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Enhancing Success of Stunting Eradication: Risk Factor Identification and Booklet-Based Intervention in Stunting Communities

Gharini Sumbaga Narhadina[1*], Devita Diatri[2], Rifka Widianingrum[3], Umniatuz Zahroh[4]

[1,2,3] Department of Biomedicine, Faculty of Medicine, Universitas Muhammadiyah Semarang, Indonesia
[4] Medical Profession Program, Faculty of Medicine, Universitas Muhammadiyah Semarang, Indonesia

ABSTRACT

Background: *Stunting is a form of chronic malnutrition that affects growth and development during early life. Stunting remains a government priority, with a target to reduce its prevalence to 14%, yet it continues to rank high in the Lamper Tengah Sub-district. This situation is attributed to the lack of family knowledge regarding the risks and long-term impacts of stunting. Therefore, this program aimed to implement stunting risk screening and a booklet-based intervention entitled "Control of Stunting Risk Factors" within the Stunting Community in Lamper Tengah Sub-district, Semarang City.*

Methods: *This community service activity was carried out in Lamper Tengah Village, targeting 10 families with stunted children. The activity methods included preparation, anthropometric measurements, filling out questionnaires on stunting risk factors, and distributing and presenting the booklet "Stunting Risk Factors." The evaluation stage was carried out by assessing the mothers' level of knowledge about stunting before and after the intervention.*

Results: *Among stunted toddlers, 60% are female, 60% do not receive exclusive breastfeeding, and only 20% practice responsive feeding. After the intervention, the proportion of families with good knowledge levels increased from 80% before the activity to 100% after the activity.*

Conclusion: *The results of the activities show that this community service program is able to increase mothers' knowledge about the risk factors for stunting. Therefore, similar activities need to be continued and expanded to include more participants, accompanied by in-depth counseling and practical guidance on active feeding practices before pregnancy, during pregnancy, and after childbirth to support efforts to reduce stunting rates in Semarang City.*

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CONTACT
Gharini Sumbaga Narhadina
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gharinisn@unimus.ac.id
Department of Biomedicine, Faculty of Medicine, Universitas Muhammadiyah Semarang
Jl. Kedungmundu Raya No. 18, Semarang, Indonesia

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INTRODUCTION

Stunting is a form of chronic undernutrition that occurs during the early stages of growth and development. It is characterized by a height-for-age ratio below minus three standard deviations (-3 SD) from the median of the World Health Organization (WHO)

growth standards (1,2). In 2022, the prevalence of stunting in Indonesia remained high at 31%, compared to the global average of 20% (3). In Central Java, the stunting rate reached 20.8%, while correct knowledge about stunting was only 66.8%, still below the national target (4,5). Stunting continues to be a major focus of the Indonesian government, which has set a target to reduce its prevalence to 14% (6).

In October 2025, a total of 2,250 cases of stunting were recorded in Semarang, accounting for 3.67% of the target child population (7). Stunting management is also aligned with the second goal of the Sustainable Development Goals (SDGs) 2030, which aims to end hunger, achieve food security, improve nutrition, and promote sustainable agriculture. Therefore, the success of stunting prevention and management is crucial to achieving the SDGs (8).

Stunting that occurs during the first 1.000 days of a child's life is particularly critical, as this period significantly influences future growth and development (9). Chronic undernutrition can result in impaired physical growth, motor development, cognitive function, and overall child health (10). The causes of stunting are multifactorial; in addition to inadequate nutritional intake, maternal nutrition during pregnancy, as well as family knowledge and awareness about stunting, play essential roles (11–13). Furthermore, environmental factors such as access to clean water, proper sanitation facilities, and hygienic conditions are also key contributors to stunting among children under five years old (13,14).

Based on a survey and interviews conducted by cadres in Lamper Tengah Subdistrict, Semarang City, in December 2024, stunting remains a top public health issue in the area. This is largely attributed to the lack of family knowledge regarding the long-term risks and impacts of stunting. Several studies indicate that booklets significantly improve maternal knowledge. This medium is effective because it allows participants to review key nutritional guidelines repeatedly, thereby ensuring better long-term retention compared to oral methods alone (15,16)**.**

Therefore, a community engagement program was implemented using an educational booklet titled *"Controlling Risk Factors of Stunting"* aimed at the stunting-affected community in Lamper Tengah. The intervention was intended to improve maternal and family knowledge about stunting, thereby contributing to the increased success of stunting eradication efforts. This activity is also expected to raise awareness among families about applying appropriate parenting and nutrition practices for children. In addition, this program is a first step in encouraging active community involvement in sustainable efforts to prevent and combat stunting.

METHODS

The community service program was conducted at Lamper Tengah Subdistrict. The target participants were 10 families with stunted children. This activity was carried out as an effort to increase the role of families in preventing and combating stunting at the community level. The program involved the active participation of mothers and family members in each series of activities. The stages of the activity included preparation, anthropometric measurements, filling out questionnaires on stunting risk factors, and the distribution and presentation of educational booklets.

The Preparation Stage

The preparation stage was initiated by conducting a survey to identify stunting risk factors. The variables assessed included maternal knowledge regarding stunting, feeding

practices, exclusive breastfeeding adherence, and the availability of healthy latrines and clean water. Following this assessment, a Focus Group Discussion (FGD) was conducted involving village authorities, representatives from the Public Health Center and health cadres in Lamper Tengah.

The Implementation Stage

Community service activity took place on January 10, 2025, located at the Lamper Tengah Subdistrict Hall, Semarang, accompanied by local health cadres from the Lamper Tengah area. The intervention was collaboratively executed by lecturers and students from the Faculty of Medicine, UNIMUS. This program aimed to enhance the knowledge and awareness of families with stunted children in order to improve the effectiveness of the stunting management program in Lamper Tengah, Semarang City.

The activities carried out included anthropometric measurements, distribution of stunting risk questionnaires, distribution of educational booklets, and a presentation on the contents of the booklet titled *"Controlling Risk Factors of Stunting"*. The intervention booklet comprises comprehensive information on the definition, impacts, and risk factor of stunting also preventive measures including Early Initiation of Breastfeeding (EIBF), Exclusive Breastfeeding (EBF), and the clarification of common breastfeeding myths. Additionally, it provides guidelines on Complementary Feeding and strategies for managing feeding difficulties in children.

The Evaluation Stage

The evaluation of the community service program was assessed through pre-test and post-test scores, utilizing a questionnaire on maternal knowledge regarding stunting. The evaluation was conducted to determine changes in mothers' knowledge levels before and after the intervention. The questionnaire covered aspects of understanding stunting, risk factors, and stunting prevention efforts at the family level. The evaluation results were used as a basis for assessing the effectiveness of the community service activities that had been carried out.

RESULTS

The community engagement activity was carried out through a knowledge-based intervention for families of stunted toddlers using the booklet *"Controlling Risk Factors of Stunting"*, targeting families with stunted children (Figure 1). A total of 10 families attended, accompanied by seven health cadres from the Lamper Tengah Subdistrict Health Forum. The activity took place on January 10, 2025, at the Lamper Tengah Subdistrict Hall. The educational material delivered was aligned with the contents of the booklet, covering topics such as the definition of stunting, its risk factors and causes, exclusive breastfeeding and related myths, complementary feeding (MPASI), and formula milk.

Figure 1. Educational Session and Distribution of the Booklet
"Controlling Risk Factors of Stunting"

This community engagement program also included a screening of stunting risk factors in the Lamper Tengah Subdistrict. Table 1 presents the age and anthropometric data of stunted children in Lamper Tengah.

Table 1. Age and Anthropometric Characteristics of Stunted Children in Lamper Tengah Subdistrict

Parameter	Mean	Std. Deviation
Child age	39.60	13.74
Child height	85.80	7.80
Child weight	11.13	1.83

Table 2 presents the risk factors associated with stunted children in the Lamper Tengah Subdistrict. Among the stunted toddlers, 60% were female, with 50% of parents having completed senior high school and 40% having a monthly income between IDR 3.000.000 and 5.000,000. The majority of mothers (80%) adhered to antenatal care (ANC) visits at the Lamper Public Health Center, and only 10% had a history of preterm birth. Additionally, 50% of the children had a history of low birth weight (LBW), and 60% were not exclusively breastfed.

Table 2. Risk Factor Characteristics of Stunted Children in Lamper Tengah Subdistrict

Parameter	Frequency (n)	Percentage (%)
Sex		
Male	4	40
Female	6	60

Parameter	Frequency (n)	Percentage (%)
Parental Education Level		
University	1	10
Senior High School	5	50
Junior High School	3	30
Elementary School	1	10
Parental Income (IDR)		
3.000.000-5.000.000	4	40
1.000.000-3.000.000	3	30
<1.000.000	3	30
ANC Compliance		
Good	8	80
Poor	2	20
History of Preterm Birth		
Yes	1	10
No	9	90
History of Low Birth Weight (LBW)		
Yes	5	50
No	5	50
Early Initiation of Breastfeeding		
Yes	8	80
No	2	20
Exclusive Breastfeeding		
Yes	4	40
No	6	60
Feeding Practice		
Appropriate		
Yes	6	60
No	4	40
Adequate		
Yes	7	70
No	3	30
Responsive		
Yes	2	20
No	8	80
Safe		
Yes	10	100
No	0	0

The pre- and post-intervention data on family knowledge show a significant improvement following the presentation and distribution of the booklet *"Controlling Risk Factors of Stunting."* The proportion of families with good knowledge increased from 80 % before the intervention to 100 % afterward, as illustrated in Figure 2.

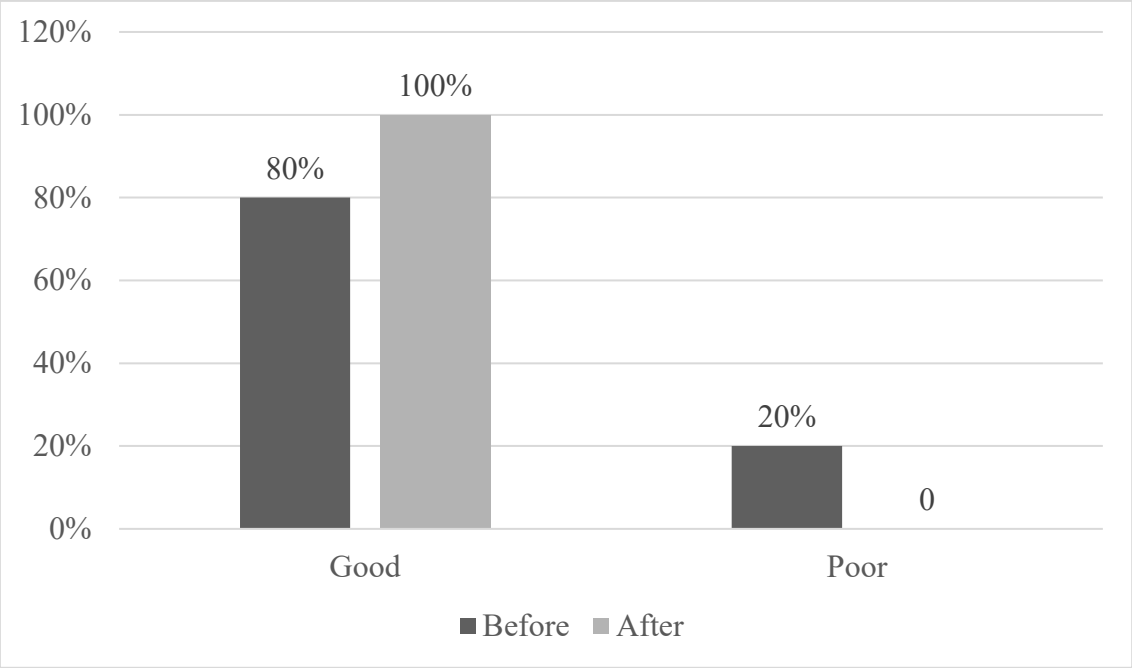

Figure 2. Maternal Knowledge Level on Stunting Risk Before and After the Intervention

DISCUSSION

The main results of this community service activity show an increase in mothers' and families' knowledge about stunting risk factors after receiving educational intervention through booklets. This increase in knowledge was particularly evident in their understanding of the importance of exclusive breastfeeding, responsive feeding practices, and the timing and principles of complementary feeding. These findings indicate that simple community-based educational interventions can contribute positively to stunting prevention efforts, which can be further linked to scientific evidence regarding the role of breastfeeding and complementary feeding in supporting optimal child growth.

This is supported by a 2021 study conducted in Yogyakarta, which found that children who were not exclusively breastfed had a 5.17 times higher risk of experiencing stunting (17). Infants undergo rapid growth between the ages of 2 and 12 months. Breast milk contains digestible macro- and micronutrients suitable for infants under six months of age (18). Growth hormones such as IGF-I found in breast milk up to nine months of age play a significant role in promoting rapid growth during the first year of life, thereby contributing to stunting prevention (19,20). However, the nutritional composition of breast milk decreases after nine months of age, making it essential to introduce complementary feeding (MPASI) beginning at six months. Appropriate MPASI should consider portion size, consistency, nutritional composition, and proper feeding techniques.

Feeding practices among stunted toddlers in Lamper Tengah were assessed based on four aspects: appropriateness, adequacy, responsiveness, and safety. According to the questionnaire results, only 20% of caregivers practiced responsive feeding. Responsive feeding (RF) is an approach that takes into account the child's hunger and satiety cues and is part of the concept of active feeding. Responsive feeding is associated with improved dietary intake and reduced stunting prevalence. The core principles of RF include observing and responding to a child’s hunger and fullness cues, avoiding coercion during

feeding, creating a positive and loving mealtime atmosphere, and encouraging the child's independence. These principles are expected to support appetite regulation and cognitive development, thereby improving nutritional intake and preventing malnutrition-related conditions such as stunting (21,22).

According to the Health Belief Model theory, knowledge influences an individual's perception of the causes of health condition, such as stunting, thereby affecting behavioral changes related to disease prevention (23,24). This program significant increase in participants' knowledge observed after the intervention implies a heightened potential for behavioral change. Improving maternal understanding of stunting risk factors, this activity effectively lays the cognitive foundation necessary for the adoption of better feeding practices and hygiene standards in the Lamper Tengah community (25).

Studies conducted in various regions have also shown that good knowledge is strongly associated with positive behaviors in stunting prevention (26–28). The findings indicate that increasing the knowledge of mothers and families through educational activities has the potential to encourage behavioral changes in nutrition and child-rearing practices. Thus, knowledge-based interventions are an important component of stunting prevention strategies at the family and community levels. The implications of these activities underscore the need to strengthen ongoing educational programs that involve families as key actors in efforts to reduce stunting.

Limitation in this community service was quantity and attention's participants divided between absorbing the educational material and supervising their children. Additionally, some participants were unable to attend due to work commitments. Future interventions should focus on more practical educational methods, such as complementary feeding cooking demonstrations utilizing locally sourced ingredients, coupled with longitudinal monitoring to ensure sustained behavioral change.

CONCLUSIONS AND SUGGESTIONS

The most prominent risk factors contributing to stunting in Lamper Tengah Subdistrict, Semarang City, were the lack of exclusive breastfeeding and the low proportion of families practicing responsive feeding during complementary feeding (MPASI). To improve knowledge and promote behavioral change, an educational session and the distribution of a booklet titled "Controlling Risk Factors of Stunting" were conducted. Pretest and posttest results demonstrated a significant increase in the knowledge of families with stunted children. This community engagement program should be expanded to reach a broader group within stunting-affected communities to enhance the overall success of stunting prevention efforts in Semarang City. Future interventions may benefit from incorporating more in-depth education and practical sessions on complementary feeding based on the concept of active feeding, delivered during the prenatal, perinatal, and postnatal periods, to further reduce stunting prevalence.

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CONFLICT OF INTERESTS

The author declares that there is no conflict of interest regarding the results of this community service activity.

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