding practices and growth monitoring of toddlers at home.

DISCUSSION

The results of this study indicate that the Supplementary Feeding Program (PMT) has a significant effect on improving the nutritional status of toddlers, both in terms of anthropometric measures and maternal knowledge. This discussion groups the findings into three main variables—height, weight, and maternal knowledge—and compares them with relevant theories and previous research. Although Bulo Village exhibited a complex nutritional profile including undernutrition, at-risk overnutrition, and obesity, the PMT intervention in this study was specifically designed to address undernutrition by improving height, weight, and maternal knowledge. The program did not target overnutrition or obesity, as its components (nutritious food supplementation and maternal nutrition education) were focused on fulfilling deficiencies rather than managing excess intake. Nonetheless, the presence of overnutrition cases, as identified in baseline data, highlights the need for complementary interventions in the future, such as education on healthy portion sizes, reduction of sugary and fatty foods, and promotion of physical activity. This

broader nutritional challenge in Bulo Village calls for a more integrated strategy beyond the scope of the current PMT implementation.

Height

The increase in children's height after the PMT intervention reflects a positive impact on their linear growth. In nutritional science, height gain is associated with long-term nutritional adequacy, particularly in relation to protein, calcium, and micronutrients such as zinc and vitamin D. The success of PMT in supporting linear growth is supported by the findings of Nurlaelah and Ningsih (7), who reported a significant increase in height after the provision of fortified PMT biscuits. Their research supports the idea that combining PMT with nutrition education can be an effective strategy for stunting prevention.

Conversely, the lack of effectiveness found in the study by Putri and Mahmudiono (8) emphasizes the importance of consistency and quality in food supplementation. Program success does not depend solely on the type of food provided but also on frequency, supervision, and the active involvement of parents in the feeding process.

Weight

Weight is a more responsive indicator of short-term nutritional interventions compared to height. This study shows a significant increase in weight after PMT implementation, indicating that the program successfully met the children's energy and protein needs. These results are consistent with those of Fajar et al. (6), who observed an increase in the proportion of children reaching normal weight after receiving PMT in the form of milk and eggs.

However, other studies reported limited effectiveness when proper monitoring was lacking. This highlights the importance of a multidisciplinary approach to PMT implementation, involving regular growth monitoring, counseling, and active participation from health workers and community volunteers. Supplementary Feeding (PMT) for toddlers has been proven to increase their weight. Based on research conducted at Sei Tatas

Public Health Center, Kapuas Regency, the weight of malnourished children aged 6–48 months who received PMT increased by up to 6.81% (9). Similar results were found in a study conducted in Blang Mangat Subdistrict, where children's weight before and after receiving supplementary food—prepared using locally sourced ingredients—varied significantly (10). Local food ingredients are generally more accessible and can help boost the local economy (11), which adds value to the PMT program when implemented using local resources.

Maternal Knowledge

Mothers' knowledge of nutrition plays a direct role in child-feeding practices. In this study, maternal knowledge significantly improved following the intervention, reflecting the success of the educational components of the PMT program. The nutritional education delivered during the program contributed to behavioral changes in feeding practices and better management of children's dietary intake. This is further supported by the study of Ira Fatira et al. (2024) in the working area of Tanjung Karang Public Health Center, Mataram City, which showed that maternal nutrition knowledge is closely related to toddlers' dietary intake (12).

Research by Muslimin B et al. (13) and Fatira et al. (12) suggests that mothers with greater nutritional knowledge are more likely to provide nutritious food and adhere consistently to intervention programs. Active maternal involvement is crucial for the long-term success of nutritional interventions.

Overall, the success of PMT in Desa Bulo was not solely dependent on the provision of supplementary food, but also on the integration of nutrition education, growth monitoring, and family engagement. The combination of physical and educational interventions proved effective in improving the nutritional status of toddlers. However, program sustainability is essential to ensure that improvements in nutritional status can be maintained over the long term. Additionally, the integration of nutrition counseling—as conducted by Masri et al.

(2021)—demonstrated that a holistic approach involving parental education can further enhance the effectiveness of PMT (14). Effectiveness requires an evaluation of how children's nutritional status changes before and after the intervention, and identifying which elements influence the program's performance (15).

CONCLUSIONS AND RECOMMENDATIONS

The Supplementary Feeding Program (PMT) has proven effective in improving the nutritional status of toddlers in Bulo Village. The observed increases in children's height and weight demonstrate that the intervention successfully addressed essential nutritional needs during the four-month implementation. Additionally, the significant improvement in maternal knowledge regarding nutrition and child-feeding practices underscores the effectiveness of the educational component integrated into the program. These outcomes affirm that a holistic approach—combining direct nutritional support with caregiver education—plays a crucial role in tackling early childhood malnutrition. The success of this intervention was further reinforced by strong parental participation and active engagement of health workers in both growth monitoring and educational sessions. For Bulo Village and similar rural communities, future PMT implementations should prioritize the consistent use of culturally acceptable and locally sourced nutritious foods, such as mung beans, eggs, sweet potatoes, bananas, and moringa leaves, which are widely available and rich in essential nutrients. These ingredients not only provide high-quality protein and micronutrients but also support local agriculture and food sustainability. Furthermore, nutrition education for mothers should be continued and expanded, with content tailored to local dietary habits and barriers—focusing on affordable meal planning, safe food preparation, and age-appropriate feeding practices. Involving local Posyandu cadres and community leaders in education and program delivery will help ensure trust and participation. It is also recommended to integrate the PMT with broader community

empowerment programs, such as household food security initiatives (e.g., home gardening with nutrient-dense crops), and to establish a routine child growth monitoring system that includes home visits and personalized follow-up. Finally, future research should explore the long-term impact of PMT, test scalable models across different geographic and cultural contexts, and examine the cost-effectiveness of combining food-based and educational interventions to strengthen public health nutrition strategies at the village level.

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