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Empowering Mothers Through Megamor Innovation (Mega Programme with Moringa Nuggets) to Prevent and Help Overcome Stunting

Pemberdayaan Ibu Melalui Inovasi Megamor (Mega Program dengan Nugget Kelor) untuk Mencegah dan membantu mengatasi Stunting

Finta Isti Kundarti[1], Ira Titisari[1], Dwi Estuning Rahayu[1], Alvi Nur Puspita Putri[1], Rysma Dhella Khammidah[1]

[1] Department of Midwifery, Poltekkes Kemenkes Malang, Indonesia

Correspondence:
Finta Isti Kundarti
fintaistikundarti@gmail.com

Abstract:

Stunting is a severe form of malnutrition and causes a person's weight to drop significantly quickly. In Keniten Village, RT/RW 001/004, cases of stunting among toddlers were found. This community service aims to increase the knowledge of mothers of toddlers about toddler nutrition and innovations in how to process food sourced from local wisdom, namely moringa leaves, which have high nutritional value. This community service activity was carried out in 1 meeting. This activity begins with counseling about toddler nutrition to mothers of toddlers, lasting 30 minutes. Then, the activity will continue with a Moringa Nugget cooking demonstration, which will last 30 minutes. This activity was attended by 17 mothers of toddlers and their toddlers. The cooking demonstration activity starts with preparing the tools and ingredients needed and then practicing how to process moringa leaves into Moringa nuggets. The results of the interviews and post-tests showed an increase in the understanding and skills of mothers of toddlers regarding understanding of children's nutrition, as well as innovations in processing additional food from local moringa leaves into Moringa nuggets. Suggestions for further community service activities include developing additional food processing innovations that are more diverse based on local ingredients often found in the surrounding area.

Keywords: stunting, moringa leaves, nutrition

Abstrak:

Stunting merupakan salah satu bentuk kekurangan gizi yang serius dan menyebabkan berat badan seseorang turun secara signifikan dalam waktu yang relatif singkat. Di Desa Keniten RT/RW 001/004 ditemukan kasus stunting pada balita. Tujuan dari pengabdian masyarakat ini adalah untuk meningkatkan pengetahuan ibu balita tentang gizi balita dan inovasi cara mengolah makanan yang bersumber dari bahan kearifan lokal yaitu daun kelor yang mempunyai nilai gizi yang tinggi. Kegiatan pengabdian masyarakat ini dilaksanakan dalam 1 kali pertemuan. Kegiatan ini diawali dengan penyuluhan tentang gizi balita kepada ibu balita, penyuluhan ini berlangsung selama 30 menit. Kemudian, kegiatan akan dilanjutkan dengan demo masak Nugget Kelor yang berlangsung selama 30 menit. Kegiatan ini diikuti oleh 17 orang ibu balita beserta balitanya. Kegiatan demo masak diawali dengan menyiapkan alat dan bahan yang dibutuhkan, kemudian mempraktikkan cara mengolah daun kelor menjadi nugget kelor. Hasil wawancara dan post test menunjukkan adanya peningkatan pemahaman dan keterampilan ibu balita mengenai pemahaman gizi anak dan juga inovasi dalam mengolah makanan tambahan dari daun kelor lokal menjadi nugget kelor. Saran untuk kegiatan pengabdian kepada masyarakat selanjutnya adalah mengembangkan inovasi pengolahan pangan tambahan yang lebih beragam sesuai dengan bahan lokal yang banyak terdapat di daerah sekitar.

Kata Kunci: *stunting, daun kelor, nutrisi*

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INTRODUCTION

Stunting is a condition of failure to grow in toddlers, resulting in a child's height being inappropriate for their age (Picauly et al., 2024; Vaivada et al., 2020). Chronic malnutrition is the primary cause of stunting, especially during the first 1,000 days of a toddler's life (De Sanctis et al., 2021; Shofa et al., 2024). Childhood stunting affects many children worldwide. Both are important risk factors for disease and death. Although both conditions share similar risk factors and often occur in the same children, they are generally described as relatively distinct manifestations of malnutrition (Sadler et al., 2023). Several studies on stunting in Indonesia show that factors related to stunting include the birth length of toddlers, family income or economic level, mother's education, history of exclusive breastfeeding, history of illness/infection, health services, and immunization history (Kusumajaya et al., 2023; Thahir et al., 2023).

The impact of stunting on health is severe, especially in children who experience growth and development disorders, which can lead to serious complications and even death (Ariskawati et al., 2024). Children who experience stunting will generally experience obstacles in their cognitive and motor development, affecting their adult productivity (Alam et al., 2020; Ritanti & Aprilia, 2024). The relationship between child nutrition and health risks is clear and unmistakable. Stunted children suffer from inadequate nutrition and have a higher risk of death, often due to a lack of income or resources (Wand et al., 2024).

Activities pursued by the government to improve nutrition and prevent stunting or short stature in toddlers are interventions in the health sector, such as immunization, providing additional food (PMT) for pregnant women, PMT for toddlers, and monitoring the growth and development of toddlers at Posyandu. In addition to government-provided PMT, additional foods or drinks high in macronutrients and micronutrients can be provided to meet nutritional needs. The development of additional food recovery is prioritized based on local food ingredients or foods (Octavia et al., 2025; Mahayaty et al., 2024)

It doesn't have to cost a lot of money for mothers of toddlers to provide their children with nutrition, because Keniten Village has abundant natural resources. Almost every resident's yard is covered with Moringa plants, which are rich in nutrients for toddlers. Various moringa products have been developed, such as cakes, bread, yogurt, soup, weaning food, and biscuits. Complementary foods are defined as specially formulated foods, in ready-to-eat or ground form, that are modified in their energy density, protein, fat, or micronutrient composition to help meet nutritional requirements (Walia et al., 2019). Moringa leaves have the nickname Mother's Best Friend and Miracle Tree because Moringa is believed to have the potential to overcome malnutrition and hunger and prevent and treat various diseases throughout the world (Aldakheel et al., 2020)

Moringa leaves are a plant that is widely and easily cultivated in Indonesia and have the potential to be an economical, nutritious, and sustainable additional food (Katmawanti et al., 2021).

Several experts have researched whether Moringa leaves are good for meeting the needs of children growing up; for children aged 1-3 years, 100 grams of fresh Moringa leaves will meet all their daily calcium needs, around 75% of iron and half their protein needs, as well as an important supply of potassium, Vitamin B complex, copper, and essential amino acids. At least 20 grams of fresh leaves will provide children with vitamins A and C (Afriza et al., 2023; Nastiti et al., 2025).

However, in Keniten Village, most people, including mothers of toddlers, do not yet have optimal knowledge regarding providing balanced nutrition for children. Many mothers still complain that it is difficult for their children to eat and that their creativity in preparing toddler menus is limited, so the menu served is less attractive and children refuse to eat. Analysis of the situation in Keniten Village RT/RW 001/004 for our community service in 2024: the results of the knowledge of mothers of toddlers before and after the MEGAMOR (Mega Moringa) program: Mega Program with Moringa Leaves, which involved 17 mothers of toddlers and assessed their level of knowledge at the pre-test and post-test. When conducting the pre-test, the distribution of mothers' knowledge levels was as follows: very high 1 (5.8%), high 2 (11.8%), medium 3 (17.7%), low 6 (35.2%), and very low 5 (29.5%). After the post-test, the level of knowledge changed significantly, with a substantial increase in the very high category to 58.9%, while the very low category fell to 0%. This community service aims to increase mothers of toddlers' understanding and skills regarding child nutrition and innovation in processing additional food from local moringa leaves into Moringa nuggets, especially in Keniten Village.

Community-based approaches to addressing stunting have been shown to be effective in various studies, highlighting the role of maternal empowerment in improving children's nutritional status. Nutritional interventions based on local resources significantly reduce malnutrition rates (Sokhela et al., 2022). Community-based strategies that include maternal education and utilization of local foods can significantly improve child growth. The MEGAMOR program, which educates mothers in Keniten Village about Moringa leaves, aligns with this approach, in which increased nutritional understanding contributes to behavioral changes in providing healthy food for children (Hamed, 2022).

This community service aims to increase mothers of toddlers' knowledge of toddler nutrition and innovations in processing food based on local wisdom, namely moringa leaves, which have high nutritional value. Using moringa leaves as an additional source of nutrition supports the food-based intervention, which is more effective than pharmaceutical-based nutritional supplementation in sustainably improving children's nutritional status (Brar et al., 2022). Moringa contains essential micronutrients that support children's growth and development; consuming moringa can increase iron and protein levels in children's diets (Rotella & Soriano, 2022). Thus, interventions using local resources such as moringa increase food security and provide an economical and sustainable solution for overcoming stunting.

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IMPLEMENTATION METHOD

The implementation of activities in this community service was carried out by a team of 3 lecturers and 10 undergraduate applied midwifery students. This activity was carried out on Wednesday, 08 May 2024, from 14.00 – 16.00 WIB at the Keniten Village Hall, targeting mothers with toddlers from RT.001/RW.004, Keniten Village, totaling 17 people. Community service activities are carried out to address health problems using various methods: preparation for implementation, lectures/counseling, cooking demonstrations, and question-and-answer sessions. The flow of community service activities includes:

1. Preparation for implementation

In the preparation stage of the implementation, the students initially collected data from residents of RT/RW 001/004, Keniten Village, to identify existing health problems and determine the community's needs. This initial assessment was carried out to obtain an overview of the conditions faced by residents, particularly problems related to toddler nutrition and stunting prevention. After identifying the main issues in the community, the students collaborated with lecturers, village midwives, coordinating midwives, and Keniten Village officials to discuss appropriate solutions through a Focus Group Discussion (FGD). The FGD served as a collaborative forum for exchanging information, identifying priority problems, and developing an intervention plan that was relevant to the community's conditions. Through this discussion, the team designed the MEGAMOR program as a community empowerment activity focusing on improving mothers' knowledge and skills in utilizing local food resources, particularly moringa leaves, as nutritious supplementary food for toddlers. This preparation stage was important to ensure that the program implementation was based on actual community needs and involved relevant stakeholders in addressing stunting prevention efforts.

2. Lectures/counseling

Before the activity began, mothers of toddlers were asked to fill out a form expressing their willingness to participate in this community service activity voluntarily. This implementation is delivered using a lecture method, which contains material about the importance of preventing stunting and introducing locally processed ingredients to be used as additional food for toddlers to increase body weight. It also includes innovations by managing attractive foods.

3. Cooking demonstration

Before the cooking demonstration to create innovative processed foods from local wisdom, namely Moringa leaves, which have high nutritional value, the community service team consulted with a nutritionist from the Mojo Health Center about the food ingredients used, how to process them, nutritional value, and food safety. This cooking demonstration method implements a program created using local ingredients in Keniten Village, namely Moringa leaves. Moringa leaves are used as an innovative snack for toddlers, namely processed moringa nuggets, which have many benefits.

4. Question and answer

This activity's success indicators are increased mothers' knowledge of toddler nutrition and innovation in processing toddler food using local wisdom and moringa leaves. A questionnaire will be used to assess mothers' knowledge of toddler nutrition.

A questionnaire for this activity uses the pre-test (initial test) and post-test (final test) orally. This pre-test aims to determine the target level of knowledge gained before presenting the material. Meanwhile, this post-test aims to find out the level of understanding of the material that has been presented previously so that you can get an idea of the abilities achieved after the end of the delivery of the material that has been given. At the end of the event, an oral post-test was conducted to assess how well the community accepted the material for the pre-test questions, which covered how to cook Moringa nuggets before the cooking demonstration. The results will be analyzed by comparing mothers' knowledge of toddler nutrition before and after receiving material on toddler nutrition and on processing food from moringa leaves.



Figure 1. Flow of implementation of community service activities

RESULT AND DISCUSSION

The result of this community service activity demonstrated an improvement in mothers' knowledge regarding innovations in providing supplementary food for stunted toddlers. The intervention successfully increased mothers' understanding of toddler nutrition, the importance of preventing stunting, and the utilization of local food resources as alternative sources of nutritious food. Through counseling sessions and cooking demonstrations, mothers gained new insights into how locally available ingredients, particularly moringa leaves, can be processed into attractive and nutritious food products suitable for toddlers.

The evaluation of the program was conducted using univariate analysis through the frequency distribution of mothers' knowledge levels before and after the intervention. A total of 17 mothers of toddlers participated in the assessment, which was conducted before and after receiving nutritional counseling and attending the Moringa nugget cooking demonstration. The analysis aimed to identify changes in mothers' knowledge following education and practical training on stunting prevention and the preparation of supplementary foods using local ingredients.

The findings indicate that the combination of health education and direct practice using moringa leaves as a local food resource was effective in improving mothers' understanding of toddler

nutrition. The frequency distribution of mothers' knowledge before and after the counseling intervention illustrates the changes in knowledge levels achieved through the MEGAMOR program. These results highlight that community-based interventions that utilize local resources can be an effective way to increase nutritional awareness and support stunting prevention efforts at the household level. The detailed distribution of mothers' knowledge levels before and after the intervention is presented in the following table.

Table 1. Frequency distribution of knowledge of mothers of toddlers before and after the MEGAMOR (Mega Moringa) program: Megah Program with Moringa Leaves (n=17)

Knowledge	Frequency	Percentage (%)
Pre-test		
Very high	1	5.8
Tall	2	11.8
Enough	3	17.7
Low	6	35.2
Very low	5	29.5
Post-test		
Very high	10	58.8
Tall	5	29.5
Enough	1	5.8
Low	1	5.8
Very low	0	0

Based on Table 1 regarding the frequency distribution of knowledge of mothers of toddlers before and after the MEGAMOR (Mega Moringa) program: Megah Program with Moringa Leaves, the pre-test results showed that the distribution of knowledge levels of mothers of toddlers was as follows: very high 1 (5.8%), high 2 (11.8%), medium 3 (17.7%), low 6 (35.2%), and very low 5 (29.5%). After the post-test, the level of knowledge changed significantly, with a substantial increase in the very high category to 58.9%, while the very low category fell to 0%.

Malnutrition counseling for mothers of toddlers to prevent malnutrition or malnutrition or conditions of failure to grow in children under five caused by malnutrition (Stunting). Before the counseling was conducted, the presenters administered a pre-test consisting of questions on the use of local ingredients commonly processed in Keniten Village. This extension received strong enthusiasm from the community, and many people used local moringa leaves to create dishes, such as vegetable soup and stir-fried moringa with additional vegetables. Moringa leaves (Moringa oleifera) are a high-nutrient food source (Azlan et al., 2022). Nutrition counseling for toddlers to mothers, according to the MyPlate portions. The program to prevent stunting is the "MEGAMOR" program (Mega Moringa: Megah Program with Moringa Nuggets). This program uses local materials often found in the Keniten Village area.

After the counseling activities, a cooking demonstration was conducted. This cooking demonstration was conducted to provide ideas for menu variations for mothers of toddlers, using local ingredients found around Keniten Village, namely Moringa leaves. Moringa leaf-processed

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products are very diverse, including vegetables, Moringa leaf tea, Moringa leaf flour, and nuggets. Moringa leaves contain phytosterol compounds, compounds that are insoluble in water. Therefore, when processing Moringa leaf nuggets, you must use fresh Moringa leaves and all parts of the leaf (Abdalla et al., 2022). Moringa leaves are effective in helping toddlers with stunting obtain additional vitamins, which are important for children's growth and development (Katmawanti et al., 2021; Hanifiyah et al., 2024). This cooking demonstration activity began with the group showing a video about processing Moringa nuggets. Chicken nuggets with Moringa leaves can be used as additional food for toddlers, providing high crude protein and fiber content needed to address stunting (Yasin et al., 2024). After showing the video, the presenter in charge did a cooking demonstration. This cooking demonstration activity was lively and interactive. Mothers of toddlers and several guests also had the opportunity to taste Moringa nuggets.

This food innovation, Moringa nuggets, received a positive response from mothers of toddlers because the product was considered attractive, had an acceptable taste, and used ingredients that were readily available and affordable in the local environment. The use of Moringa leaves as the main ingredient provided mothers with an alternative for preparing nutritious supplementary food without requiring expensive ingredients. The cooking demonstration allowed participants to directly observe and practice preparing Moringa nuggets, covering ingredient preparation, processing techniques, and serving methods. This practical approach helped mothers gain new skills and increase their confidence in creating healthier food variations for their children.

To support the program's sustainability, the cooking demonstration was complemented by educational media in the form of leaflets containing the Moringa nugget recipe, nutritional benefits, and a barcode that could be scanned to view a video tutorial on the preparation process. These learning materials enabled mothers to review the information independently after the activity and apply the demonstrated skills at home. At the end of the activity, an oral post-test was conducted to evaluate participants' understanding of the materials presented, particularly their knowledge of the preparation process for Moringa nuggets. The results of this evaluation provided an overview of the community's acceptance and understanding of the intervention provided during the program.

However, several challenges were identified during the activity's implementation. The counseling session did not begin as planned because some mothers of toddlers arrived late, and the learning environment became less conducive due to a toddler who was unsettled during the session. To overcome these challenges, the team continued the activity while waiting for other participants to arrive and provided a child-friendly environment, including a play area, snacks, educational activities, and committee members who assisted in managing the children. For future activities, it is recommended that organizers discuss and agree on the most suitable schedule with participants in advance to improve attendance and punctuality. In addition, involving caregivers such as grandparents, fathers, or other family members may help mothers participate more actively while ensuring that their children remain supervised during the activity. Addressing these challenges can

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improve the effectiveness, continuity, and nutritional benefits of future community empowerment programs.

The "MEGAMOR" program integrates nutrition education and cooking demonstrations using local ingredients such as moringa leaves, which has shown a practical approach to preventing stunting in toddlers. The research emphasized that stunting and malnutrition in children share similar risk factors and often co-occur, making community-based nutrition interventions crucial (Mathews et al., 2023). Nutrition education and agricultural interventions have improved children's dietary diversity and nutritional status (Pareek et al., 2023). In addition, providing Moringa leaf supplements during pregnancy can prevent stunting in children aged 36 to 42 months (Basri et al., 2021).

Using moringa leaves as a local food source in community nutrition education programs can effectively improve children's nutritional status and prevent stunting. Moringa leaves are rich in important micronutrients such as vitamin A, iron, and calcium, essential for child growth and development (Escher et al., 2024). A study showed that food-based interventions utilizing local resources can improve nutrient intake and nutritional status in children at risk of stunting (Mulu et al., 2022). Thus, an approach that combines nutritional education with the use of local food ingredients, such as moringa leaves, can provide a sustainable solution to prevent toddler stunting.

The success of the MEGAMOR program can be explained through the perspective of Behavior Change Theory, which emphasizes that behavioral transformation is more effectively achieved when individuals receive information accompanied by direct experience and practical application. In this program, nutrition education was delivered not only through verbal explanations but also through hands-on cooking demonstrations of Moringa nuggets. This combination allowed mothers of toddlers to better understand the nutritional benefits of moringa leaves and gain confidence in preparing nutritious complementary foods using locally available ingredients.

Furthermore, the use of supporting educational media, such as leaflets containing recipes and video barcodes demonstrating the preparation process, provided mothers with accessible resources they could review and practice at home. These practice-based, visually supported educational approaches may encourage healthier food-preparation habits and promote continued use of moringa-based foods in children's diets. Through sustainable behavioral changes among mothers, the program has the potential to improve children's nutritional intake and contribute to long-term efforts in preventing stunting.

The limitation of this community service activity is that the program was conducted in only one session with a limited number of participants, involving 17 mothers of toddlers. Therefore, the program's impact cannot yet fully capture broader changes in community knowledge and behavior. In addition, the evaluation focused only on improving mothers' knowledge through pre-test and post-test assessments, without measuring changes in food preparation practices, the sustainability of implementing Moringa nugget processing at home, or its long-term impact on children's nutritional

status. The activity also lacked continuous assistance to ensure the sustained utilization of Moringa leaves as a nutritious supplementary food for toddlers.

For future community service activities, it is recommended to develop a continuous mentoring program for mothers of toddlers and community health cadres to ensure that local food-based innovations can be implemented sustainably. Future programs may also expand the variety of processed products using Moringa leaves or other local food resources by considering nutritional value, food safety, children's acceptance, and potential economic benefits for the community. Furthermore, future evaluations should include measurements of changes in feeding practices and toddler nutritional indicators to determine the long-term effectiveness of the intervention in preventing stunting.

Overall, MEGAMOR offers a practical approach to introducing nutritious, locally available foods into toddlers' diets. Future activities should help mothers apply the skills they have learned, address challenges in preparing moringa-based foods at home and assess children's acceptance of these products. Further evaluation is also needed to determine whether the program leads to sustained changes in feeding practices and child nutritional outcomes.

CONCLUSION AND SUGGESTIONS

This community service activity concludes that there is an increasing number of mothers with knowledge of toddler nutrition and innovations in processing toddler food from local wisdom sources, namely moringa leaves, which have high nutritional value. What distinguishes this community service program from other programs is its use of local wisdom materials, namely moringa leaves, which have high nutritional value. Moringa leaves grow abundantly in the Keniten village area. The next suggestion for community service providers is to continue developing skills in teaching additional food-processing methods to mothers of toddlers and in providing the support and understanding needed to increase awareness of the importance of toddler nutrition. Suggestions for community service partners, such as village officials or local government, can help cadre mothers and mothers of toddlers in Keniten Village reduce the high risk of stunting and ensure the sustainability of additional feeding programs with other variations. Hopefully, this program can strengthen cross-sector collaboration among relevant parties, such as nutritionists and other health experts, to improve the quality and availability of additional nutritious food.

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