Improving Maternal Knowledge and Practical Skills Through Local Food-Based Supplementary Feeding Education for Stunting Prevention in Rural Indonesia

Mohammed Assoumani[1], Etna Iyana Hamriya[2], Nisrina Shafa Amalia[3]
*Iyanaetna04@gmail.com[1]
*University of Comoros, Mvouni, Comoros[1], Universitas Muhammadiyah Gresik[2,3]

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A B S T R A CT

Background: Stunting remains a major public health challenge in low- and middle-income countries, including Indonesia. Inadequate nutritional knowledge among caregivers and the underutilization of locally available food resources contribute significantly to the persistence of childhood stunting, particularly in rural communities. Community-based interventions that integrate nutrition education and local food utilization may offer sustainable approaches to strengthen household nutrition practices and support stunting prevention efforts.
Objective: This study aimed to evaluate the implementation and outcomes of a community-based nutrition education and local food-based supplementary feeding training program in improving knowledge and practical skills related to stunting prevention among mothers of children under five years of age and community health volunteers.
Methods: A community-based participatory intervention study with a pre-post evaluation design was conducted in Pulorejo Village, Dawarblandong District, Mojokerto Regency, East Java, Indonesia. Participants consisted of mothers of children under five years of age and *posyandu* cadres selected through purposive sampling. The intervention comprised nutrition education on stunting and balanced nutrition, followed by practical training in preparing corn-based supplementary food. Data were collected using structured questionnaires, observation checklists, field observations, and informal interviews. Quantitative data were analyzed descriptively by comparing pre- and post-intervention results, while qualitative data were analyzed thematically.
Results: The intervention resulted in improved participant knowledge regarding stunting, balanced nutrition, and the importance of utilizing local food resources for supplementary feeding. Participants also demonstrated enhanced practical skills in preparing corn-based supplementary food, including ingredient selection, hygienic food processing, and independent preparation of corn pudding. Furthermore, participants expressed positive perceptions toward the use of corn as an affordable, accessible, and culturally acceptable supplementary food ingredient. The findings indicate that combining nutrition education with hands-on training can effectively strengthen community capacity for stunting prevention and promote sustainable utilization of local food resources.
Conclusion: Community-based nutrition education integrated with practical training on local food-based supplementary feeding is a promising strategy for improving caregiver knowledge and practical competencies related to child nutrition and stunting prevention. The utilization of locally available food resources may provide a sustainable and culturally appropriate approach to support household nutrition practices and contribute to ongoing efforts to reduce childhood stunting in rural communities.

INTRODUCTION

Stunting remains one of the most critical public health challenges worldwide, particularly in low- and middle-income countries. It is defined as impaired linear growth resulting from chronic undernutrition and recurrent infections during the first 1,000 days of life, a period that is essential

for physical and cognitive development (de Onis & Branca, 2016; Prendergast & Humphrey, 2014). Children who experience stunting are more likely to suffer from delayed cognitive function, poor educational attainment, reduced productivity in adulthood, and an increased risk of non-communicable diseases later in life (Victora et al., 2008; Dewey & Begum, 2011; Black et al., 2013). Consequently, stunting is not merely an anthropometric issue but a multidimensional problem that affects human capital development and long-term socioeconomic progress (Hoddinott et al., 2013; Leroy & Frongillo, 2019).

Indonesia continues to face a substantial burden of childhood stunting despite significant progress in recent years. National and regional evidence shows that stunting remains prevalent, particularly in rural communities, and is strongly associated with inadequate dietary intake, poor maternal nutrition knowledge, limited access to health services, and suboptimal infant and young child feeding practices (Beal et al., 2018; Danaei et al., 2016). The persistence of stunting in these areas reflects the complex interaction of biological, behavioral, and structural determinants. Therefore, community-based interventions that focus on preventive and promotive strategies are essential to accelerate stunting reduction (Ruel & Alderman, 2013; Bhutta et al., 2013).

One of the promising approaches to preventing stunting is the utilization of locally available food resources as supplementary feeding for children under five years of age. Local foods such as corn, legumes, tubers, and vegetables are widely available in many Indonesian villages and contain essential nutrients that can support child growth when appropriately processed and combined with protein-rich ingredients (Stewart et al., 2013; Ahmed et al., 2012). The use of local food resources offers several advantages, including affordability, sustainability, cultural acceptability, and reduced dependence on commercial supplementary foods. Moreover, promoting local food utilization aligns with the concept of community empowerment and food security by encouraging households to maximize locally available nutritional resources (Ruel & Alderman, 2013; Pérez-Escamilla et al., 2018).

Previous studies have demonstrated that maternal nutritional knowledge significantly influences children's dietary quality and nutritional status. Community-based nutrition education and practical food-processing training have been shown to improve caregivers' understanding and skills in preparing nutritious complementary and supplementary foods (Bhutta et al., 2013; Black et al., 2017). Furthermore, interventions based on local food ingredients have been associated with improved dietary diversity and increased community participation in nutrition programs (Likhar & Patil, 2022). Recent studies in Indonesia also suggest that education models and local food-based interventions can improve maternal feeding behavior, self-efficacy, knowledge, attitudes, and practices related to stunting prevention (Mahisa et al., 2024; Sari et al., 2025; Evawaty et al., 2025; Manoppo & Padaunan, 2025; Rachmah et al., 2025). Nevertheless, most previous studies have primarily focused either on the nutritional composition of specific food products or on large-scale stunting intervention programs, with limited attention given to integrating nutrition education and hands-on supplementary feeding preparation at the village level.

Pulorejo Village, Dawarblandong District, Mojokerto Regency, remains one of the rural areas where the risk of stunting persists, partly due to the limited utilization of local food resources for supplementary feeding practices. Although corn is abundantly available in the area and possesses considerable nutritional potential, its use as a nutritious supplementary food for toddlers remains minimal because of insufficient knowledge and practical skills among caregivers regarding its preparation and processing.

Therefore, this study introduces an integrated community-based intervention that combines stunting education with practical training on preparing corn-based supplementary food using

locally available ingredients. The novelty of this study lies in its emphasis on empowering mothers of young children and community health volunteers through participatory nutrition education and practical food preparation activities tailored to local resources and sociocultural contexts. This approach is expected to enhance community knowledge and skills in utilizing local food resources for child nutrition improvement (Sari et al., 2025; Evawaty et al., 2025; Manoppo & Padaunan, 2025).

Accordingly, the present study aimed to analyze the implementation and outcomes of a local food-based supplementary feeding education and training program in improving community knowledge and practical skills related to stunting prevention in Pulorejo Village, Dawarblandong District, Mojokerto Regency, Indonesia.

METHODS

STUDY DESIGN AND SETTING

This study employed a community-based participatory intervention study with a pre-post evaluation design to assess the effectiveness of a local food-based supplementary feeding education and training program for stunting prevention. The intervention was conducted on 9 February 2026 in Pulorejo Village, Dawarblandong District, Mojokerto Regency, East Java, Indonesia. The village was selected because it remains vulnerable to childhood stunting and has considerable potential for the utilization of locally available food resources, particularly corn, as ingredients for supplementary feeding.

PARTICIPANTS

The participants consisted of mothers of children under five years of age and community health volunteers (*posyandu* cadres) residing in Pulorejo Village. Participants were recruited through coordination with village authorities and local health cadres using purposive sampling. Eligibility criteria included: (1) being a mother or primary caregiver of a child under five years old or an active *posyandu* cadre, (2) residing in the study area, and (3) being willing to participate in all stages of the intervention and evaluation. All participants provided informed consent prior to participation.

INTERVENTION PROCEDURES

The intervention was implemented in four sequential stages.

Preliminary Assessment

An initial assessment was conducted through field observations and informal discussions with community health volunteers to identify local nutritional problems, feeding practices, and the availability and utilization of local food resources. Information regarding child feeding habits and community perceptions of stunting was also collected to inform the design and delivery of the intervention.

Pre-Intervention Assessment

Before the educational session and practical training, participants completed a pre-intervention assessment to measure baseline knowledge regarding stunting, balanced nutrition, and the use of local food resources for supplementary feeding. In addition, baseline practical skills related to food preparation and hygienic processing were observed using a structured checklist.

Nutrition Education

Participants attended an educational session on stunting and balanced nutrition. The educational materials covered the definition and causes of stunting, its short- and long-term consequences, the importance of nutrition during the first 1,000 days of life, and the principles of balanced diets for

young children. The sessions were delivered through interactive lectures and group discussions to encourage active participant engagement and knowledge exchange.

Practical Training on Local Food-Based Supplementary Feeding

Following the educational session, participants received hands-on training in preparing corn-based supplementary food in the form of corn pudding. Corn was selected because it is readily available in the community and has the potential to serve as an affordable and culturally acceptable food source. During the practical session, participants were introduced to ingredient selection, food preparation techniques, hygienic processing methods, and strategies to improve the nutritional quality of supplementary foods by incorporating additional protein sources.

Post-Intervention Assessment

After the education and training sessions, participants completed a post-intervention assessment using the same knowledge questionnaire administered at baseline. Their practical skills in preparing corn-based supplementary food were also reassessed through direct observation. The post-intervention evaluation aimed to identify changes in participants' knowledge, understanding, and practical abilities following the intervention.

DATA COLLECTION

Data were collected using a combination of structured questionnaires, observation checklists, field observations, informal interviews, and documentation of intervention activities. The questionnaire was used to assess participants' knowledge of stunting, balanced nutrition, and local food-based supplementary feeding before and after the intervention. The observation checklist was used to evaluate participants' practical skills in preparing supplementary food, including ingredient selection, hygiene practices, processing techniques, and final product presentation. Observational notes were also used to record participant responses, engagement, and behavioral changes during the sessions.

DATA ANALYSIS

The collected data were analyzed using descriptive and comparative approaches. Quantitative data from the pre- and post-intervention assessments were summarized using frequencies and percentages, and changes in knowledge and practical skills were described by comparing baseline and post-intervention results. Qualitative information obtained from observations, discussions, and participant feedback was organized into thematic categories, including knowledge of stunting, perceptions of local food utilization, and practical skills in preparing supplementary foods. The findings were then interpreted to evaluate the effectiveness of the intervention in strengthening community capacity for stunting prevention.

ETHICAL CONSIDERATIONS

This study adhered to the ethical principles of voluntary participation, confidentiality, and respect for participants' autonomy. Participants were informed about the objectives and procedures of the study before data collection commenced, and all information obtained during the study was used solely for research purposes and reported anonymously.

RESULT AND DISCUSSION

PARTICIPANT CHARACTERISTICS

A total of n = 97 participants attended the intervention program, consisting of 45 women (46.4%) and 52 men (53.6%)**.** The participants included caregivers of children under five years of age and community health volunteers (*posyandu* cadres). Most participants were aged between XX–XX

years and had completed elementary/secondary education**.** The majority of participants had previously received information about child nutrition through community health services; however, only a limited proportion had participated in practical training on local food-based supplementary feeding.

The demographic characteristics indicate that the intervention targeted a population group that plays a central role in child feeding practices and household nutritional decision-making. Maternal education, access to nutrition information, and household caregiving roles are consistently associated with child nutritional outcomes and the success of nutrition interventions (Black et al., 2013; Beal et al., 2018; Danaei et al., 2016). In addition, the first 1,000 days of life remain a critical window for growth and development, making caregiver-focused interventions particularly important for stunting prevention (Victora et al., 2008; Grantham-McGregor et al., 2007)..

Table 1. Characteristics of the Participants

Characteristics	n	%
Age (years)		
<25	11	10.2
25–35	37	34.3
>35	60	55.6
Educational level		
Primary school		
Secondary school		
Higher education	17	40.5
Occupation	12	21.8
Housewife	23	41.8
Others	20	36.4

CHANGES IN KNOWLEDGE REGARDING STUNTING AND NUTRITION

The results demonstrated an improvement in participants' knowledge following the educational intervention. As presented in the table, the mean knowledge score increased after the intervention, indicating a positive change in participants' understanding of stunting, balanced nutrition, and the use of local food resources

Table 2. Pre- and Post-Intervention Knowledge Scores

Variable	Pre-test Mean ± SD	Post-test Mean ± SD	Percentage Change
Knowledge score	57	78	36.8

The increase in knowledge scores suggests that nutrition education effectively improved participants' understanding of stunting, balanced nutrition, and the importance of local food utilization. This finding is consistent with previous studies showing that community-based nutrition education can significantly improve maternal knowledge, awareness, and feeding-related decision-making (Bhutta et al., 2013; Ruel & Alderman, 2013). Similar findings have also been reported in recent local studies, where education models based on local food ingredients improved

maternal feeding behavior and self-efficacy in preventing stunting (Sari et al., 2025; Evawaty et al., 2025)..

Improved maternal knowledge is considered a critical determinant of better nutritional behavior because caregivers with adequate nutritional literacy are more likely to adopt appropriate feeding practices and seek preventive measures against childhood malnutrition (Dewey & Begum, 2011; Stewart et al., 2013). The findings of the present study therefore reinforce the importance of educational interventions as an integral component of community-based stunting prevention programs (Black et al., 2013; Likhar & Patil, 2022).

IMPROVEMENT IN PRACTICAL SKILLS FOR PREPARING LOCAL FOOD-BASED SUPPLEMENTARY FEEDING

Direct observations conducted after the intervention showed a substantial improvement in participants' practical abilities to prepare corn-based supplementary food. Most participants were able to correctly identify ingredients, apply hygienic food-processing techniques, and prepare corn pudding independently.

The practical component of the intervention appeared to facilitate experiential learning, enabling participants to translate theoretical knowledge into actual food preparation practices. This finding supports the principles of participatory nutrition education, which emphasize the integration of knowledge acquisition and skill development (Stewart et al., 2013). Previous studies have demonstrated that hands-on nutrition training produces greater behavioral changes than conventional lecture-based education alone because participants are actively engaged in problem-solving and practical application of knowledge (Manoppo & Padaunan, 2025; Evawaty et al., 2025).

Consequently, the integration of educational sessions with practical training may enhance the sustainability and effectiveness of community nutrition programs. In the context of stunting prevention, practical food preparation skills are especially important because they enable caregivers to apply nutrition knowledge directly within the household setting and improve the quality of complementary feeding during early childhood (Victora et al., 2008; Black et al., 2017).

COMMUNITY ACCEPTANCE OF CORN-BASED SUPPLEMENTARY FEEDING

Participants expressed positive perceptions toward the use of corn as a supplementary food ingredient. Corn was considered affordable, easily accessible, culturally acceptable, and suitable for incorporation into daily feeding practices for children under five years of age.

The favorable acceptance of corn-based supplementary food highlights the importance of utilizing locally available food resources in addressing nutritional problems. Local food-based interventions have several advantages, including lower production costs, greater sustainability, and increased community ownership of nutrition programs (Pérez-Escamilla et al., 2018; Hoddinott et al., 2013). Recent studies in Indonesia also reported that supplementary feeding made from local foods was associated with improved maternal practices and better nutritional outcomes among toddlers (Mahisa et al., 2024; Rachmah et al., 2025).

Furthermore, promoting local food resources aligns with the broader concept of food sovereignty and community empowerment. The use of locally available foods may reduce dependency on commercially manufactured supplementary foods and contribute to the development of sustainable food systems in rural communities (Ruel & Alderman, 2013; UNICEF, 2024). This approach is

particularly relevant in settings where access to commercial products is limited or where household food security depends heavily on locally produced ingredients.

IMPLICATIONS FOR STUNTING PREVENTION

The findings of this study suggest that a community-based intervention integrating nutrition education with practical training on local food-based supplementary feeding can improve participants' knowledge and practical skills related to child nutrition. Enhanced caregiver capacity may contribute to improved household feeding practices and potentially reduce the risk of undernutrition and stunting among children (de Onis & Branca, 2016; UNICEF, WHO, & World Bank Group, 2025).

The intervention also demonstrated that locally available food resources can be effectively utilized as part of community nutrition strategies. The approach is relatively low-cost, culturally appropriate, and feasible for implementation in rural settings where access to commercial nutritional products may be limited. These characteristics are consistent with the broader evidence that nutrition-sensitive and community-driven interventions are essential for accelerating progress in maternal and child nutrition (Bhutta et al., 2013; Ruel & Alderman, 2013; Hoddinott et al., 2013).

Nevertheless, this study has several limitations. The intervention was conducted in a single village with a relatively small number of participants and employed a short-term evaluation design. Therefore, the study could not determine the long-term effects of the intervention on children's nutritional status or stunting prevalence. Future studies should employ larger sample sizes, longer follow-up periods, and more rigorous experimental designs to evaluate the effectiveness of local food-based interventions on child growth outcomes (Prendergast & Humphrey, 2014; Black et al., 2017). In addition, future research should assess whether improvements in caregiver knowledge and skills translate into measurable changes in child anthropometric indicators over time.

CONCLUSION

The present study demonstrated that a community-based intervention integrating nutrition education and practical training on local food-based supplementary feeding effectively improved participants' knowledge and practical skills related to stunting prevention. Following the intervention, mothers of children under five years of age and community health volunteers showed better understanding of the causes and consequences of stunting, the importance of balanced nutrition during the first 1,000 days of life, and the potential use of locally available food resources for child nutrition improvement.

The practical training on preparing corn-based supplementary food also enhanced participants' ability to process locally available ingredients into nutritious and culturally acceptable supplementary foods. The positive acceptance of corn-based products indicates that local food resources can serve as sustainable and affordable alternatives for community nutrition interventions, particularly in rural settings with limited access to commercial nutritional products.

These findings highlight the importance of combining nutrition education with participatory, hands-on learning approaches to strengthen community capacity for stunting prevention. The study further demonstrates that empowering caregivers through local food utilization may contribute to the development of more sustainable, community-driven nutrition strategies.

Nevertheless, this study was limited by its relatively small sample size, single-study setting, and short-term evaluation period, which did not permit assessment of the intervention's long-term effects on child nutritional status and stunting prevalence. Future studies should employ larger

samples, longer follow-up periods, and more rigorous experimental designs to evaluate the impact of local food-based supplementary feeding interventions on child growth and nutritional outcomes. In conclusion, community-based nutrition education combined with practical training in the utilization of local food resources represents a promising strategy for strengthening household nutritional practices and supporting national efforts to reduce childhood stunting in Indonesia and other low- and middle-income settings.

Practical Implications: The findings suggest that integrating local food-based supplementary feeding programs into community health services (*posyandu*) may provide a cost-effective and sustainable approach to improving child nutrition and accelerating stunting reduction efforts in rural communities.

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