

## Implementation of Nutrition Education and High-Calcium Supplementary Feeding Demonstration in Stunting Prevention: Knowledge Level and Satisfaction of Mothers with Toddlers

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### ABSTRACT

Stunting is a critical global health issue, with Indonesia experiencing high prevalence rates, particularly in regions like West Kalimantan, where the rate reached 26.6% in 2018. Despite some progress in reducing stunting rates, urgent interventions are necessary, particularly through government initiatives focused on improving nutritional status among pregnant women and young children, as well as comprehensive nutritional education programs to raise awareness and promote healthier dietary practices. The purpose of this community service activity is to enhance the knowledge of mothers with toddlers and improve their dietary intake, particularly focusing on foods rich in calcium to support the physical growth of children. The study utilized a quantitative approach with a quasi-experimental design, specifically a pretest-posttest format without a control group, to assess the impact of educational interventions on mothers' knowledge of stunting and calcium-rich foods. Participants included 25 mothers of toddlers from Posyandu Berdikari, who were engaged through interactive lectures and cooking demonstrations over two months. Knowledge was measured using pretest and posttest questionnaires, while satisfaction with food products was evaluated through a 5-point Likert scale. Data analysis included the Wilcoxon Rank Test for knowledge changes and descriptive statistics to assess satisfaction and organoleptic preferences. The community service program resulted in a significant increase in knowledge among 19 out of 25 respondents, with an average improvement of 25 points and statistical significance ( $P = 0.00$ ). Additionally, 80% of participants expressed high satisfaction with the calcium-rich Nugget products, while 96% of mothers felt prepared to practice the PMT recipes at home. This indicates a positive impact on both knowledge and acceptance of nutritional education and products. The nutrition education program significantly improved mothers' knowledge about stunting, leading to high satisfaction with calcium-rich products and readiness to implement PMT recipes at home.

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## INTRODUCTION

Stunting is indeed a significant global health issue, with Indonesia being one of the countries with the highest prevalence rates. According to recent estimates, nearly seven million children under the age of five are affected by stunting globally, which underscores the urgency of addressing this public health issue (Vaivada et al., 2020). In Indonesia, the prevalence of stunting was approximately 19.3% in 2020, reflecting a decline from 42.38% in 2010 (Beal et al., 2018; Hendraswari et al., 2021). This decline indicates progress, yet the rates remain alarmingly high, necessitating continued efforts to combat stunting. In West Kalimantan, the prevalence of stunting is notably higher than the national average, reaching 26.6% in 2018, as documented by the Dinas Kesehatan Kalimantan Barat (Hendraswari et al., 2021). The capital city, Pontianak, reflects similar challenges, indicating an urgent local health crisis that requires targeted interventions (Beal et al., 2018). The data from these regions highlight the need for more intensive and focused strategies to address stunting, particularly in areas where prevalence rates are significantly elevated, such as Pontianak. Government initiatives aimed at combating stunting have increasingly prioritized the enhancement of nutritional status among pregnant women and infants through various supplementary feeding programs. These programs are essential as they directly address the nutritional deficiencies that contribute to stunting, particularly during the critical periods of pregnancy and early childhood. For instance, the provision of iron and folic acid supplements to pregnant women has been shown to significantly improve maternal health outcomes, which subsequently enhances fetal development and reduces the risk of stunting in children (Ambarwati, 2023) (Z, 2014) (Skolmowska et al., 2022). Research indicates that such micronutrient supplementation is crucial in preventing low birth weight, a significant risk factor for stunting (Ambarwati, 2023) (Christy & Simanjuntak, 2023). Moreover, comprehensive nutritional education programs have been implemented to raise awareness among pregnant women regarding the importance of adequate nutrition. These educational interventions have been linked to improved dietary practices and enhanced nutritional knowledge among pregnant women (Muhamad, 2023) (Yanti, 2023). For example, a study demonstrated that nutrition education interventions effectively increased knowledge about stunting prevention behaviors in pregnant women, leading to better health outcomes for both mothers and their infants (Muhamad, 2023) (Yanti, 2023). Such educational efforts are vital, as they empower women to make informed dietary choices that can mitigate the risks associated with malnutrition and stunting (Permatasari et al., 2021). In addition to maternal nutrition, supplementary feeding programs specifically targeting infants and young children have been developed to ensure they receive the necessary nutrients during the transition to complementary foods. This transitional period is critical for growth and development, as inadequate nutrition during this time can lead to stunting (Christy & Simanjuntak, 2023) (Kpewou et al., 2020). Research has shown that interventions providing ready-to-use supplementary foods to mothers can significantly improve the nutritional status of both mothers and their infants, thereby addressing the intergenerational cycle of malnutrition (Kpewou et al., 2020). These initiatives underscore the importance of a holistic approach to nutrition that encompasses both maternal and child health to effectively combat stunting. Research indicates that targeted nutritional interventions, particularly when combined with educational initiatives, can significantly enhance dietary practices among mothers, which is essential for stunting prevention. For instance, a study by Rachmah et al. demonstrates that educational interventions based on the Theory of Planned Behavior can effectively improve knowledge related to complementary feeding, thereby positively impacting dietary choices among mothers (Rachmah et al., 2023). This aligns with findings from Zakiyuddin, who emphasizes the relationship between maternal education and nutritional knowledge, suggesting that higher maternal education correlates with better nutritional practices, which are crucial in mitigating stunting (Zakiyuddin, 2023). Moreover, the provision of dietary supplements rich in essential nutrients has been linked to improvements in growth metrics among stunted children. Research by Nadirawati et al. supports this claim, showing that such interventions can lead to measurable enhancements in the physical development of affected children (Suastini & Sumada, 2022). This is further corroborated by studies highlighting the importance of dietary

diversity and balanced meals during early childhood, which are critical for optimal growth and development (Fauziah et al., 2023). Community empowerment through training programs for health cadres has also proven effective in increasing awareness and knowledge about stunting prevention strategies. Winarningsih and Heryani illustrate how community-based training can foster better nutritional practices among mothers, leading to improved health outcomes for children (Haq et al., 2021; Iqbal et al., 2023). Additionally, the integration of local wisdom into nutrition education programs has been shown to enhance maternal understanding of stunting and its prevention. Astuti's research indicates that culturally relevant practices in education can significantly improve maternal engagement and knowledge retention regarding nutrition (Mutiarasari et al., 2021). Furthermore, the effectiveness of these interventions is often measured by the satisfaction levels of mothers, which can be significantly enhanced through participatory approaches in nutrition education. Chabibah's findings suggest that when mothers are actively involved in the educational process, their satisfaction and understanding of nutritional practices improve markedly (Kurniyawan, 2023). In summary, the implementation of nutrition education and high-calcium supplementary feeding is pivotal in stunting prevention. By enhancing maternal knowledge and providing practical support through community programs, it is possible to improve the nutritional status of toddlers and reduce the prevalence of stunting. These strategies not only address immediate nutritional needs but also foster long-term health outcomes for children.

## METHOD

### *Research Design*

The 2024 community service program was conducted at Posyandu Berdikari, Kelurahan Pal Lima, Pontianak Barat, with the aim of improving the knowledge of community health volunteers (kader), pregnant women, and breastfeeding mothers regarding stunting and the importance of consuming calcium-rich foods. This program was carried out by a team of nutrition lecturers from Poltekkes Kemenkes Pontianak, in collaboration with Puskesmas PAL V and Kelurahan Desa PAL Lima. This study employed a quantitative approach with a quasi-experimental method, specifically a pretest-posttest design without a control group. The primary focus was to evaluate the improvement in mothers' knowledge about stunting and the benefits of calcium consumption after being given education and cooking demonstrations.

### *Research Subjects*

The subjects of this study were 25 mothers of toddlers living in the Posyandu Berdikari PAL Lima area. The inclusion criteria were mothers who were willing to participate in the activities from start to finish and who had children under the age of five.

### *Community Service Procedure*

The community service activities were carried out over two months, from July to August 2024, with the following details:

1. Nutrition and Stunting Education: Conducted through interactive lectures and Q&A sessions. The topics covered included:
  - Calcium-rich food sources
  - Calcium nutritional needs
  - Benefits of calcium consumption
  - Risks of calcium deficiency
  - Tips for calcium absorption and retention in the body
2. Cooking Demonstration: Aimed at introducing calcium-rich fish-based products, such as Fish Nuggets, Anchovy Cookies, and Mackerel Floss. Each product was cooked live in front of the participants, and the recipes were provided and stored at the Posyandu for other community health volunteers' reference.

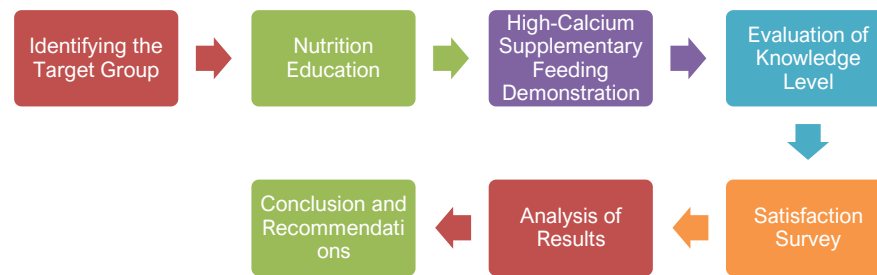


FIGURE 1. Flowchart Community Service Procedure

### Data Collection

- Knowledge Measurement**  
 The knowledge of mothers of toddlers was assessed using pretest and posttest questionnaires administered before and after the educational sessions. The assessment covered understanding of calcium nutrition, stunting, and the impact of calcium consumption on children's health.
- Product Satisfaction Evaluation**  
 Satisfaction was evaluated using a 5-point Likert scale questionnaire to assess the participants' satisfaction with the food products based on organoleptic aspects (taste, texture, aroma, and appearance).

### Data Analysis

The Wilcoxon Rank Test was used to analyze the changes in the knowledge of mothers of toddlers before and after the educational sessions. This test was chosen because the data were not normally distributed. Descriptive analysis was used to evaluate the level of satisfaction of the mothers regarding the demonstrated food products. The data were analyzed using frequency descriptive statistics based on the Likert scale to determine organoleptic preferences for the products..

## RESULT AND DISCUSSION

### Nutrition Education about Stunting

One of the main factors causing stunting is a lack of nutrition and education in mothers. Studies show that maternal education significantly influences children's nutritional outcomes, with higher levels of maternal education correlating with lower levels of stunting in children (Kia et al., 2019; Kragel et al., 2020). Nutrition education has proven to be effective in increasing mothers' knowledge about stunting, as shown by the results in table 1 below:

TABLE 1. Differences in Knowledge of Mothers of Toddlers Before and After being given Nutrition Education about Stunting

	N	Mean Rank	P value
NILAI POST - NILAI PRE	Negative Ranks	0 <sup>a</sup>	0,00*
	Positive Ranks	19 <sup>b</sup>	
	Ties	6 <sup>c</sup>	
	Total	16	
Median Before	62,5		
Median After	87,5		
Different	25,0		

## Wilcoxon Signed Ranks Test

- a. NILAI POST < NILAI PRE
- b. NILAI POST > NILAI PRE
- c. NILAI POST = NILAI PRE

\* = signifikan

Based on the results in Table 1, it can be seen that there were 19 respondents out of 25 who experienced an increase in their knowledge value after being given nutrition education with an increase of 25 points. Apart from that, if we look at the statistical tests, it shows that there is a significant difference in mothers' knowledge after being given nutritional education about stunting ( $P = 0.00$ ). This is in line with several studies, such as research conducted by Segapangamianu (2023) and Rahmad et al. (2022), which shows that the use of booklets in nutrition education can have a significant positive impact on mothers' knowledge and attitudes. In this study, booklets containing well-organized nutritional information were able to provide mothers with more in-depth and easily understood knowledge, which was then translated into real action to meet their children's nutritional needs more optimally (Segapangamianu, 2023) (Rahmad et al., 2022). Research by Mukodri (2023) also strengthens these findings by showing that nutrition education using booklets is effective in increasing mothers' knowledge about preventing stunting, which is one of the most serious nutritional problems among children. With the information presented clearly in the booklet, mothers can better understand the importance of balanced nutrition and how to apply it in daily feeding to their children (Mukodri, 2023).

Another study by Pratiwi & Puspitasari (2017) revealed that the use of booklet media can significantly increase mothers' knowledge about balanced nutrition, especially for mothers who have undernourished toddlers. The quasi-experimental design used in this study showed that after the educational intervention using booklets, there was a significant increase in knowledge in the group of mother respondents. These findings show that booklets are not only effective as a medium for conveying information but are also able to change mothers' attitudes and behaviors in providing better nutrition for their children (Pratiwi & Puspitasari, 2017). In addition, research by Hisanah (2023) shows that the combination of using booklet media with other educational methods, such as educational games, can provide more optimal results in increasing mothers' knowledge and attitudes towards preventing anemia. This indicates that diversifying methods in nutrition education, including the use of booklets, can increase the effectiveness of educational programs and have a broader impact on changing nutritional behavior (Hisanah, 2023).



**FIGURE 2.** Nutrition Education for Mothers of Toddlers and Pregnant Women

Nutrition education using booklet media can increase mothers' knowledge through several mechanisms. First, booklets allow for a systematic and structured presentation of information, which makes it easier for mothers to understand and retain information. As stated by Kragel et al. (2020), information presented in

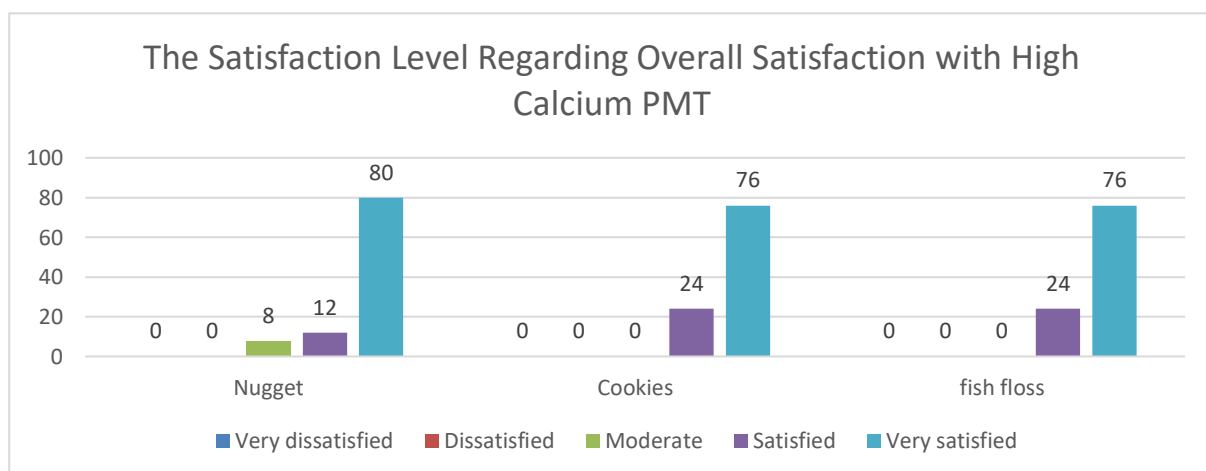
written formats such as booklets provides opportunities for readers to access and repeat information according to their needs, which can strengthen learning and application of this knowledge in everyday life (Kragel et al., 2020). Second, the booklet can be accessed independently by mothers at any time, providing flexibility in learning time and place. This is different from other media, such as lectures or videos, which may require physical presence or special devices. According to Kia et al. (2019), the use of media that is easily accessible and understood by mothers, such as booklets, can increase their involvement in the education process, which ultimately increases the effectiveness of nutrition education programs (Kia et al., 2019).

The advantages of booklet media compared to other educational media lie in its portability, affordability, and ease of access. In addition, booklets allow information to be conveyed in detail with visualizations that can support understanding without requiring sophisticated technology, such as in digital media. Mutmainnah & Musni (2023) emphasize that booklets provide an efficient and effective way to convey important information to audiences who may have limited access to technology or time to attend live educational sessions (Mutmainnah & Musni, 2023). Overall, these results underscore the importance of using booklets as an effective nutrition education tool. By providing information that is structured, accessible at any time, and easy to understand, booklets are able to significantly increase mothers' knowledge, which is an important step in preventing stunting and improving children's health..

### Demonstration of Making High Calcium PMT

#### *PMT Satisfaction Level*

Providing additional foods high in calcium is an important strategy in preventing stunting, especially in children. Stunting, which is a serious nutritional problem in Indonesia, is caused by various factors, including inadequate nutritional intake, especially protein and calcium (Siagian et al., 2020; Marsellinda, 2023). Calcium plays an important role in bone mineralization, which is very crucial during a child's growth period. Research shows that adequate calcium intake can support optimal linear growth in children (Marsellinda, 2023) (Elvionita, 2023). One approach to increasing calcium intake is through the development of additional calcium-rich foods. In this community service activity, one of the activities is to carry out a demonstration of making high-calcium PMT, including making fish nuggets, fish cookies, and fish floss.



**FIGURE 3.** Level of Satisfaction with Overall Satisfaction of High Calcium PMT (Cookies, Nuggets and Fish Floss)

Demonstrations on making additional foods such as fish nuggets, fish cookies, and fish floss have a significant impact on the level of satisfaction of mothers of toddlers. This activity not only aims to increase mothers' knowledge and skills in processing fish into more attractive and nutritious products but also contributes to efforts to prevent stunting in children. The results of this community service can be seen from

the overall satisfaction level of high calcium PMT in Nugget products; 80% of respondents are very satisfied, and 76% are very satisfied with cookies and fish floss (Figure 2). The satisfaction of mothers of toddlers with this additional food is also influenced by the organoleptic aspects of the product produced. The taste, texture, and appearance of food are very important in determining children's acceptance of the food (Kasmiati et al., 2020; Sundari et al., 2021). Therefore, activities that involve mothers in the process of making and processing food not only improve their skills but also give them the opportunity to experiment with different recipes and ingredients, which ultimately can increase their satisfaction with the final result (Tasabaramo, 2023) (Rusnaini et al., 2020).

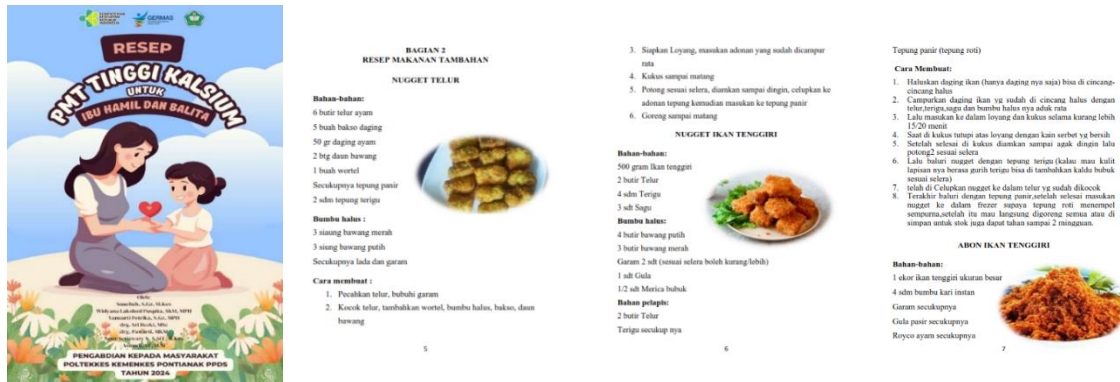


FIGURE 4. High Calcium PMT Recipe Book for Pregnant Women and Toddlers

Apart from that, this activity also provides practical skills that can be used by mothers to create more attractive food variations for their children, which in turn can increase their satisfaction with the food served (Larasati et al., 2023) (Isma, 2023) (Sundari et al., 2021). Fish floss can be a good source of protein and is easily accepted by children, thereby increasing their nutritional intake (Nur et al., 2022; Novianti & Mahyuni, 2021; Kasmiati et al., 2020).

Demonstrations on making fish nuggets and fish cookies also have a similar purpose. These products are designed to appeal to children, who often prefer foods that have a wider variety of shapes and tastes. Fish nuggets, for example, are not only rich in protein but can also be combined with other ingredients such as vegetables to increase nutritional value (Suwarsito et al., 2018; Warsidah, 2024). Fish cookies, on the other hand, offer a healthy and nutritious snack alternative, so mothers feel more satisfied when their children enjoy food that is not only delicious but also healthy (Rohima et al., 2022). Overall, the demonstration of making additional foods such as fish nuggets, fish cookies, and fish floss not only provides nutritional benefits for toddlers but also increases mothers' skills and knowledge in processing food. This contributes to increased maternal satisfaction with the food served to their children, which is very important in supporting optimal child growth and development (Gella, 2023).

**Readiness of Mothers of Toddlers to Practice PMT Recipes at Home**

Readiness to practice PMT (Additional Feeding) recipes high in calcium at home for mothers of toddlers is an important step in supporting children's growth and development. Providing foods rich in calcium is very necessary to prevent health problems such as stunting and other growth disorders. In this community service, an analysis was carried out regarding the mother's readiness to practice the PMT recipe at home. This can be seen in table 2 below:

TABLE 2. Readiness to Practice High Calcium PMT Recipes at Home for Mothers of Toddlers

Readiness to Practice the Recipe	N	%
No	1	4
Yes	24	96
Total	25	100

Description:  
N: Quantity  
%: Percent

Based on the results in table 2, it shows that almost all mothers of toddlers, 96%, are ready to practice PMT recipes at home. Only 4% of mothers of toddlers are not ready to practice the PMT prescription. In this context, it is important to understand how mothers can prepare and serve food that meets their children's nutritional needs. Understanding good sources of calcium is very important. Foods such as dairy products, fish, and dark green vegetables are good sources of calcium. Utilizing local foods rich in calcium, such as fish bones, can be a good alternative for increasing children's calcium intake (Payu, 2023). Apart from that, educational activities that involve mothers in making healthy and nutritious food can increase their knowledge about the importance of calcium in children's diets (Rahman, 2023).



**FIGURE.5.** Cooking Demonstration

Mothers need to be involved in the learning process about how to cook and serve foods that are high in calcium. Programs such as cooking classes can help mothers understand the right techniques and recipes for serving nutritious food (Nurkholik, 2023). Through this activity, mothers not only learn about recipes but also about the importance of balanced nutrition in daily meals. Active participation in educational activities can increase mothers' awareness and knowledge about nutrition (Sutanto et al., 2022).

Next, it is important to create a supportive environment for mothers to practice the high calcium PMT prescription. Support from family and community can play an important role in a mother's success in serving healthy food. Research shows that a positive social environment can influence children's eating behavior and increase maternal compliance in providing nutritious food (Hijja et al., 2022). Therefore, collaboration between mothers, families, and communities is very necessary to create healthy eating patterns for toddlers.

Evaluation of feeding practices is also important to ensure that children receive adequate nutritional intake. Regular monitoring and evaluation of children's eating patterns can help identify nutritional problems that may occur (Sutyawan et al., 2019). Thus, maternal readiness to practice high calcium PMT prescriptions at home involves understanding calcium sources, participation in educational activities, support from the social environment, and evaluation of feeding practices. With this comprehensive approach, it is hoped that mothers can provide nutritious food and support optimal child health.

## CONCLUSION

The nutrition education provided to mothers about stunting has proven to be effective in improving the knowledge of mothers of toddlers. Additionally, the results of this activity are also reflected in the high satisfaction levels with calcium-rich supplementary foods (PMT) in Nugget products, with 80% of respondents being very satisfied and 76% being very satisfied with the cookies and fish floss products. The satisfaction of mothers of toddlers is influenced by the organoleptic aspects of these products. Most of the mothers of toddlers are ready to practice the PMT recipes at home, with only a small portion not yet ready.



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