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The Effectiveness of the Supplementary Feeding Program (PMT) on the Nutritional Status of Children Under Five in the Working Area of Mekar Sari Public Health Center

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ABSTRACT

Malnutrition among children under five remains a major public health problem in Indonesia and contributes to impaired growth, low productivity, and reduced quality of life. This study aimed to evaluate the effectiveness of the supplementary feeding program in improving the nutritional status of children under five in the working area of Mekar Sari Public Health Center, Balikpapan, Indonesia. A descriptive quantitative design was applied to 60 children aged six months to five years with poor nutritional status. Total sampling was employed, whereby all eligible children registered in the supplementary feeding program at the Mekar Sari Public Health Center were included in the study. Data on body weight were collected before and after the intervention and analyzed using a paired sample t-test. The results showed an increase in average body weight from 11.0 kg to 11.4 kg after the intervention, indicating a significant improvement. The findings suggest that the supplementary feeding program effectively enhances children's nutritional status, although additional support, including caregiver education and environmental sanitation improvement, is required to achieve sustainable outcomes.

Keywords: Children Under Five, Supplementary Feeding Program, Undernutrition

INTRODUCTION

Malnutrition among children under five remains a persistent public health challenge in Indonesia, reflecting the multidimensional nature of nutritional problems involving biological, social, economic, and environmental factors. According to the Indonesia Nutritional Status Survey (SSGI) 2023, 21.5% of children under five are stunted**,** indicating that one in five Indonesian children experiences chronic growth failure. Stunting is associated with increased susceptibility to infectious diseases, delayed cognitive development, and reduced productivity in adulthood, ultimately hindering national human capital development (Ministry of Health of the Republic of Indonesia, 2023; UNICEF, World Health Organization, 2023).

To address this challenge, the Indonesian government has implemented the Supplementary Feeding Program (PMT) as a community-based nutritional intervention targeting undernourished children. This program provides additional energy- and protein-rich foods to improve children's nutritional status and prevent further growth retardation. The program is primarily delivered through public health centers (*Puskesmas*) and integrated health service posts (*Posyandu*), ensuring accessibility for families from low socioeconomic backgrounds (Ministry of Health of the Republic of Indonesia, 2021).

Despite its nationwide implementation, the effectiveness of supplementary feeding programs varies across regions. Factors such as caregiver compliance, household food security, environmental sanitation, and parental nutrition knowledge significantly influence program

outcomes. Previous studies have demonstrated that supplementary feeding can result in short-term weight gain; however, sustained improvements in linear growth require complementary interventions, including hygiene promotion, infection control, and caregiver education (Black et al., 2013; Torlesse et al., 2016).

In the working area of the Mekar Sari Public Health Center, Balikpapan, the supplementary feeding program has been routinely implemented as part of local health strategies to reduce undernutrition and stunting. Preliminary monitoring data indicate improvements in body weight among participating children; however, the magnitude of improvement varies between individuals. This variability underscores the importance of evaluating the actual effectiveness of the program within the local context to identify strengths and areas for improvement.

Based on this background, the present study aims to evaluate the effectiveness of the supplementary feeding program in improving the nutritional status of children under five in the working area of the Mekar Sari Public Health Center, Balikpapan, Indonesia. The findings are expected to provide empirical evidence to support local health policy enhancement and to strengthen the design of community-based nutrition programs for achieving sustainable child health outcomes.

METHODS

This study employed a descriptive quantitative design to evaluate the effectiveness of the supplementary feeding program on the nutritional status of children under five. The research was conducted in the working area of Mekar Sari Public Health Center, Balikpapan, Indonesia, from May to July 2025.

The study focused on one main variable, namely the nutritional status of children, which was represented by changes in body weight before and after receiving the supplementary feeding intervention. The independent variable was the supplementary feeding program provided by the health center, while the dependent variable was the improvement in body weight as an indicator of nutritional status.

The population in this study consisted of all children aged six months to five years identified as having poor or severe nutritional status based on the World Health Organization (WHO) growth standards. A total of 60 children met the inclusion criteria and were selected using a total sampling technique from the list of beneficiaries recorded at the health center.

Data were collected through direct anthropometric measurements conducted by trained health workers. Body weight was measured at baseline (before the intervention) and again after the supplementary feeding program was completed, using calibrated digital scales. Height was measured once at baseline to describe general growth conditions but was not included in the statistical test. All measurements followed standardized procedures to ensure data reliability and accuracy.

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to summarize participant characteristics, mean, and standard deviation of body weight before and after the intervention. The paired sample t-test was used to determine the significance of differences in body weight, with a significance level set at $p < 0.05$.

This study obtained ethical clearance from the Ethics Committee of the Health Research Board, Institute of Health Sciences Strada Indonesia (No. 087/KEPK/IV/2025). Participation in the study was voluntary, and informed consent was obtained from all parents or guardians of the children prior to data collection.

RESULTS AND DISCUSSION

Participant Characteristics

A total of 60 children under five years of age were included in this study. Based on age distribution, the majority of participants were toddlers aged 12–36 months, representing the most vulnerable period for growth faltering. More than half of the children were male. At baseline, most participants were classified as underweight, while the remainder were severely undernourished.

Table 1. Frequency Distribution of Participant Characteristics

Variable	Category	Frequency (n)	Percentage (%)
Age (months)	6–11	10	16.7
	12–36	32	53.3
	37–59	18	30.0
Sex	Male	34	56.7
	Female	26	43.3
Baseline Nutritional Status	Underweight	42	70.0
	Severely underweight	18	30.0

Source: Primary data, 2025

Descriptive Statistics of Anthropometric Measurements

The mean baseline body weight of the participants was 11.0 kg (SD = 1.2)**,** which increased to 11.4 kg **(SD = 1.3)** after the supplementary feeding program. The average weight gain observed was 0.4 kg**.** The mean baseline height, measured once at the beginning of the study, was 87.5 cm (SD = 6.2)**.** These findings indicate a general improvement in nutritional status following the intervention.

Table 2. Descriptive Statistics of Weight and Height

Variable	Mean ± SD	Minimum	Maximum
Initial weight (kg)	11.0 ± 1.2	9.0	14.0
Final weight (kg)	11.4 ± 1.3	9.3	14.5
Height (cm)	87.5 ± 6.2	75.0	98.0

Source: Primary data, 2025

Effect of Supplementary Feeding Program on Body Weight

Paired sample t-test analysis showed a statistically significant difference in body weight before and after the intervention (t = 3.25; df = 59; p = 0.002). The effect size (Cohen's d = 0.42) indicated a moderate effect, suggesting that the supplementary feeding program had a meaningful impact on improving the body weight of undernourished children.

Table 3. Paired Sample t-Test of Body Weight Before and After Intervention

Variable	Mean Difference (kg)	t	df	p-value
Final – Initial Weight	0.40	3.25	59	0.002

Source: Primary data, 2025

DISCUSSION

This study demonstrated that the supplementary feeding program implemented in the working area of the Mekar Sari Public Health Center resulted in a statistically significant improvement in body weight among undernourished children under five. The inclusion of participant characteristic data provides essential context for interpreting these findings. Most participants were toddlers aged 12–36 months, and nearly one-third were classified as severely undernourished at baseline. This age group represents a critical period of growth and nutritional vulnerability, during which inadequate nutrient intake may rapidly lead to growth faltering.

The observed mean weight gain of 0.4 kg indicates a positive short-term nutritional response to the supplementary feeding intervention. This finding is consistent with previous studies reporting that community-based supplementary feeding programs can improve body weight among undernourished children when implemented through primary healthcare services. Torlesse et al. (2016) reported that consistent feeding interventions, supported by adequate dietary intake and sanitation, contributed to reductions in underweight prevalence among Indonesian children. Similarly, UNICEF and World Health Organization (2023) emphasized that supplementary feeding remains a key strategy for addressing child malnutrition in low- and middle-income countries.

Despite these positive outcomes, the magnitude of weight gain observed in this study remains modest. This limited improvement may be partly explained by the baseline characteristics of the study population. Approximately 30% of participants were severely undernourished, a condition that often requires longer intervention duration and more intensive nutritional support to achieve substantial weight recovery. In addition, more than half of the children were aged 12–36 months, a developmental stage characterized by high nutritional requirements and increased susceptibility to infections, which may slow initial weight gain during short-term interventions.

Furthermore, variability in individual weight gain suggests heterogeneous responses to the program. Differences in caregiver participation, household dietary practices, and environmental sanitation conditions may have influenced the effectiveness of the supplementary feeding intervention. Previous research has shown that recurrent infections and poor sanitation can impair nutrient absorption, thereby limiting the benefits of food supplementation (Black et al., 2013). Without consistent caregiver adherence and supportive household environments, the nutritional gains achieved through supplementary feeding programs may not be optimal.

This study focused on changes in body weight as a short-term indicator of nutritional status and did not assess height changes due to limited longitudinal data. Height-for-age is a key indicator of chronic undernutrition and stunting, reflecting cumulative nutritional and environmental exposures over time. Consequently, while the observed weight gain reflects short-term improvement, the long-term impact of the supplementary feeding program on linear growth and stunting reduction could not be evaluated.

Overall, the findings of this study confirm that the supplementary feeding program effectively improves short-term nutritional outcomes among undernourished children. However, achieving sustainable improvements in child growth requires a multisectoral approach that integrates nutrition-specific interventions with broader strategies, including caregiver education, infection prevention, sanitation improvement, and household food security enhancement. Consideration of baseline nutritional status and age-specific vulnerability is essential for optimizing the effectiveness of supplementary feeding programs and supporting long-term child health and development.

CONCLUSION

The findings of this study demonstrate that the supplementary feeding program implemented in the working area of Mekar Sari Public Health Center, Balikpapan, effectively improved the body weight of undernourished children under five. The mean body weight increased significantly from 11.0 kg to 11.4 kg after the intervention, indicating that the program had a moderate yet meaningful effect on short-term nutritional recovery.

These results confirm that supplementary feeding remains an important public health strategy for addressing child undernutrition, particularly when integrated with primary healthcare services at the community level. However, the modest increase in body weight suggests that supplementary feeding alone is not sufficient to achieve sustainable improvements in child growth.

Future programs should be complemented with continuous caregiver education, household nutrition counseling, and improvements in sanitation and food security. Collaboration between health workers, families, and local authorities is essential to strengthen program effectiveness and ensure long-term nutritional outcomes. Further longitudinal studies are recommended to assess the program's impact on height and overall growth indicators as measures of stunting reduction.

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