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Implementation evaluation of a local food based supplementary feeding program to support child nutrition in West Sulawesi, Indonesia

Evaluasi implementasi program pemberian makanan tambahan berbasis pangan lokal untuk mendukung status gizi anak di Sulawesi Barat, Indonesia

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Abstract

Stunting remains a major public health problem in Indonesia, particularly in West Sulawesi, where structural and operational constraints limit the effectiveness of nutrition interventions. Local food-based supplementary feeding programs require systematic evaluation to understand their implementation performance within primary health care systems. This study aimed to evaluate the implementation of a local food-based supplementary feeding program to improve child nutritional outcomes in West Sulawesi. This descriptive qualitative study with a cross-sectional evaluation approach was conducted in the Mamuju, Majene, and Mamasa districts between November and December 2023. A total of 99 participants were involved, including 38 program managers and 61 mothers of beneficiary children. Data were collected through focus group discussions, in-depth interviews, structured questionnaires, and direct observations. Qualitative data were analyzed using thematic analysis, while quantitative data were summarized using descriptive statistics. Data triangulation was applied to enhance credibility. The results showed that the program was implemented in accordance with national technical guidelines but lacked locally adapted operational regulations. Most mothers (93.4%) reported weight gain among their children following program participation, and 23 of 54 undernourished children in one district showed short-term improvement in nutritional status. Key implementation challenges included limited nutrition personnel, delayed fund disbursement, inconsistent monitoring, and geographic barriers. In conclusion, the local food-based supplementary feeding program contributed to short-term improvements in child nutritional outcomes but faced operational constraints that limited optimal implementation. Strengthening governance, monitoring systems, and health workforce capacity is essential to improve program effectiveness.

Keywords: Child nutrition, implementation evaluation, supplementary feeding, public health nutrition.

Abstrak

Stunting masih menjadi masalah kesehatan masyarakat utama di Indonesia, khususnya di Provinsi Sulawesi Barat, di mana berbagai kendala struktural dan operasional membatasi efektivitas intervensi gizi. Program pemberian makanan tambahan (PMT) berbasis pangan lokal memerlukan evaluasi sistematis untuk memahami kinerja implementasinya dalam sistem pelayanan kesehatan primer. Tujuan penelitian untuk mengevaluasi implementasi program pemberian makanan tambahan berbasis pangan lokal dalam mendukung perbaikan status gizi anak di Sulawesi Barat. Metode penelitian menggunakan desain kualitatif deskriptif dengan pendekatan evaluasi potong lintang. Studi dilaksanakan di Kabupaten Mamuju, Majene, dan Mamasa pada

November–Desember 2023 dengan melibatkan 99 partisipan, terdiri atas 38 pengelola program dan 61 ibu anak penerima program. Data dikumpulkan melalui diskusi kelompok terarah, wawancara mendalam, kuesioner terstruktur, dan observasi langsung. Data kualitatif dianalisis secara tematik, sedangkan data kuantitatif dianalisis secara deskriptif. Triangulasi data dilakukan untuk meningkatkan kredibilitas temuan. Hasil, program dilaksanakan sesuai pedoman teknis nasional, namun belum didukung regulasi operasional di tingkat daerah. Sebagian besar ibu (93,4%) melaporkan peningkatan berat badan anak setelah mengikuti program, dan 23 dari 54 anak dengan gizi kurang di salah satu kabupaten menunjukkan perbaikan status gizi jangka pendek. Kendala utama meliputi keterbatasan tenaga gizi, keterlambatan pencairan dana, pemantauan yang belum konsisten, dan hambatan geografis. Kesimpulan, program pemberian makanan tambahan (PMT) berbasis pangan lokal berkontribusi terhadap perbaikan status gizi anak dalam jangka pendek, namun masih menghadapi kendala implementasi. Penguatan tata kelola, sistem pemantauan, dan kapasitas tenaga kesehatan diperlukan untuk meningkatkan efektivitas program.

Kata Kunci: Evaluasi program, gizi anak, kesehatan masyarakat, pemberian makanan tambahan.

Introduction

Stunting remains one of the most persistent global health problems, particularly in low- and middle-income countries (LMICs), where it adversely affects child survival, growth, and long-term human development. Stunting reflects chronic undernutrition resulting from cumulative nutritional deprivation, recurrent infections, and suboptimal caregiving practices during early childhood (Carosella et al., 2024; Chilot et al., 2023). Despite global progress, an estimated 148 million children under five years of age will be stunted worldwide in 2022, with Southeast Asia contributing substantially to this burden (Unicef, 2023).

The persistence of stunting is closely linked to the triple burden of malnutrition, characterized by the coexistence of undernutrition, overnutrition, and micronutrient deficiencies within the same population or even household. These conditions interact in complex ways that undermine child growth and long-term human capital development. Undernutrition contributes directly to linear growth retardation and delayed neurodevelopment, whereas overnutrition increases the risk of childhood overweight and metabolic disorders later in life. Simultaneously, deficiencies in essential micronutrients, including iron, zinc, and vitamin A, can compromise immune function and cognitive performance (Rahmadiyah et al., 2024; Sufri et al., 2023). Evidence suggests that improvements in height-for-age Z-scores during the first 1,000 days of life are positively associated with enhanced cognitive outcomes and future productivity, underscoring the need for integrated nutritional strategies (Georgiadis et al., 2021; Jalaludin et al., 2025).

In Indonesia, stunting remains a major national development concern owing to its relatively high prevalence and significant regional disparities. West Sulawesi represents one of the provinces with a persistently higher stunting prevalence than the national average. Geographic isolation, uneven distribution of health services, logistical constraints in food access, and limited local nutrition financing contribute to persistent child undernutrition in this region (Mariana et al., 2024; Sufri et al., 2023). In addition, sociocultural practices related to maternal nutrition, infant and young child feeding, and health-seeking behavior may influence the effectiveness of centrally designed nutrition programs implemented at the community level.

The determinants of stunting are widely recognized as multifactorial and interrelated. Biological determinants include maternal nutritional status, anemia, and health conditions during pregnancy, as well as suboptimal breastfeeding practices. Behavioral determinants encompass inappropriate infant and young child feeding practices, particularly the timing, quality, and diversity of complementary foods. Environmental determinants include inadequate water, sanitation, hygiene (WASH) conditions, food

insecurity, and limited access to primary healthcare services (Astuti et al., 2025; Rahmadiyah et al., 2024). These interacting determinants often create cumulative disadvantages that perpetuate chronic malnutrition across generations.

Nutrition-specific interventions play a critical role in addressing these challenges, particularly during the first 1,000 days of life. Supplementary feeding programs are widely implemented to improve dietary intake and nutritional adequacy among vulnerable populations, including undernourished children and pregnant women (Soofi et al., 2022). In Indonesia, supplementary feeding programs typically provide nutrient-dense foods combined with nutrition education to improve dietary diversity and caregiving (Nugroho et al., 2023). When effectively implemented, such interventions have been associated with improvements in short-term nutritional outcomes and reductions in undernutrition prevalence (Ruel et al., 2018; Sufri et al., 2023).

Increasing attention has been devoted to local food-based supplementary feeding approaches that utilize locally available food resources to enhance cultural acceptability, sustainability, and community participation. Evidence from several LMICs indicates that locally sourced supplementary feeding can improve nutrient intake while simultaneously strengthening local food systems and household resilience (Banudi et al., 2024; Fadare et al., 2019). Previous studies have also indicated that program effectiveness improves when dietary diversity, food quality, and systematic monitoring are emphasized (Pramesthi et al., 2025).

However, the performance of supplementary feeding programs depends not only on policy design but also on implementation fidelity, resource availability, and health system capacity at the primary care level. Limited training of frontline health workers, delays in budget disbursements, weak monitoring systems, and insufficient coordination across sectors may substantially constrain program implementation (Khan, 2025; Nasution et al., 2025). Consequently, understanding how such programs operate within local health systems is essential for improving their effectiveness.

Although supplementary feeding programs have been widely implemented in Indonesia, many existing studies primarily focus on nutritional outcomes and provide limited insight into how program governance, financing mechanisms, human resources, and monitoring systems influence implementation at the district and community levels (Sriwahyuni et al., 2022). This gap highlights the need for implementation-focused evaluations that examine operational processes rather than causal impacts on stunting prevalence.

Therefore, this study aimed to evaluate the implementation of a local food–based supplementary feeding program in West Sulawesi by examining program inputs, implementation processes, and operational outputs at the primary health care level. Rather than measuring the causal effects on stunting reduction, this study focused on understanding how the program was implemented, identifying operational strengths and constraints, and generating context-specific evidence to inform improvements in nutrition program governance and service delivery.

Methods

Study Design

This study employed a qualitative implementation evaluation design supported by descriptive quantitative summaries to examine the implementation of a local food–based supplementary feeding program to improve children's nutritional outcomes. The evaluation adopted a cross-sectional assessment of program implementation, integrating multiple qualitative data sources while summarizing available program monitoring data descriptively.

This approach was selected to capture the contextual, operational, and experiential dimensions of program implementation that are not fully reflected through outcome indicators alone. Implementation-focused qualitative approaches are widely used in health systems and nutrition program evaluations, where program performance is shaped by governance arrangements, resource allocation, health system capacity, and community participation.

Study Setting and Period

This study was conducted in West Sulawesi Province, Indonesia, a region that has consistently reported stunting prevalence above the national average.

Three districts (Mamuju, Majene, and Mamasa) were purposively selected because of their high stunting burden and geographic diversity. Data were collected between November and December 2023 across nine primary health centers (Puskesmas): Binanga, Campaloga, and Topore (Mamuju District); Banggae II, Lembang, and Tammeroddo (Majene District); and Malabo, Mamasa, and Tawalian (Mamasa District).

These facilities were selected because they actively implemented a local food-based supplementary feeding program during the study period.

Data Sources

Both primary and secondary data sources were used to ensure a comprehensive assessment and triangulation. Primary data were collected through focus group discussions, in-depth interviews, structured questionnaires, and direct field observations of supplementary feeding program implementation activities.

Secondary data included national supplementary feeding program technical guidelines, routine program monitoring reports, child growth monitoring records maintained at primary health centers, and administrative program documentation obtained from district health offices.

Participants and Sampling

The participants represented multiple stakeholder groups involved in the implementation and utilization of supplementary feeding programs, including district health office officials, nutrition program managers, heads of primary health centers, nutritionists, village midwives, community health volunteers involved in food preparation and distribution, and mothers of children receiving supplementary feeding.

A purposive sampling strategy was used to identify key informants with direct responsibility or experience in program planning, implementation, and monitoring. This strategy ensured the inclusion of information-rich participants who were capable of providing detailed insights into program operations.

Subsequently, snowball sampling was applied to recruit additional community-level implementers and beneficiary mothers who were directly involved in the program activities. This approach enables the inclusion of diverse perspectives across different implementation contexts and is commonly recommended in qualitative health systems research.

A total of 99 participants were involved in the study, including 38 program managers and 61 mothers of beneficiary children.

Data Collection Procedures

Data collection involved a multimethod approach that integrated qualitative inquiry with descriptive quantitative documentation.

FGDs were conducted with program implementers and community volunteers to explore collective experiences related to program planning and coordination, food preparation and menu implementation, distribution mechanisms, and operational challenges during program delivery.

These discussions have enabled the identification of shared implementation experiences and local adaptations in programme delivery.

In-depth interviews were conducted with policymakers, health workers, and beneficiary mothers to explore their individual perspectives regarding program governance, resource availability, service delivery processes, perceived benefits, and challenges of program participation.

Structured questionnaires were administered to program managers and mothers of beneficiary children to collect descriptive quantitative information on respondent characteristics, program coverage and implementation consistency, and perceived changes in children's body weight during program participation. Direct observations were conducted to document food preparation practices, distribution mechanisms, and program monitoring activities at the primary health center level.

Operational Definitions

Undernourished children: Children were categorized as undernourished based on weight-for-age indicators recorded in routine growth monitoring data maintained at primary health centers, following the national child nutrition monitoring guidelines.

Short-term nutritional improvement: Short-term nutritional improvement is defined as reported increases in body weight recorded

during routine child growth monitoring after approximately two months of participation in the supplementary feeding program. These data were obtained from program monitoring records and caregiver reports and were summarized descriptively rather than interpreted as causal effects of the intervention.

Data Analysis

All FGDs and interviews were audio-recorded with participant consent and transcribed verbatim. Qualitative data were analyzed using thematic analysis, following these stages: data familiarization, open coding, category development, theme synthesis. Themes were organized according to the input–process–output evaluation framework to examine how program resources, implementation practices, and contextual factors influenced program performance.

Quantitative data from the questionnaires and routine program records were analyzed using descriptive statistics, including frequencies and percentages. These results complemented the qualitative findings, illustrated patterns in program implementation, and reported changes in children's weight. The integration of qualitative and quantitative findings enabled methodological triangulation, strengthening the credibility of the evaluation.

Trustworthiness and Rigor

Several strategies were employed to enhance the methodological rigor and trustworthiness. Method triangulation (focus group discussions, interviews, and questionnaires) and source triangulation (policymakers, implementers, and beneficiaries) were used to verify consistency across data sources. Member checking was conducted with selected participants to review preliminary interpretations and confirm accuracy. An audit trail for detailed documentation of data collection and analysis procedures was maintained to support auditability and transparency.

Ethical Considerations

Ethical principles were strictly observed throughout the study. All participants provided informed consent prior to participation, and the confidentiality of personal information was ensured through the anonymization of transcripts and data records.

Participation was voluntary, and respondents were informed of their right to withdraw at any stage without penalty. The study adhered to ethical standards for research involving human participants, particularly vulnerable populations, such as mothers and young children.

Result and Discussion

This study included 99 participants, comprising 38 program managers and 61 mothers of beneficiary children. Participants represented multiple stakeholder groups involved in program implementation, including policymakers, health workers, community volunteers, and service recipients.

Participants with FGD were categorized into three groups: (1) policy-level stakeholders, (2) program implementers at primary health centers, and (3) beneficiary mothers.

Table 1. Present the distribution of participants across districts.

District	supplementary Feeding Programs Managers		Mothers of supplementary Feeding Programs Beneficiaries	
	n	%	n	%
Mamuju	17	44.7	24	39.3
Majene	9	23.7	26	42.6
Mamasa	12	31.6	11	18

Program managers were more represented in Mamuju (44.7%), reflecting higher service capacity and administrative resources. In contrast, a greater proportion of beneficiary mothers were recruited in Majene (42.6%), likely due to better accessibility during data collection. Lower participation in Mamasa (18%) reflected geographic constraints, which were also identified as a key implementation barrier in the qualitative findings.

Table 2 shows that most mothers had secondary-level education (49.2%) and were primarily housewives (80.3%), indicating that caregiving responsibilities were concentrated within the household and may influence program adherence and feeding practices

Table 2. Educational level and occupation of mothers of supplementary feeding programs beneficiaries (n= 61)

Variable	n	%
Education		
No formal schooling	1	1.6
Primary school	12	19.7
Junior high school	13	21.3
Senior high school	30	49.2
Diploma	2	3.3
Bachelor's degree	3	4.9
Occupation		
Housewife	49	80.3
Honorary worker	5	8.2
Civil servant	6	9.8
Trader	1	1.6

Regulatory Basis for Implementing Supplementary Feeding Programs

All districts implemented the program based on national technical guidelines for local food–based supplementary feeding issued in 2023, and all program managers reported the availability of implementation frameworks.

However, no district developed locally adapted operational guidelines. Qualitative findings indicated that delays in the issuance of final technical guidance led to inconsistencies between budget planning and program implementation. One program implementer stated "We had to start the program before the technical guidelines were finalized, so budgeting and implementation did not always match." This gap contributed to variations in implementation practices across districts.

Input Analysis: Financing, Human Resources, and Guidelines

Program financing followed national allocation standards, with funds distributed for food ingredients, operational costs, and program management. Reported daily allocations were approximately IDR 21,500–22,000 for pregnant women and IDR 16,000 for underweight children. However, the actual food expenditure for children was sometimes reduced to approximately IDR 12,000, owing to operational deductions.

Questionnaire data revealed that 68.4% perceived funding as adequate, and 31.6% reported inadequacy. FGDs revealed that delayed fund disbursement disrupted program continuity and menu planning "Sometimes the funds came late, so we had to adjust menus or delay distribution." Human resource constraints were consistently reported. Several health centers operated with only one nutritionist supported by volunteers, limiting supervision and monitoring capacity.

Process Analysis: Planning, Implementation, Monitoring, and Reporting

Beneficiary targeting was based on routine nutrition monitoring data systems with additional screening to avoid duplication of services.

Menu implementation varied across sites, with 7-day or 10-day menu cycles, and variation in meal and snack distribution. Implementation models differed across locations for centralized kitchens at health centers and decentralized kitchens at the village level.

A community volunteer noted "In remote areas, food is prepared in each village because transportation is difficult." Owing to geographic barriers, food delivery is often conducted through home visits. Although daily recording was conducted, no standardized system existed to document actual food consumption. Reporting was typically conducted monthly; however, inconsistencies in reporting at the district level were observed.

Output of Supplementary Feeding Program Implementation

Program outputs were assessed using routine growth monitoring records and caregiver reports, focusing on short-term changes in child body weight; 93.4% of mothers reported weight gain in their children, and 23 of 54 undernourished children in one district showed improvement in weight status after approximately two months.

These findings reflect short-term changes based on routine monitoring data and caregiver reports rather than controlled measurements or causal inference. Children who did not gain weight were frequently reported to have experienced an illness during the intervention period.

Supporting and Inhibiting Factors

Factors supporting program implementation included strong leadership commitment at both the primary health center and district levels, as well as the availability of central government

funding, which facilitated program initiation and continuity. However, several key barriers were identified across the study sites. These included limited human resources, particularly the shortage of trained nutrition personnel, delays in fund disbursement that disrupted program scheduling and menu planning, geographic constraints that hindered access to remote beneficiaries, and high transportation costs that increased the operational burden. These challenges were consistently reported across districts and were found to influence both program coverage and the consistency of implementation.

This study provides an implementation-focused evaluation of local food-based supplementary feeding programs in West Sulawesi. The findings indicated that the program was associated with short-term improvements in children's body weight, while also revealing substantial variability in implementation across districts. Importantly, these findings reflect program performance and implementation processes rather than causal effects on stunting reduction.

The observed improvements in body weight do not necessarily reflect changes in linear growth, as stunting is a chronic condition that requires long-term multisectoral interventions. Studies in diverse settings have shown that nutrition programs embedded within existing health systems and supported by community engagement tend to achieve more favorable outcomes (Ramadhanty, 2024; Renzaho et al., 2022). In the present study, weight gain reported by the majority of beneficiary mothers and improvements among undernourished children identified through FGDs suggested that supplementary feeding contributed to short-term improvements in dietary intake and body weight among beneficiaries, although these outcomes should be interpreted cautiously. However, these gains were not uniform across all settings, reflecting differences in implementation capacity and local adaptation.

Variations in menu cycles, delivery mechanisms, monitoring practices, and reporting systems across primary health centers reflected differences in implementation fidelity and highlighted gaps in standardization and supervision. This finding aligns with the evidence that structured implementation, continuous supervision, and systematic monitoring are critical for achieving the intended outcomes in SFPs (Farmer, 2021; Ramadhanty, 2024). In contexts where delivery was constrained by staffing shortages or geographic barriers, the limited integration of nutrition education may have reduced the potential for sustained behavior change, thereby limiting the long-term impact of the program beyond short-term weight gain.

Financing and human resource constraints further shaped the implementation of supplementary feeding programs. Delays in fund disbursement and the perceived inadequacy of budgets in some facilities disrupted program continuity and limited flexibility in food provision. These challenges are consistent with previous research indicating that delayed or unstable financing undermines the sustainability and effectiveness of health and nutrition programs (Njiro et al., 2023). Similarly, reliance on a limited number of trained nutrition personnel, often supported by volunteers, constrained supervision, documentation, and follow-up activities. Prior studies emphasize that adequate and well-distributed human resources are essential for maintaining implementation fidelity and ensuring program quality (Antonio, 2023; Owusu-Addo et al., 2023).

The findings also highlight important mechanisms linking supplementary feeding with behavioral changes. While supplementary feeding programs primarily deliver food-based support, opportunities for consistent nutritional education and caregiver engagement are uneven. Evidence from other settings suggests that supplementary feeding programs are more likely to produce sustained nutritional benefits when combined with behavior change communication and culturally appropriate education (Lalchandani et al., 2022; Ramadhanty, 2024). In this study, logistical constraints and home-based delivery models sometimes limited direct counseling, potentially reducing the long-term impact of supplementary feeding programs beyond short-term weight gain.

A notable observation was the improvement in body weight without a corresponding assessment of linear growth. This pattern has been reported in other supplementary feeding programs, in which short-term weight gain does not necessarily translate into improvements in height-for-age or reductions in stunting (Ramadhanty, 2024). Such findings reinforce the understanding that

stunting is a chronic condition that requires sustained, multifaceted interventions that extend beyond short-duration feeding programs and address underlying determinants, such as infection, caregiving practices, and food security.

From a policy and governance perspective, this study underscores the need for a stronger alignment between national guidelines and local implementation. Reliance on central technical guidance without locally adapted operational frameworks contributed to planning–implementation mismatches, particularly in budgeting and reporting. Previous research has highlighted that effective governance models, characterized by clear roles, intersectoral coordination, and local resource mobilization, are critical for scaling and sustaining nutritional interventions (Choudhury et al., 2020; Renzaho et al., 2022). Strengthening these governance dimensions may enhance the resilience and effectiveness of supplementary feeding programs in geographically diverse and resource-constrained settings.

Overall, this discussion situates the study's findings within the broader literature on the implementation of supplementary feeding and nutrition programs. The results suggest that this study contributes to the literature by providing implementation-level evidence on how program governance, resources, and delivery systems shape supplementary feeding performance in resource-constrained settings.

This study had several limitations. First, outcome measures were based on routine monitoring data and caregiver reports, without standardized anthropometric measurements. Second, the cross-sectional design limited the causal interpretation. Third, variations in data recording across sites may have influenced data consistency.

Conclusion

This study provides an implementation-focused evaluation of a local food-based supplementary feeding program in West Sulawesi. The findings indicated short-term improvements in child body weight and positive caregiver perceptions, based on routine monitoring data and self-reports. However, these outcomes do not imply effects on stunting reduction. Program implementation was constrained by limited human resources, delayed fund disbursement, inconsistent monitoring systems, and variability across health facilities.

Strengthening locally adapted operational guidelines, improving health workforce capacity, ensuring timely financing, and integrating supplementary feeding with nutrition education and routine growth monitoring are essential to enhance the implementation quality and support more sustainable child nutrition interventions.

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