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Empowering *Posyandu* Cadres: The Effectiveness of Local Food-Based Complementary Feeding Training for Stunting Reduction in Kendari City

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Abstract

Stunting remains a critical public health priority in Indonesia. While *Posyandu* cadres generally possess baseline knowledge of standard complementary feeding (MP-ASI), their specific capacity to formulate and process locally sourced foods often requires enhancement to provide sustainable, community-based nutritional solutions. This study aimed to evaluate the effectiveness of local food-based MP-ASI training on improving the specific knowledge and practical skills of *Posyandu* cadres in the Mata Community Health Center working area, Kendari City, Southeast Sulawesi. A pre-experimental study with a one-group pretest-posttest design was conducted. Thirty active cadres were selected using a purposive sampling technique. The intervention comprised a 3-day continuous training program combining interactive theoretical sessions and hands-on cooking demonstrations. Data were collected using validated questionnaires and observation checklists. Bivariate analysis was performed using the Wilcoxon Signed-Rank Test ($\alpha = 0.05$). The intervention drove a significant transition in the cadres' capacity regarding local ingredients. The mean knowledge score specifically on local food-based MP-ASI significantly increased from 75.60 to 92.47 (Z = -4.000, $p < 0.001$). Correspondingly, the cadres' practical skill scores surged from 72.33 to 94.00 (Z = -5.477, $p < 0.001$), with the proportion of skilled cadres shifting dramatically from 23.3% to 100% post-intervention. Local food-based MP-ASI training effectively bridges the gap in cadres' specific nutritional knowledge and practical skills. Empowering cadres through targeted, hands-on capacity building is a highly recommended, sustainable strategy to accelerate stunting reduction at the primary healthcare level.

Keywords: Stunting; Complementary Feeding; Local Food; *Posyandu* Cadres; Health Education.

INTRODUCTION

Stunting is a chronic nutritional problem that remains a top priority in national health development. Clinically defined as a growth faltering condition where a child's length or height-for-age falls below minus two standard deviations (<-2 SD) of the WHO Child Growth Standards, stunting is the manifestation of prolonged malnutrition, particularly during the first 1,000 days of life (World Health Organization, 2025). The impact of stunting extends beyond linear growth faltering, it significantly impairs brain development and cognitive capacity (Soliman et al., 2021). In the long term, it increases the risk of degenerative diseases and diminishes national economic productivity, with the World Bank estimating a 2-3% annual loss in a country's Gross Domestic Product (GDP) due to human capital deficits (Akseer et al., 2022; De Sanctis et al., 2021).

Globally, Indonesia bears one of the highest burdens of stunting, ranking third in the WHO South-East Asia Region (SEAR) (Alfaqeeh et al., 2026). However, the Indonesian Nutritional Status Survey (SSGI) reported a consistent downward trend from 27.7% in 2019 to a historic low of 19.8% in 2024 and this is falling below the WHO's 20% threshold (Kementerian Kesehatan, 2024). Despite this milestone, the prevalence remains above the National Medium-Term Development Plan (RPJMN) 2025-2029 target of 14.2%, necessitating massive and sustainable acceleration efforts.

At the provincial level, Southeast Sulawesi continues to face a severe stunting challenge. It ranks among the top 10 provinces with the highest prevalence nationally, remaining significantly above the 19.8% national average despite a decline in recent years (Kementerian Kesehatan, 2024). In Kendari City, the highest stunting burden in 2024 was recorded in the Mata Community Health Center (Puskesmas Mata) working area, with 122 absolute cases and a prevalence of 9.06% (Ningrum et al., 2025). Although data from 2025 indicates a reduction to 5.4%, Puskesmas Mata remains the area with the highest absolute number of cases in the city. In the previous study, this high prevalence is due to associated

with inadequate community knowledge regarding appropriate complementary feeding (MP-ASI) practices, limited access to nutritious foods, and the suboptimal role of *Posyandu* (Integrated Healthcare Center) cadres in delivering nutritional education (Titaley et al., 2026).

Based on the UNICEF (2020) conceptual framework, inadequate dietary intake particularly during the golden period of 6 to 24 months is an immediate cause of stunting. During this phase, breast milk alone is insufficient to meet the surging nutritional demands (United Nations Children's Fund, 2021). The utilization of local foods for MP-ASI is a highly relevant and sustainable strategy to bridge this gap. Southeast Sulawesi boasts abundant, affordable, and nutrient-dense local food sources, including fresh marine fish (kembung, anchovies, skipjack tuna), legumes (mung beans, red beans), local vegetables (pumpkin, spinach, water spinach), and tubers (sweet potato, cassava). These ingredients provide essential macronutrients and micronutrients, such as protein, iron, zinc, vitamin A, and folic acid, which are critical for optimal child growth (Octavia et al., 2025).

In community-based stunting mitigation, *Posyandu* cadres serve as the frontline of primary healthcare. They play a strategic role in early detection, growth monitoring, and maternal nutrition education. Previous studies have demonstrated the efficacy of structured training in enhancing cadres' capacities, for instance, Indrayani et al. (2026) reported that education and training as factors that may increase the *Posyandu* cadres performance. However, to date, no such community-tailored intervention has been conducted in the Puskesmas Mata working area. Given its stunting prevalence and specific sociocultural context, this study presents a strong novelty in developing a contextual, community-based intervention model. Therefore, this study aimed to analyze the effectiveness of local food-based MP-ASI preparation training in improving the knowledge and practical skills of *Posyandu* cadres as an effort to accelerate stunting reduction in the Mata Community Health Center working area, Kendari City, Southeast Sulawesi.

MATERIALS AND METHODS

Study design and setting

This study employed a pre-experimental design with a one-group pretest-posttest approach ($O_1 \rightarrow X \rightarrow O_2$) to evaluate the effect of a training intervention on the knowledge and skills of *Posyandu* cadres. The research was conducted in the working area of the Mata Community Health Center (*Puskesmas* Mata), Kendari City, Southeast Sulawesi.

Population and sample

The study population consisted of all 55 *Posyandu* cadres spread across 11 *Posyandu* units within the Puskesmas Mata working area. A total of 30 cadres were selected as the sample using a purposive sampling technique based on criteria established by the Puskesmas nutritionists.

a. Inclusion Criteria: Active cadres, willing to participate by signing informed consent forms, and committed to attending the entire training program.
b. Exclusion Criteria: Cadres who were sick, unable to attend the training, or resigned during the study period.

Variables and instruments

The independent variable in this study was the local food-based MP-ASI preparation training, while the dependent variables were the cadres' knowledge and skill levels. Two main instruments were utilized for data collection. Knowledge questionnaire with 15 items multiple-choice questionnaire that had been tested for validity and reliability. It covered topics such as the definition of stunting, local food-based MP-ASI, nutritional requirements, appropriate texture and feeding frequency by age, and the utilization of local ingredients. Observation checklist with 10 indicators checklist assessing practical MP-ASI preparation skills. Indicators included hygiene and sanitation, ingredient selection and preparation, adherence to recipes, utilization of animal-based protein sources, adaptation of portion and texture for specific age groups, and nutrient identification. Scoring was binary, yes (1) and no (0).

Intervention procedure

The intervention was structured over three consecutive days, preceded by a preparation phase involving coordination with *Puskesmas* Mata regarding the schedule, venue, and preparation of research instruments (questionnaires, observation checklists, training modules, and recipe posters). On day 1, the program commenced with an explanation of the study objectives and the signing of informed consent forms. This was followed by the pretest assessing both knowledge and skills. Subsequently, cadres received theoretical education and hands-on practice in preparing local food-based MP-ASI for infants aged 6–8 months. On the day 2, the researcher delivered materials on MP-ASI for infants aged 9–11 months, followed by live demonstrations and direct practical sessions with the cadres based on the developed recipes. The researcher provided active mentoring and guidance throughout the process. Day 3, materials focused on MP-ASI for children aged 12–23 months. Following the theoretical and practical sessions, the posttest (knowledge questionnaire and skill observation checklist) was administered to evaluate the intervention's overall impact.

Data analysis

Univariate analysis was conducted to present data in frequency distribution tables and narrative forms. Bivariate analysis was performed to evaluate the

differences between pretest and posttest scores. Data normality was first tested using the Shapiro-Wilk test. If the data were normally distributed, a Paired t-Test was used; if not, the Wilcoxon Signed-Rank Test was applied. Statistical significance was set at $\alpha = 0.05$ ($p < 0.05$).

RESULTS AND DISCUSSION

The study included 30 active *Posyandu* cadres, all of whom were female (100%). As detailed in Table 1, the majority of the respondents were aged between 40-54 years (50%), indicating a mature demographic with potentially extensive experience in the community. In terms of educational background, most cadres had completed senior high school (66.7%). The predominant occupation was housewife (93.3%), allowing them more time to engage in community health volunteering.

Table 1. Characteristics of Repondents.

Characteristics	n	%
Gender		
Female	30	100
Age (Years)		
25–39	6	20
40–54	15	50
55–71	9	30
Education Level		
Junior High School	7	23.3
Senior High School	20	66.7
Bachelor's Degree	3	10
Occupation		
Housewife	28	93.3
Government Employee (P3K)	1	3.3
Private Sector	1	3.3
Total	30	100

The analysis revealed a substantial improvement in the cadres' knowledge regarding local food-based MP-ASI following the intervention. Before the training (pretest), more than half of the respondents (53.3%) were categorized as having poor knowledge. However, after the training (posttest), 100% of the respondents achieved a good knowledge level. The mean knowledge score significantly increased by 16.87 points, from 75.60 to 92.47 (Table 2). Because the data did not meet the assumption of normality, a Wilcoxon Signed-Rank Test was performed. The results (Table 3) showed 16 positive ranks and 14 ties, with a Z-score of -4.000 and a p-value < 0.001, indicating that the training had a statistically significant positive effect on the cadres' knowledge. Similarly, the practical skills of the cadres showed remarkable improvement after the hands-on demonstration and practice sessions. During the pretest, the majority of the cadres (76.7%) were categorized as unskilled in preparing local food-based MP-ASI. Post-intervention, all cadres (100%) successfully shifted to the skilled category. The mean skill score increased by 21.67 points, rising from 72.33 in the pretest to 94.00 in the posttest (Table 2). The Wilcoxon Signed-Rank Test for the skill variable yielded 30 positive ranks with no negative ranks or ties. The statistical analysis resulted in a Z-score of -5.477 and a p-value < 0.001 (Table 3), confirming that the intervention significantly improved the practical skills of the *Posyandu* cadres.

Table 2. Distribution of Knowledge and Skills Categories Before and After Training.

Variable / Category	Pretest		Posttest		Mean Score	Mean Score Change
	n	%	n	%		
Knowledge						
Poor	16	53.3	0	0	Pretest: 75.60	+ 16.87
Good	14	46.7	30	100	Posttest: 92.47	
Skills						
Unskilled	23	76.7	0	0	Pretest: 72.33	+ 21.67
Skilled	7	23.3	30	100	Posttest: 94.00	

Table 3 presents the results of the bivariate analysis using the Wilcoxon Signed-Rank Test to determine the statistical significance of the training intervention. For the knowledge variable, there were 0 negative ranks, indicating that no cadre experienced a decrease in their knowledge score post-intervention. There were 16

positive ranks, meaning 16 cadres showed an increased knowledge score, and 14 ties, indicating that 14 cadres maintained their score. This resulted in a Z-score of -4.000 and a p-value of < 0.001. Regarding the practical skills, the results demonstrated 30 positive ranks with 0 negative ranks and 0 ties. This indicates that all 30 participating cadres experienced an absolute increase in their skill scores after the training. The analysis yielded a Z-score of -5.477 and a p-value of < 0.001. Because the p-values for both variables are well below the 0.05 significance level, it is statistically concluded that the local food-based MP-ASI training had a highly significant positive effect on improving both the knowledge and practical skills of the *Posyandu* cadres."

Table 3. Bivariate Analysis of Training Effect on Knowledge and Skills (Wilcoxon Signed-Rank Test).

Variable	Negative Ranks	Positive Ranks	Ties	Z	p-value
Knowledge Level	0	16	14	-4	< 0.001
Skill Level	0	30	0	-5.477	< 0.001

Discussion

The present study demonstrates that structured, local food-based MP-ASI training significantly enhances both theoretical knowledge and practical skills of *Posyandu* cadres. These findings are highly relevant for community-based interventions aimed at accelerating stunting reduction in areas with high prevalence, such as the Mata Community Health Center (*Puskesmas* Mata) working area.

Prior to the intervention, more than half of the cadres (53.3%) possessed poor knowledge regarding stunting and complementary feeding. This baseline condition can be attributed to the demographic characteristics of the respondents, where the majority had only junior or senior high school education and were in mature age brackets. Educational background profoundly influences an individual's ability to receive and comprehend new health information, while advancing age is often accompanied by a gradual decline in memory retention and the speed of processing new concepts (Caeiros et al., 2024). However, following the training, 100% of the respondents reached a good knowledge category, with the Wilcoxon test confirming a highly significant statistical improvement. This substantial improvement occurred because the training module was specifically tailored to their community needs. By combining interactive lectures, open discussions, and direct practice, the information was more easily absorbed (National Academies of Sciences et al., 2018). This combination of method not to increase knowledge alone, but also the attitude and skills towards maternal knowledge and children's nutritional status (Koro et al., 2024; Prasetyo et al., 2023).

The most prominent transformation was observed in the cadres' practical skills. Initially, 76.7% of the cadres were categorized as unskilled. Field observations revealed that many cadres lacked hands-on experience and failed to implement basic food hygiene and sanitation principles such as omitting handwashing or not washing raw ingredients before preparation. Furthermore, they did not weigh ingredients according to recipe measurements and lacked a systematic approach to cooking.

Post-intervention, the skill level surged to 100% in the skilled category ($p < 0.001$), with all 30 respondents showing positive ranks. This definitive success emphasizes that theoretical education alone is insufficient for behavioral change. The direct mentoring provided by researchers during the cooking practice, coupled with the provision of visual aids such as recipe posters, allowed cadres to systematically experience the process of selecting local ingredients, adjusting textures for specific infant age groups, and applying proper sanitation (Farmer & Hingst, 2025). According to Elendu et al. (2024), training methods that integrate theory with direct practice are highly effective because participants do not merely memorize concepts but actively apply them in real-world scenarios. This aligns with findings from Astuti et al. (2023) regarding "Fish-Kuit" MP-ASI training and Ambarwati et al. (2025), which affirmed that hands-on local food training empowers cadres in stunting prevention efforts.

Empowering *Posyandu* cadres through this training model directly supports the acceleration of stunting reduction targets. Cadres equipped with correct knowledge and practical skills can serve as credible "agents of change," confidently demonstrating affordable, local food-based MP-ASI preparation to mothers in their neighborhoods. Systematizing this community-level capacity building is a strategic step for primary healthcare institutions (*Puskesmas*) to ensure institutional accountability in meeting the Ministry of Health's Strategic Plan indicators and achieving the broader global targets of the Sustainable Development Goals (SDG 2 and SDG 3).

CONCLUSIONS

The local food-based MP-ASI training proved to be highly effective, exerting a significant positive influence on both the knowledge ($p < 0.001$) and practical skills ($p < 0.001$) of *Posyandu* cadres in the Mata Community

Health Center working area, Kendari City. While cadres generally possess a baseline understanding of standard complementary feeding, this intervention successfully drove a specific transition of knowledge on local food-based MP-ASI and its practical application. The significant shift of cadres from the poor knowledge and unskilled categories regarding the use of local ingredients to universally good knowledge and skilled categories highlight the efficacy of combining interactive theoretical sessions with guided, hands-on cooking practices. This specific capacity-building model is recommended to be integrated into routine *Puskesmas* programs as a sustainable, community-driven strategy to accelerate stunting reduction.

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Authors' Contributions: I Made Rai Sudarsono: Conceived and designed the study, conducted the field investigation, and wrote the original draft of the manuscript. Imanuddin: Contributed to the methodology, performed the statistical data analysis, and curated the data. Rasmaniar: Coordinated the field investigation, managed project administration, and assisted in drafting the manuscript. Ade Tri Anugra: Supervised the research process, validated the analytical methods, and critically reviewed and edited the final manuscript. All authors have read and approved the final manuscript for publication.

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