

Effect of Local Food-Based Supplementary Feeding on the Nutritional Status of Undernourished Under-Five Children

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ABSTRACT/ ABSTRAK

ABSTRACT. Undernutrition among under-five children remains a major public health concern in Indonesia. Local Food-Based Supplementary Feeding is one of the strategies implemented to improve the nutritional status of undernourished under-five children. This study aimed to analyze the effect of Local Food-Based Supplementary Feeding on changes in the nutritional status of undernourished under-five children in the catchment area of the Marusu Community Health Center. This analytical observational study employed a pre-post approach using secondary data. A total sampling technique was applied, involving 54 under-five children who met the inclusion and exclusion criteria. Changes in nutritional status were analyzed using the Wilcoxon signed-rank test. The results showed that 39 under-five children (72.2%) improved to normal nutritional status, while 15 (27.8%) remained undernourished. The mean z-score increased from -2.49 before the intervention to -1.61 after the intervention, with a statistically significant difference ($p = 0.000$; $p < 0.05$). The findings indicate that Local Food-Based Supplementary Feeding was associated with improvements in the nutritional status of undernourished under-five children in the catchment area of the Marusu Community Health Center. Therefore, the Local Food-Based Supplementary Feeding Program should be implemented continuously and integrated with nutrition education and growth monitoring to optimize improvements in the nutritional status of under-five children.

ABSTRAK. Masalah gizi kurang pada balita masih menjadi salah satu persoalan kesehatan masyarakat yang memerlukan perhatian serius di Indonesia. Pemberian Makanan Tambahan (PMT) berbasis pangan lokal merupakan salah satu strategi untuk meningkatkan status gizi balita gizi kurang. Penelitian ini bertujuan untuk menganalisis pengaruh Pemberian Makanan Tambahan berbasis pangan lokal terhadap status gizi balita gizi kurang di wilayah kerja Puskesmas Marusu. Penelitian ini merupakan studi analitik observasional dengan pendekatan sebelum dan sesudah (*pre-post*) menggunakan data sekunder. Teknik pengambilan sampel menggunakan *total sampling* dengan melibatkan 54 balita yang memenuhi kriteria inklusi dan eksklusi. Perubahan status gizi dianalisis menggunakan uji Wilcoxon signed-rank. Hasil penelitian menunjukkan bahwa sebanyak 39 balita (72,2%) mengalami perbaikan status gizi menjadi gizi baik, sedangkan 15 balita (27,8%) tetap berada pada kategori gizi kurang. Rata-rata nilai *z-score* meningkat dari -2,49 sebelum intervensi menjadi -1,61 setelah intervensi, dengan perbedaan yang bermakna secara statistik ($p = 0,000$; $p < 0,05$). Hasil penelitian menunjukkan bahwa Pemberian Makanan Tambahan berbasis pangan lokal berhubungan dengan perbaikan status gizi balita gizi kurang di wilayah kerja Puskesmas Marusu. Oleh karena itu, program Pemberian Makanan Tambahan berbasis pangan lokal perlu dilaksanakan secara berkelanjutan dan diintegrasikan dengan edukasi gizi serta pemantauan pertumbuhan untuk mengoptimalkan perbaikan status gizi balita.

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INTRODUCTION

Undernutrition among under-five children remains a major public health concern in Indonesia. Under-five children are in a critical stage of growth and development, making inadequate nutritional intake likely to have long-term consequences for physical growth, cognitive development, and the quality of future human resources. Nutritional problems among under-five children include stunting, wasting, and overweight (WHO, 2020). According to the World Health Organization (WHO), wasting is a form of acute undernutrition characterized by a weight-for-height (*WFH*) *z*-score below -2 standard deviations (SD) (Syarfaini et al., 2022).

Undernutrition among under-five children remains a significant public health issue worldwide. The World Health Organization (WHO) reported that approximately 45.4 million under-five children, representing about 8% of the global under-five population, were affected by wasting in 2020 (WHO, 2020). In Indonesia, the 2024 Indonesian Nutritional Status Survey reported an undernutrition prevalence of 7.4% among under-five children. At the regional level, South Sulawesi Province reported an undernutrition prevalence of 8.3%, while Maros Regency recorded a prevalence of 13.6%, one of the highest rates in the province (SSGI, 2022). These findings indicate that improving the nutritional status of under-five children remains a national public health priority.

The development of effective nutrition policies requires robust scientific evidence to support the design and implementation of appropriate intervention programs (J et al., 2022). The Indonesian government has implemented several strategies to accelerate nutritional improvement, including the Healthy Indonesia Program with a Family Approach and the First 1,000 Days of Life Movement, both of which aim to improve community nutrition through promotive and preventive interventions (Amaliya, 2021). One of the most widely implemented nutrition-specific interventions is the Supplementary Feeding Program, which is designed to meet the macro- and micronutrient requirements of under-five children and thereby improve their nutritional status (Askandary et al., 2024).

According to the Regulation of the Minister of Health of the Republic of Indonesia No. 51 of 2016, the Supplementary Feeding Program is a nutrition intervention intended for undernourished under-five children to support optimal growth and development (Apriliani et al., 2024). In practice, the Ministry of Health promotes the use of locally available foods as the primary source of supplementary feeding because they are readily accessible, sustainable, and nutritionally valuable. In addition to improving the nutritional status of under-five children, Local Food-Based Supplementary Feeding serves as a means of providing nutrition education for families while encouraging the utilization of local food resources within communities (Naelasari & Nurmaningsih, 2022).

Previous studies have demonstrated that Local Food-Based Supplementary Feeding can improve the nutritional status of under-five children. Ramazana et al. (2024) reported that implementing Local Food-Based Supplementary Feeding in the catchment area of the Simpang Tiga Community Health Center, Aceh Besar Regency, significantly increased body weight among undernourished under-five children, enabling many of them to achieve normal nutritional status. Nevertheless, the effectiveness of supplementary feeding programs may vary across settings because of differences in population characteristics, program implementation, adherence to food consumption, and environmental and socioeconomic conditions. Therefore, further evaluations of Local Food-Based Supplementary Feeding programs in different settings are needed to strengthen the evidence regarding their effectiveness.

The catchment area of the Marusu Community Health Center is one of the areas implementing a Local Food-Based Supplementary Feeding Program for undernourished under-five children. However, evidence regarding changes in the nutritional status of children following participation in the program remains limited. The findings of this study are expected to provide evidence for evaluating the implementation of the Local Food-Based Supplementary Feeding Program and to contribute to the development of nutrition intervention strategies at the primary healthcare level.

Therefore, this study aimed to analyze the effect of Local Food-Based Supplementary Feeding on the nutritional status of undernourished under-five children in the catchment area of the Marusu Community Health Center. Specifically, the study sought to describe the characteristics of under-five children receiving the intervention and to evaluate changes in their nutritional status before and after participation based on anthropometric measurements.

RESEARCH METHOD

This study employed an analytical observational design using a pre–post approach based on secondary data to evaluate changes in the nutritional status of undernourished under-five children following Local Food-Based Supplementary Feeding. The study was conducted in June 2025 using secondary data obtained from the 2024 implementation reports of the Local Food-Based Supplementary Feeding Program for undernourished under-five children in the catchment area of the Marusu Community Health Center.

The study population consisted of all undernourished under-five children who received the Local Food-Based Supplementary Feeding intervention in the catchment area of the Marusu Community Health Center. A total sampling technique was employed, whereby all eligible participants were included in the study, resulting in a final sample of 54 under-five children. The inclusion criteria comprised under-five children classified as undernourished based on the weight-for-height (*WFH*) indicator, with a *z*-score ranging from ≥ -3 SD to < -2 SD, who had received Local Food-Based Supplementary Feeding for 56 days. Under-five children with incomplete anthropometric data or incomplete program implementation records were excluded from the study.

The variables assessed included the characteristics of the under-five children (age and sex) and their nutritional status based on the weight-for-height (*WFH*) indicator before and after the Local Food-Based Supplementary Feeding intervention. Anthropometric data were obtained from the documented implementation reports of the Local Food-Based Supplementary Feeding Program maintained by the Marusu Community Health Center.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize participants' characteristics as frequencies, percentages, means, and *z*-scores. Differences in nutritional status before and after the intervention were analyzed using the Wilcoxon signed-rank test because the data consisted of paired observations and were not normally distributed. Statistical significance was established at $p < 0.05$. Ethical approval for this study was granted by the Health Research Ethics Committee of Makassar Polytechnic of Health, Ministry of Health, Indonesia (No. 1398/M/KEPK-PTKMS/VI/2025).

RESULTS

Table 1. Characteristics of Under-Five Children in the Catchment Area of the Marusu Community Health Center

Characteristics	N	Percentage (%)
Sex		
Male	29	53.7
Female	25	46.3
Age Group (months)		
12–23	18	33.3
24–35	15	27.8
36–47	12	22.2
48–59	9	16.7

Table 1 shows that among the 54 under-five children included in the study, most were male (29; 53.7%), while females accounted for 25 (46.3%). Based on age group, the largest proportion of participants was aged 12–23 months (18; 33.3%), followed by those aged 24–35 months (15; 27.8%), 36–47 months (12; 22.2%), and 48–59 months (9; 16.7%).

Table 2. Changes in the Nutritional Status of Undernourished Under-Five Children Following Local Food-Based Supplementary Feeding

Changes in Nutritional Status	N	Percentage (%)
Remained undernourished	15	27.8
Improved to normal nutritional status	39	72.2
Total	54	100.0

As presented in Table 2, a total of 39 under-five children (72.2%) improved from undernutrition to normal nutritional status following Local Food-Based Supplementary Feeding, whereas 15 children (27.8%) remained undernourished. Among the 39 children who demonstrated improved nutritional status, 23 were male and 16 were female. In contrast, of the 15 children who remained undernourished, six were male and nine were female.

Table 3. Body Weight and z-Score Before and After Local Food-Based Supplementary Feeding

Measurement Time	Mean Body Weight (kg)	Mean z-Score	Minimum z-Score	Maximum z-Score	p-value
Before intervention	10.08	−2.49	−3.00	−2.01	0.000
After intervention	10.25	−1.61	−3.00	−0.15	

Table 3 shows that the mean body weight of the under-five children increased from 10.08 kg before the intervention to 10.25 kg after Local Food-Based Supplementary Feeding. Likewise, the mean z-score improved from −2.49 before the intervention to −1.61 after the intervention. The minimum z-score remained unchanged at −3.00, whereas the maximum z-score increased from −2.01 to −0.15.

The Wilcoxon signed-rank test demonstrated a statistically significant difference in z-scores before and after Local Food-Based Supplementary Feeding ($p = 0.000$; $p < 0.05$), indicating a significant improvement in the nutritional status of undernourished under-five children following the intervention.

DISCUSSION

The nutritional status of under-five children is an important indicator of health, growth, and development during early childhood. Children in this stage require adequate nutrient intake in both quantity and quality to support optimal growth and development. Good nutritional status reflects sufficient energy and nutrient intake to meet physiological needs, whereas undernutrition indicates an imbalance between dietary intake and the body's metabolic requirements, resulting from inadequate food consumption or diseases that impair nutrient absorption (Sari et al., 2023).

All participants in the present study were undernourished under-five children before receiving the Local Food-Based Supplementary Feeding intervention. Most participants were male and belonged to the 12–23-month age group. This age represents a critical period of growth because physical and brain development occur rapidly, making inadequate nutrient intake during this stage likely to result in long-term impairments in physical growth and cognitive development (Cusick & Georgieff, 2016). After receiving Local Food-Based Supplementary Feeding for 56 days, most participants achieved normal nutritional status. The Wilcoxon signed-rank test demonstrated a statistically significant difference in z -scores before and after the intervention. These findings suggest that Local Food-Based Supplementary Feeding was associated with improved nutritional status among undernourished under-five children in the catchment area of the Marusu Community Health Center.

The improvement in nutritional status observed in this study may be attributed to increased energy and nutrient intake during the implementation of the supplementary feeding program. Local foods used in the intervention generally provide energy, protein, vitamins, and minerals that are essential for meeting nutritional requirements during growth. Adequate energy and protein intake contributes to tissue development and nutritional recovery among under-five children (Nelista & Fembi, 2021). In addition, the use of locally available foods enhances community acceptance because the ingredients are familiar, accessible, and culturally appropriate. High acceptability of the supplementary foods may improve daily dietary intake, thereby contributing to better nutritional status (Ramadhania et al., 2025).

The findings of this study are consistent with those reported by Ramadhania et al. (2025), who demonstrated that Local Food-Based Supplementary Feeding provided for 56 days significantly improved the z -scores of undernourished under-five children. Similar findings were reported by Ramazana et al. (2024), who found that three months of Local Food-Based Supplementary Feeding increased body weight and improved the nutritional status of undernourished under-five children. Collectively, these findings support the role of Local Food-Based Supplementary Feeding as an effective strategy for improving nutritional status when implemented consistently, tailored to children's nutritional requirements, and accompanied by regular growth monitoring.

Despite these positive findings, some participants remained undernourished after completing the intervention. This observation indicates that the success of supplementary feeding programs is influenced not only by the provision of additional food but also by other determinants of child nutritional status. Children with severely compromised nutritional status at baseline may continue to have z -scores below the normal range despite gaining weight. Furthermore, Sultan et al. (2024) reported that limited financial resources, insufficient human resources, inadequate dietary intake, caregiving practices, healthy lifestyle behaviors, and infectious diseases all influence the effectiveness of supplementary feeding

programs. Therefore, improving the nutritional status of under-five children requires a comprehensive approach that extends beyond supplementary feeding alone.

The present findings differ from those of Putri and Mahmudiono (2020), who reported that a supplementary feeding recovery program implemented in the catchment area of the Simomulyo Community Health Center, Surabaya, did not produce significant improvements in nutritional status based on the weight-for-height indicator. These discrepancies may be explained by differences in participant characteristics, adherence to the intervention, program quality, duration of the intervention, and environmental conditions across study settings. Consequently, the effectiveness of supplementary feeding programs may vary depending on the characteristics of the target population and the quality of program implementation.

Child undernutrition is a multifactorial condition influenced by both direct and indirect determinants. Direct determinants include inadequate dietary intake and infectious diseases, whereas indirect determinants include maternal education, household socioeconomic status, environmental sanitation, access to safe drinking water, and parental knowledge of child feeding practices (Hosang et al., 2017). Therefore, Local Food-Based Supplementary Feeding should be implemented as part of an integrated strategy that includes nutrition education for caregivers, regular growth monitoring, and infection prevention measures to ensure sustainable improvements in children's nutritional status. Education regarding the importance of supplementary feeding and continuous caregiver support throughout program implementation may further enhance intervention effectiveness (Rahmadinda et al., 2024). Through such a comprehensive approach, Local Food-Based Supplementary Feeding may contribute not only to improving the nutritional status of under-five children but also to preventing chronic forms of child undernutrition, including stunting.

CONCLUSION

Local Food-Based Supplementary Feeding implemented in the catchment area of the Marusu Community Health Center was associated with improved nutritional status among undernourished under-five children. The findings demonstrated significant improvements in nutritional status following the intervention, suggesting that Local Food-Based Supplementary Feeding may serve as an effective strategy for improving the nutritional status of undernourished under-five children when implemented consistently and accompanied by regular growth monitoring.

Optimizing the implementation of Local Food-Based Supplementary Feeding should be supported through the utilization of nutritious local foods, caregiver education on appropriate child feeding practices, and routine growth monitoring to sustain the benefits of the program and contribute to the prevention of child undernutrition.

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