



Changes in nutritional status among children aged 11–59 months participating in a local food-based supplementary feeding program in Sebangki Subdistrict

Perubahan status gizi balita usia 11–59 bulan penerima program pemberian makanan tambahan berbasis pangan lokal di Kecamatan Sebangki

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Abstract

Undernutrition among children under five years of age remains a major public health challenge in Indonesia. The Local Food-Based Supplementary Feeding Program (PMT) is a government intervention aimed at improving child nutritional status. This study described changes in the nutritional status of children aged 11–59 months who participated in the program in Sebangki Subdistrict, Landak Regency. This retrospective, secondary-data, pre-post evaluation used a descriptive quantitative approach. Data were drawn from the 2023 PMT program records collected between December 2023 and March 2024 in the working area of Sebangki Community Health Center, Landak Regency, West Kalimantan. The study included 91 children aged 11–59 months, selected through total sampling. Nutritional status was assessed using weight-for-age (WAZ) and weight-for-height (WHZ) z-scores, which were analyzed descriptively as frequencies and percentages. Results based on WAZ showed that severely underweight children decreased from 12.1% to 4.4% and underweight from 87.9% to 63.7%, while 31.9% became normal weight. Based on WHZ, wasting decreased from 29.7% to 14.3%, whereas the normal status increased from 70.3% to 85.7%. In conclusion, program participation was accompanied by favorable changes in nutritional status based on WAZ and WHZ. As this pre-post evaluation lacked a comparison group, findings should be interpreted descriptively rather than as evidence of program effectiveness.

Keywords: children under five, local foods, nutritional status, supplementary feeding, wasting

Abstrak

Masalah gizi kurang pada balita masih menjadi tantangan kesehatan masyarakat di Indonesia. Program Pemberian Makanan Tambahan (PMT) berbasis pangan lokal merupakan salah satu intervensi pemerintah untuk memperbaiki status gizi balita. Penelitian ini mendeskripsikan perubahan status gizi anak usia 11–59 bulan peserta program tersebut di Kecamatan Sebangki, Kabupaten Landak. Penelitian merupakan evaluasi pre-post retrospektif berbasis data sekunder dengan pendekatan deskriptif kuantitatif. Data diperoleh dari catatan program PMT tahun 2023 yang dikumpulkan Desember 2023–Maret 2024 di wilayah kerja Puskesmas Sebangki, Kabupaten Landak, Kalimantan Barat. Sampel terdiri atas 91 anak usia 11–59 bulan, dipilih dengan total sampling. Status gizi dinilai menggunakan indikator BB/U dan BB/TB, dianalisis deskriptif sebagai frekuensi dan persentase. Hasil, berdasarkan BB/U, gizi buruk menurun dari 12,1% menjadi 4,4% dan gizi kurang dari 87,9% menjadi 63,7%, sedangkan 31,9% anak berkategori gizi baik. Berdasarkan BB/TB, wasting menurun dari 29,7%

menjadi 14,3%, sedangkan status gizi normal meningkat dari 70,3% menjadi 85,7%. Kesimpulan, partisipasi dalam program PMT berbasis pangan lokal diikuti oleh perubahan status gizi yang positif berdasarkan BB/U dan BB/TB. Karena evaluasi ini tidak memiliki kelompok pembandingan, temuan sebaiknya dimaknai secara deskriptif, bukan sebagai bukti efektivitas program.

Kata Kunci: Anak bawah lima tahun, pemberian makanan tambahan, pangan lokal, status gizi, wasting

Introduction

Nutritional problems among children under five years of age remain a major public health challenge in Indonesia, as they significantly affect physical growth, cognitive development, productivity, and the quality of future human resources. Inadequate nutritional intake during the critical early years of life may disrupt brain development, reduce learning capacity, and increase vulnerability to infectious diseases (World Health Organization and Unicef, 2023). Based on the 2023 Indonesian Health Survey (SKI), the national prevalence of stunting among children under five years of age reached 21.5%, while underweight and wasting were reported at 15.9% and 8.5%, respectively. The prevalence of wasting increased from 7.7% in 2022 to 8.5% in 2023, indicating that acute malnutrition remains a persistent public health concern in Indonesia (Kemenkes RI 2023). These conditions remain higher than the targets established in the 2020–2024 National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional* [RPJMN]), which aims to reduce stunting prevalence to 14% and wasting prevalence to 7%. Therefore, the persistence of stunting, underweight, and wasting reflects the continued burden of multiple forms of malnutrition among Indonesian children and highlights the need for comprehensive nutritional interventions (Andriani et al., 2023; Mericq et al., 2017).

Nutrition issues among toddlers remain a major concern in West Kalimantan Province, where the prevalence of stunting remains above the national target (Kemenkes RI, 2023). Landak Regency continues to face high rates of stunting and malnutrition, influenced by low birth weight, lack of exclusive breastfeeding, inappropriate complementary feeding, and low socioeconomic status (Kinasih & Jannah, 2026; Trisnawati et al., 2024). Sebangki Subdistrict, a rural area of Landak Regency where most residents work in agriculture and plantations,

faces limited access to health services and low dietary diversity, making the improvement of toddlers' nutritional status a public health priority (Hasibuan et al., 2025).

According to the UNICEF Conceptual Framework, childhood undernutrition is influenced by multiple interconnected factors operating at different levels. Immediate determinants include insufficient dietary intake and infectious diseases, while underlying factors involve inadequate childcare practices, restricted access to healthcare services, and unfavorable living environments. At the fundamental level, socioeconomic conditions, such as poverty, limited parental education, and inadequate access to essential resources, contribute to the persistence of nutritional problems (Novia et al., 2023). If these determinants are not effectively addressed, they may negatively affect children's growth and developmental processes, increasing the likelihood of stunting and wasting (Usada et al., 2021).

In response to this persistent nutritional problem, the Indonesian Ministry of Health has implemented a local food-based supplementary feeding program as a targeted intervention for children aged 6–59 months with underweight conditions, impaired growth patterns, or an increased risk of malnutrition (Imeldawati, 2025). Supplementary feeding, rather than replacing the child's usual diet and main meals or complementary feeding, provides additional energy and nutrients to support catch-up growth (Cichon et al., 2023; Levina Bless et al., 2024). Local foods—items readily available to and consumed by local communities—offer advantages of accessibility, cost-effectiveness, alignment with local dietary customs, and sustainability, and can be a practical and scalable approach to managing child undernutrition in resource-limited settings (Alfi et al., 2025; Sari et al., 2025; Yahdillah et al., 2024).

The success of local food-based supplementary feeding depends on accurate

beneficiary targeting, alignment of nutritional content with toddlers' needs, consumption compliance, family involvement, and effective distribution and monitoring (Kemenkes RI, 2022). Conversely, low nutritional literacy, weak family participation, unappealing menus, and inadequate monitoring can hinder program success (Damayanti et al., 2020). Several studies have reported that local food-based supplementary feeding programs improve toddlers' nutritional status, including significant weight gain and improved anthropometric indicators following the intervention (Hadju et al., 2023; Nadimin, 2022; Sari et al., 2025). International evidence similarly indicates that specially formulated and locally sourced supplementary foods can improve recovery rates and anthropometric outcomes among children with moderate wasting, although the effectiveness varies by food type, dosage, and program context (Padhani et al., 2023).

Although these studies point to the potential benefits of local food-based supplementary feeding, most focus on specific food formulations or small-scale interventions, and evidence on the effectiveness of routine government-implemented programs in rural West Kalimantan communities remains limited. Few studies have evaluated changes in nutritional status using real-world program monitoring data, and the persistent coexistence of multiple forms of malnutrition and the under-recognized burden of wasting across Southeast Asia further underscore the need for context-specific evaluation (Mutunga et al., 2020; Tan et al., 2025).

To date, data on the nutritional status of toddlers targeted by local food-based supplementary feeding in Sebangki Subdistrict, Landak Regency, remain limited. Therefore, this study evaluated changes in the nutritional status of toddlers receiving the local food-based supplementary feeding program to provide an evidence base for policy formulation and strengthen locally sourced nutrition interventions aimed at accelerating the reduction of malnutrition in Landak Regency.

Methods

This study employed a retrospective secondary data evaluation design with a descriptive

quantitative approach to assess changes in the nutritional status of children participating in the Local Food-Based Supplementary Feeding Program. The evaluation was conducted between December 2023 and March 2024 using program documentation from the 2023 implementation of the Local Food-Based Supplementary Feeding Program in the Sebangki Subdistrict, Landak Regency, West Kalimantan Province. A total of 91 children aged 11–59 months with complete anthropometric records collected before and after the intervention were included in the study. Total sampling was applied by including all children who fulfilled the eligibility criteria, including those who participated in the supplementary feeding program and had complete pre- and post-intervention anthropometric data. Children were excluded if their anthropometric information was incomplete or if relevant program records were unavailable.

Local food-based supplementary feeding was implemented in accordance with the Technical Guidelines of the Indonesian Ministry of Health. Participants received locally prepared supplementary foods in addition to their usual diet while continuing to receive routine maternal and child health services provided by the community health center. As this study was based on retrospective secondary program data and did not include a comparison group, the findings describe changes in nutritional status before and after program implementation and should not be interpreted as evidence of a causal relationship. This study received ethical clearance from the Health Research Ethics Committee, Faculty of Nursing and Health Sciences, Universitas Muhammadiyah Semarang, prior to the commencement of the research procedures (approval no. 119/KE/06/2026).

Secondary data were collected from the records of the local food-based supplementary feeding program, which included anthropometric measurements and nutritional status documentation of the participating children. The variables assessed in this study were nutritional status indicators based on weight-for-age z-scores (WAZ) and weight-for-height z-scores (WHZ), following the Child Anthropometric Standards established by the Indonesian Ministry of Health (Ministry of Health of the Republic of Indonesia, 2020). Anthropometric assessments were performed

by trained health workers at community health centers using calibrated weighing instruments and length/height measurement boards, according to the standardized procedures of the Ministry of Health. Nutritional status categories were determined based on the Indonesian Child Anthropometric Standards, and z-score calculations were conducted using WHO Anthro software. Data validity was maintained through the verification of program documentation, and only children with complete anthropometric records before and after the intervention were included in the analysis. Descriptive analysis was conducted using frequency distributions and percentages, with findings presented in tabular and narrative formats to illustrate changes in the nutritional status of children participating in the Local Food-Based Supplementary Feeding Program (Kemenkes RI, 2023).

Statistical Analysis

A descriptive analysis was conducted to summarize the distribution of children's nutritional status categories based on World Health Organization growth indicators, including weight-for-age z-score (WAZ) and weight-for-height z-score (WHZ). Frequencies and percentages were calculated to compare nutritional status before and after receiving the Local Food-Based Supplementary Feeding Program intervention. The results are presented in tables, accompanied by descriptive explanations, to demonstrate changes in the nutritional status of the study participants.

Furthermore, descriptive analysis was applied to determine the proportion of children within each nutritional status category, providing an overview of the nutritional characteristics of the beneficiaries of the supplementary feeding intervention. These findings served as an evaluation basis for assessing the contribution of local food-based supplementary feeding programs and supporting the improvement of nutritional intervention strategies in the study area.

Result and Discussion

The characteristics of the study sample were evaluated according to sex, age, and nutritional status, with nutritional assessment determined using weight-for-age and weight-for-height/weight-for-length indices. A detailed

description of the participants' characteristics is presented in Table 1.

Table 1. Characteristics of the study participants before the program (n = 91)

Characteristic	n	%
Sex		
Male	57	62.6
Female	34	37.4
Age group (months)		
12–23	10	11
24–59	81	89
Nutritional status based on weight-for-age before the program		
Severely underweight	11	12.1
Underweight	80	87.9
Nutritional status based on weight-for-height before the program		
Wasted	27	29.7
Normal	64	70.3

Table 1 presents the characteristics of the participants. Of the 91 children included in the study, 57 (62.6%) were boys and 34 (37.4%) were girls. Based on age, most participants were 24–59 months old (89.0%), while 11.0% were 12–23 months old. This distribution indicates that the supplementary feeding program primarily targeted preschool-aged children, a period characterized by rapid growth and increased nutritional requirements of the children. Inadequate nutrient intake during this stage may adversely affect physical growth, cognitive development, and immune function (Rosfinda et al., 2025).

Assessment of nutritional status before the intervention revealed that all participating children experienced undernutrition based on the weight-for-age (WAZ) index. Specifically, 80 children (87.9%) were classified as underweight, and 11 (12.1%) were categorized as severely underweight. These findings suggest that the study population represents a nutritionally vulnerable group that requires immediate intervention. Weight-for-age is a widely used indicator reflecting both chronic and acute nutritional deficiencies and serves as an important marker for identifying children at risk of growth faltering (World Health Organization and Unicef, 2023).

The high occurrence of underweight and severe underweight among children in this

study may reflect the combined effects of inadequate nutrient intake, recurrent infections, inappropriate infant and young child feeding practices, household food insecurity, and barriers to healthcare access. In line with the UNICEF Conceptual Framework, child malnutrition is a multifactorial condition resulting from the interplay between immediate causes, such as insufficient dietary intake and infectious diseases, and underlying determinants related to caregiving capacity, food security, environmental sanitation, and healthcare accessibility (UNICEF, 2023).

The findings indicate that the supplementary feeding program was appropriately targeted at children experiencing nutritional deficits. Supplemental feeding interventions are designed to provide additional energy, protein, and micronutrients to support catch-up growth and improve the nutritional status of undernourished children. The utilization of locally available foods is particularly advantageous because it promotes sustainability, affordability, cultural acceptability, and community participation (Dina et al., 2025).

Previous studies have demonstrated the effectiveness of food-based supplementary feeding programmes in improving child nutritional outcomes (Hadju et al., 2023) reported that locally sourced supplementary feeding significantly improved dietary intake and nutritional status among undernourished children. Local food-based supplementary feeding interventions contributed to significant increases in body weight among undernourished children. These findings support the implementation of sustainable community-based nutrition programs that utilize local food resources as an effective strategy for addressing childhood undernutrition (Nadimin, 2022).

The baseline findings revealed that all children enrolled in the supplementary feeding program were affected by undernutrition, predominantly characterized by underweight status. This underscores the importance of strengthening integrated nutrition strategies that combine supplementary food provision, caregiver-focused nutrition education, regular growth assessment, optimization of child feeding practices, and coordinated efforts across sectors to achieve long-term improvements in the nutritional status of children.

Outcome Evaluation Improvement in Toddler Nutritional Status based on Weight-for-Age Index

Table 2 presents the distribution of children's nutritional status based on the weight-for-age (WAZ) index before and after participation in the program. The results describe the frequency and percentage of each nutritional status category at the two measurement periods and provide a descriptive overview of the participants' nutritional status.

Table 2. Nutritional status based on Weight-for-Age Z-scores (WAZ) before and after the local food-based supplementary feeding program among children aged 11–59 months

Nutritional status category	Before the program, n (%)	After the program, n (%)
Severely underweight	11 (12.1)	4 (4.4)
Underweight	80 (87.9)	58 (63.7)
Normal weight	0 (0.0)	29 (31.9)
Total	91 (100.0)	91 (100.0)

Table 2 shows that after the provision of supplementary feeding based on local foods, there was a change in the nutritional status of toddlers based on the weight-for-age index, where the number of severely underweight toddlers decreased to four (4.4%), the number of underweight toddlers decreased to 58 (63.7%), and 29 (31.9%) experienced an improvement in their nutritional status to normal weight.

Improvement in Toddlers' Nutritional Status Based on the Weight-for-Height Z-Score (WHZ)

Table 3 presents the distribution of children's nutritional status based on the Weight-for-Height Z-score (WHZ) before and after participation in the local food-based Supplementary Feeding Program in the working area of Sebangki Community Health Center, Landak Regency. The findings are presented as frequencies and percentages to provide a descriptive overview of the nutritional status of the study participants during the two measurement periods.

Table 3. Nutritional status of children aged 11–59 months based on Weight-for-Height Z-scores (WHZ) before and after the local food-based supplementary feeding program

Nutritional status category	Before the program, n (%)	After the program, n (%)
Wasted	27 (29.7)	13 (14.3)
Normal	64 (70.3)	78 (85.7)
Total	91 (100.0)	91 (100.0)

Table 3 presents the distribution of children's nutritional status based on weight-for-height z-scores (WHZ) before and after participation in the local food-based Supplementary Feeding Program. The number of children classified as having wasting decreased from 27 (29.7%) before the program to 13 (14.3%) after the program, representing a reduction of 14 children (15.4 percentage points). The number of children with normal nutritional status increased from 64 (70.3%) to 78 (85.7%).

Based on the study findings, the proportion of children classified as severely underweight decreased from 12.1% to 4.4%, and the proportion of underweight children decreased from 87.9% to 63.7%. In addition, the proportion of children with normal nutritional status increased from 0.0% to 31.9% after participation in the local food-based Supplementary Feeding Program. These findings describe changes in nutritional status based on the weight-for-age (WAZ) index of the study participants. However, because this study was based on retrospective secondary data without a comparison group and did not assess dietary intake, adherence to the intervention, morbidity, or other potential confounding factors, these findings cannot be interpreted as evidence that the program caused the observed changes in the participants. The results may also have been influenced by natural child growth, concurrent health and nutrition services, regression to the mean or measurement error.

These results support previous evidence from a study conducted in the working area of Klasaman Community Health Center, Sorong City, which reported that supplementary feeding programs significantly influenced increasing body weight among children under five years of age receiving the intervention (Ningtiyas, 2026). Body weight is an important anthropometric

measure of body mass and is highly responsive to short-term changes caused by health conditions, appetite alterations, and variations in dietary intake. In healthy children with adequate nutritional status and balanced energy intake, body weight typically follows a progressive growth pattern corresponding to age (Yunus & Pratiwi, 2023).

The descriptive findings of this study are consistent with previous studies reporting changes in children's nutritional status following participation in local food-based supplementary feeding programs (Nadimin, 2022). Previous studies have suggested that locally produced supplementary foods may provide additional energy, protein, vitamins, and minerals needed to support child growth and development. However, the present study did not assess the composition of the supplementary foods, the amount provided, participants' consumption adherence, or the implementation of nutrition education. Therefore, the mechanisms underlying the observed changes in nutritional status could not be evaluated in the present study.

These findings are also consistent with international systematic reviews indicating that food-based supplementary feeding programs are associated with favorable anthropometric changes among children with moderate acute malnutrition compared with counselling or standard care alone, although reported effect sizes vary considerably across settings (Barbazzà et al., 2026; Lelijveld et al., 2020). Recent meta-analytic evidence further suggests that realistic weight gain during supplementary and therapeutic feeding typically falls within 5–10 g/kg/day, a benchmark that may help contextualize the pace of nutritional recovery observed in program settings such as the Sebangki Subdistrict (O'Donovan et al., 2025).

Providing supplementary feeding alongside nutrition education can improve the nutritional status of toddlers. Locally produced supplementary feed contains energy-producing and building nutrients, such as protein, along with several vitamins and minerals that are essential for regulating the body (Nadimin, 2022). The effectiveness of local supplementary feeding programs can be attributed to their nutritional content, which meets children's needs, and the availability of easily accessible local food sources. Using local food sources, this program is not only nutritionally effective but

also more sustainable, as it leverages existing community resources.

According to the Technical Guidelines of the Indonesian Ministry of Health, the local food-based Supplementary Feeding Program is designed to provide approximately 175–450 kcal of energy, 3.5–18 g of protein, and 4.4–29.3 g of fat per serving, depending on the age group of the target children (Kemenkes RI, 2020). These values represent the nutritional targets specified in the program guidelines, rather than the actual amount consumed by each child. This study did not assess the composition of the foods provided, individual dietary intake, or adherence to the supplementary feeding program. Therefore, the observed changes in nutritional status cannot be directly attributed to the nutritional content or consumption of supplementary foods (Kemenkes RI, 2020).

These descriptive findings suggest that participation in the local food-based Supplementary Feeding Program was accompanied by changes in the nutritional status of the participants. However, the present study did not evaluate the long-term sustainability, feasibility, or comparative effectiveness of this approach relative to other supplementary-feeding programs. Therefore, conclusions regarding these aspects cannot be drawn from the current study.

Conclusion

Participation in the local food-based Supplementary Feeding Program was accompanied by changes in nutritional status categories among children aged 11–59 months in Sebangki Subdistrict, Landak Regency, based on the weight-for-age (WAZ) and weight-for-height (WHZ) indices. Because this study was based on a retrospective secondary-data pre-post evaluation without a comparison group and used descriptive analysis, the findings should be interpreted as a descriptive overview rather than evidence of a causal program effect.

Future program evaluations should incorporate paired anthropometric monitoring, assessment of dietary intake and adherence to supplementary feeding, morbidity surveillance, and controlled study designs to provide stronger evidence regarding program effectiveness. Improvements were observed in both the weight-for-age z-score (WAZ) and weight-for-

height z-score (WHZ) indicators, as reflected by a reduction in the proportion of undernourished children and an increase in the proportion of children with normal nutritional status. Strengthening routine growth monitoring, caregiver nutrition education, and community participation is recommended to sustain the benefits of the supplementary feeding program.

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