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Improving mothers' knowledge by a training on the making of snack bar from taro flour and kepok banana

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ABSTRACT

The utilization of local food resources is an important strategy to support food security, improve nutrition, and empower communities. Bangun Rejo Village, Tanjung Morawa Subdistrict, Deli Serdang Regency, has abundant local food resources such as taro and kepok banana that have not been optimally utilized. This community service program aimed to improve the knowledge, attitudes, and practices of mothers with children under five years old and PKK cadres regarding the production of snack bars made from taro flour with the addition of kepok banana as a local food ingredient. The program was implemented through several stages, including socialization, pre-test, nutrition and local food education, hands-on training and demonstration of snack bar production, independent practice by participants, and post-test evaluation. A total of 25 participants took part in the activity. The results showed an increase in the average knowledge score from 63.20 before the training to 78.40 after the training. The proportion of participants with good knowledge increased from 16% to 76%. Participants' attitudes toward local food processing were already positive prior to the intervention and remained positive after the training. These findings indicate that practical, community-based education and training using local food resources are effective in strengthening knowledge and skill capacity of community, particularly among mothers of young children, to produce nutritious and practical food products.
Keyword: Community Service, Local Food, Snack Bar, Taro, Kepok Banana.

ABSTRAK

Pemanfaatan pangan lokal merupakan strategi penting dalam mendukung ketahanan pangan, peningkatan gizi, dan pemberdayaan masyarakat. Desa Bangun Rejo, Kecamatan Tanjung Morawa, Kabupaten Deli Serdang memiliki potensi pangan lokal berupa talas dan pisang kepok yang belum dimanfaatkan secara optimal. Kegiatan pengabdian kepada masyarakat ini bertujuan untuk meningkatkan pengetahuan, sikap, dan praktik ibu balita serta kader PKK dalam pengolahan snack bar berbasis tepung talas dengan penambahan pisang kepok sebagai pangan lokal. Kegiatan dilaksanakan melalui beberapa tahapan, meliputi sosialisasi, pre-test, penyuluhan gizi dan pangan lokal, pelatihan serta demonstrasi pembuatan snack bar, implementasi mandiri oleh peserta, dan post-test. Sebanyak 25 peserta mengikuti kegiatan ini. Hasil evaluasi menunjukkan adanya peningkatan rata-rata skor pengetahuan dari 63,20 sebelum pelatihan menjadi 78,40 setelah pelatihan. Proporsi peserta dengan kategori pengetahuan baik meningkat dari 16% menjadi 76%. Sikap peserta terhadap pengolahan pangan lokal sejak awal tergolong baik dan tetap menunjukkan respons positif setelah pelatihan. Kegiatan ini menunjukkan bahwa edukasi dan pelatihan berbasis praktik dengan memanfaatkan bahan pangan lokal efektif dalam meningkatkan kapasitas pengetahuan dan keterampilan masyarakat, khususnya ibu balita, dalam pengolahan pangan bergizi dan praktis.
Keyword: Pengabdian Kepada Masyarakat; Pangan Lokal; Snack Bar; Talas; Pisang Kepok

1. Introduction

Food is a biological resource derived from agricultural, plantation, forestry, livestock, fisheries, and aquatic systems, and it plays a fundamental role in sustaining human life and well-being. In Indonesia, the food sector has been identified as a priority area for national economic development due to its strategic contribution to

food security, community welfare, and local economic resilience [1]. Food security is closely linked not only to food availability and accessibility but also to food quality, safety, and nutritional adequacy, particularly at the household level.

In daily life, communities increasingly require food products that are safe, nutritious, and practical. Modern lifestyles have led to a growing demand for ready-to-eat or ready-to-use foods that can support daily activities without compromising nutritional quality. One such product is the snack bar, a compact food item designed to provide essential nutrients and help delay hunger between main meals. Snack bars are known for their convenience, relatively long shelf life, and high nutritional density, making them suitable as complementary foods for various population groups, including families with young children [2]. From a community empowerment perspective, snack bars also offer opportunities for household-scale food processing and income generation.

Taro (Colocasia esculenta L.) is a local tuber crop with considerable potential for utilization in community-based food processing. It has long been cultivated and consumed in many regions of Indonesia and contributes to food diversification, reduced dependence on wheat flour, and improved household nutrition. Taro is a rich source of carbohydrates (13-29%) and contains beneficial nutrients such as protein (1.4-3.0%) and vitamin C (7-9 mg), which is associated with antioxidant activity and protective health effects [3].

Kepok banana is recognized for its rich nutritional profile and functional components, particularly its higher potassium and sodium contents compared with other banana varieties such as Ambon banana. Potassium content in kepok banana reaches approximately 769.09 mg per 100 g, which plays an important role in regulating the renin–angiotensin–aldosterone system by influencing aldosterone secretion and sodium reabsorption in the renal tubules. Increased potassium intake enhances intracellular potassium concentration and supports the sodium–potassium pump mechanism, contributing to the regulation of electrolyte balance and blood pressure. Owing to these physiological effects, regular consumption of kepok banana has been suggested as a potential dietary approach for hypertension management [4]. In addition to its mineral content, kepok banana contains various functional compounds, including inulin (126.5 mg/100 g), antioxidants (12.35%), and dietary fiber, with crude fiber content of 1.14%. Its proximate composition includes moisture (65.94%), ash (0.72%), fat (0.10%), protein (1.76%), and carbohydrates (31.48%), highlighting its potential as a functional food ingredient as well as a nutritious snack or component in processed products such as cakes [5]. Considering its high nutritional content and widespread availability in Indonesia [6], bananas have strong potential to be developed into value-added food products through diversified community-based processing.

Bangun Rejo Village is one of the rural areas located in Tanjung Morawa Subdistrict, Deli Serdang Regency, North Sumatra, Indonesia. Tanjung Morawa is the third most populated subdistrict in the regency, with a total population of 235,558 and a land area of 131.75 km² [7]. The relatively large population and agricultural-based livelihood of the area indicate significant potential for community-based food processing activities. Local food commodities such as taro and kepok banana are commonly found in Bangun Rejo Village; however, their utilization remains limited to traditional and household-level consumption. Processing of local food commodities such as taro and kepok banana into snack bars can increase their nutritional value and improve product diversity. In addition, the development of local food–based snack products also provides opportunities for household-scale business development and community economic empowerment. This condition highlights the importance of community service programs that focus on improving knowledge and practical skills related to local food processing, diversification, and value addition to support household nutrition and community empowerment.

2. Methods

2.1. Location and participants

This community service program was conducted in Bangun Rejo Village, Tanjung Morawa Subdistrict, Deli Serdang Regency, North Sumatra, Indonesia. The participants consisted of mothers who had children under five years old and community health cadres resided in Bangun Rejo Village. Participant selection was carried out through a preliminary screening process based on the following criteria: (1) willingness to participate in all agreed activities, and (2) good physical health at the time of the program. Based on the screening results, a total of 25 participants were selected as the target group for this activity.

2.2. Program design and implementation

The program was implemented in several sequential stages. The first stage involved socialization of the activity and administration of a pre-test to assess participants' baseline knowledge and skills related to the processing of taro flour–based snack bars with the addition of kepok banana as a local food ingredient. The pre-test was conducted using a structured questionnaire covering participants' understanding of taro and kepok banana, their nutritional benefits, nutrient content, and potential processed products. This stage aimed to identify initial knowledge levels and to introduce the concept of utilizing local food resources as energy-rich snack bar products for young children.

The second stage consisted of an educational session delivered through lectures, question-and-answer activities, and group discussions. The materials provided included: (a) basic concepts of taro and kepok banana, (b) health and nutritional benefits of taro and kepok banana, (c) nutrient composition of both commodities, and (d) various processed products derived from taro and kepok banana. Educational materials were presented using visual media (LCD presentations) and supported by booklets containing information on nutritional content, benefits, required tools and ingredients, and snack bar processing procedures.

The third stage focused on hands-on training and demonstrations of snack bar production. Prior to the training, the team prepared all necessary tools and ingredients. Participants were guided on selecting fresh and intact taro roots and ripe kepok bananas, processing taro into taro flour, and preparing the tools and ingredients for snack bar production. The training included a step-by-step explanation of the snack bar formulation and processing procedures, as well as an explanation of the functional use of snack bars as an energy source for children. Participants were divided into small working groups, and each group was provided with the required materials and equipment. The community service team and enumerators demonstrated the snack bar preparation process and closely guided each group during implementation to ensure proper understanding and skill acquisition.

2.3. Snack bar formulation and processing procedure

The snack bar formulation consisted of taro flour (90 g), kepok banana (50 g), margarine (20 g), egg (50 g), sugar (80 g), and almond nuts (20 g). The processing procedure involved preparing and weighing all ingredients, mixing margarine, sugar, and egg until homogeneous, followed by the addition of taro flour and kepok banana. The dough was then molded onto a baking tray greased with margarine, topped with almond nuts, and baked in an oven at 150 °C for 40 minutes. After baking, the snack bars were cooled and cut into uniform sizes.

2.4. Post-test and evaluation

At the end of the program, a post-test was conducted to evaluate improvements in participants' knowledge and understanding after the educational and practical training activities. The questionnaire consisted of 15 structured questions covering general knowledge of taro and kepok banana, nutritional content and health benefits, local food diversification, and snack bar processing procedures. Data collection was carried out directly by the community service team and enumerators using printed questionnaires distributed before and after the intervention. Participants completed the questionnaires individually under facilitator supervision, and the results were analyzed descriptively by comparing pre-test and post-test scores. In addition to the written evaluation, participants' practical skills in snack bar production were assessed through direct observation using a performance checklist that included raw material selection, ingredient preparation, dough mixing, molding, and baking procedures. This evaluation was intended to measure both knowledge acquisition and practical skill development related to the utilization of local food resources for nutritious snack bar production.

3. Results and Discussion

3.1 Socialization and preparation stage

The community service program began with a socialization and preparation stage aimed at ensuring effective implementation of the activities. This stage involved coordination meetings with key stakeholders, including the Head of Bangun Rejo Village, village officials, and members of the Family Welfare Movement (PKK) cadres. During this initial engagement, discussions were conducted to identify community needs, confirm

participant involvement, and determine the schedule and location for the snack bar training activities. Agreement was reached regarding the venue, time, and technical aspects of the training program. In addition, the preparation stage included the arrangement of training materials, equipment, and ingredients required to produce snack bars. This preliminary coordination was essential to build community support and ensure smooth execution of the community service activities.

3.2 Implementation of snack bar training

The implementation of the snack bar training program was conducted systematically through several stages, beginning with administration of a pre-test to assess participants' initial knowledge regarding taro flour and kepok banana utilization (Figure 1). During this stage, participants were introduced to the objectives of the program, namely the development of locally based snack bar products as energy-rich complementary foods for young children. The pre-test results generally indicated that most participants had limited knowledge regarding the nutritional composition, health benefits, and processing potential of taro and kepok banana. Participants were generally familiar with taro and bananas only as conventional household food ingredients and had not previously considered their application in processed functional snack products. Similar findings have been reported in community-based food diversification programs, where local commodities are often underutilized due to limited public knowledge and technical skills in product development. The socialization stage therefore played an important role in increasing participants' awareness of local food resources and their economic and nutritional potential.

Figure 1. Educational session on taro and kepok banana utilization and snack bar preparation using lecture and visual media.

The educational stage was implemented through lectures, question-and-answer sessions, and group discussions. Educational materials focused on the characteristics and nutritional value of taro and kepok banana, including their carbohydrate, dietary fiber, vitamin, and mineral contents. Taro flour is recognized as a potential local carbohydrate source with good digestibility and energy contribution, while kepok banana provides natural sugars, potassium, and dietary fiber that are beneficial for children's growth and energy requirements. The educational materials also highlighted the importance of food diversification through local ingredients as an alternative to imported wheat-based products. The use of LCD presentations and supporting booklets facilitated participant understanding, as visual and printed educational media are known to improve information retention and learning effectiveness during community empowerment activities. Active participation during discussions indicated strong participant interest, particularly regarding the practical application of local ingredients into products with improved economic value and nutritional quality.

The hands-on training and demonstration stage represented the core activity of the program. Participants were directly involved in selecting appropriate raw materials, preparing taro flour, and producing snack bars according to the standardized formulation. The training process emphasized practical skill development through step-by-step demonstrations conducted by the community service team and enumerators. Participants showed high enthusiasm during the preparation process, especially during dough mixing, molding, and baking activities. Dividing participants into five small working groups encouraged collaboration and improved the effectiveness of knowledge transfer (Figure 2). Practical training methods are widely recognized as effective approaches for improving community skills because participants can directly observe and practice each

processing stage. Through continuous guidance, participants gained a better understanding of proper ingredient proportions, mixing techniques, and baking conditions required to produce snack bars with acceptable texture and appearance.

Figure 2. Hands-on training and group demonstration of taro flour–based snack bar production with the addition of kepok banana.

The snack bar formulation used in this program consisted of taro flour, kepok banana, margarine, egg, sugar, and almond nuts. The incorporation of taro flour and kepok banana provided a locally sourced carbohydrate base with desirable nutritional characteristics. The resulting snack bars had a compact texture, attractive appearance, and a naturally sweet flavor contributed by the kepok banana (Figure 3).

Figure 3. Snack bar made from taro flour and banana.

Participants reported that the product was easy to prepare using household-scale equipment and had good potential as a nutritious snack for children. In addition, the use of almond nuts contributed additional fat and protein, thereby enhancing the energy density of the product. The baking process at 150 °C for 40 minutes successfully produced snack bars with a stable structure and desirable color. The successful implementation of the training demonstrated that local food commodities such as taro and kepok banana can be effectively processed into value-added snack products with potential nutritional and economic benefits for the community.

Overall, the implementation of the training program successfully improved participants' knowledge and practical skills regarding local food processing and snack bar production. The combination of educational sessions and practical demonstrations proved effective in enhancing community capacity and encouraging the utilization of local food resources as nutritious products for children. Furthermore, the activity supported local food diversification efforts and promoted community awareness of developing functional food products based on indigenous agricultural commodities.

3.3 Evaluation and post-test results

The post-test evaluation was conducted after the completion of the educational and practical training sessions to assess the improvement in participants' knowledge and understanding regarding the utilization of taro flour and kepok banana in snack bar production. The evaluation used a structured questionnaire similar to the pre-test instrument, covering topics related to the nutritional benefits of taro and kepok banana, their nutrient

composition, processing techniques, and the functional role of snack bars as energy-rich foods for children. The post-test was intended to measure the effectiveness of the training program in increasing participants' cognitive understanding and practical knowledge (Figure 4).

Figure 4. Evaluation and post-test activities to assess participants' knowledge and skills after the snack bar training program.

The post-test results indicated a clear improvement in participants' knowledge compared to the pre-test outcomes (Table 1). Before the training, the average knowledge score was 63.20, with scores ranging from 40 to 85, indicating generally moderate to low knowledge levels. After the training, the average knowledge score increased to 78.40, with scores ranging from 85 to 95. Similar improvements in knowledge have been reported in previous community-based nutrition education and food processing programs, where participatory training methods significantly increased caregivers' awareness and understanding of local food utilization and healthy food preparation practices [1,2]. Moreover, Hadijah and Andriani [3] emphasized that hands-on training using locally available ingredients plays a crucial role in improving community knowledge and acceptance of alternative food products. The observed increase in knowledge in this program also supports findings from other community service activities, which highlight that combining lectures, discussions, and practical demonstrations is an effective approach to transferring knowledge and empowering communities to adopt sustainable, nutrition-oriented food processing practices.

Table 1. Pre-test and post-test results of participants in the snack bar production training program.

Knowledge	N	Mean	Min	Max
Before Training	25	63.20	40	85
After Training	25	78.40	85	95

Further analysis of knowledge categories showed a substantial shift from moderate to good knowledge levels following the training (Table 2). Prior to the intervention, only 16% of participants were classified as having good knowledge, whereas after the training, this proportion increased to 76%.

Table 2. Distribution of participants' knowledge categories before and after the training program.

Knowledge	Category	N	%
Before Training	Poor	0	0
	Moderate	21	84
	Good	4	14
	Total	25	100
After Training	Poor	0	0
	Moderate	6	24
	Good	19	76
	Total	25	100

Knowledge improvement is a critical outcome of community-based nutrition education, as knowledge is formed through sensory experience, attention, and perception, which influence individuals' ability to adopt healthier food practices. Similar improvements in knowledge following nutrition education and food processing training have been reported in previous community service and intervention-based studies, highlighting the effectiveness of participatory learning approaches.

3.4 Participants' attitudes toward the training program

Participants demonstrated positive attitudes toward the training activities throughout the program. Attitude scores measured during the pre-test and post-test phases are presented in Table 3. The average attitude score increased slightly from 25.28 before the training to 25.44 after the training, indicating a generally positive and consistent attitude toward local food processing and snack bar production.

Table 3. Participants' attitude scores during the pre-test and post-test.

Attitude	N	Mean	Min	Max
Before Training	25	25.28	21	27
After Training	25	25.44	21	27

As shown in Table 4, all participants were categorized as having good attitudes both before and after the training (100%). This finding suggests that participants were already positively inclined toward learning and adopting new food processing practices prior to the intervention. Attitude is defined as an internal response or readiness to act toward a particular object or stimulus, which can influence motivation and behavioral intention [8]. According to attitude theory, attitudes serve as a driving force that shapes individuals' willingness to accept and apply new knowledge, rather than representing actual behavior itself [9]. The consistently positive attitudes observed in this program likely contributed to the high level of participant engagement and skill acquisition during the training.

Table 4. Distribution of participants' attitude categories before and after the training program.

Practice	Category	n	%
Before Training	Poor	0	0
	Good	25	100
	Total	25	100
After Training	Poor	0	0
	Good	25	100
	Total	25	100

3.5 Effect of education and training on knowledge, attitudes, and practices

The overall impact of the education and training activities on participants' knowledge, attitudes, and practices is summarized in Table 5. Statistical analysis using a paired t-test showed a significant difference in knowledge scores before and after the training ($p = 0.000$), indicating a meaningful effect of the intervention on participants' knowledge levels. This finding supports previous studies demonstrating that structured nutrition education and hands-on food processing training can significantly enhance community knowledge, particularly among mothers and caregivers.

Table 5. Effects of education and training on participants' knowledge, attitudes, and practices.

Variable	N	Standard Deviation	p- Value
Knowledge before training	25	10.194	0.000
Knowledge after training	25	7.461	
Practices before training	25	1.275	0.698

Similarly, attitude scores before and after the training also showed a statistically significant difference ($p = 0.000$), reflecting the positive influence of the educational intervention. Although the categorical attitude classification remained unchanged, the quantitative improvement suggests reinforcement of positive perceptions and readiness to apply the acquired knowledge. These results align with previous community-based studies report that education and training programs focusing on local food utilization contribute to improved knowledge, positive attitudes, and increased capacity for healthy food preparation practices [1].

Overall, the findings indicate that the community service program successfully enhanced participants' knowledge and reinforced positive attitudes toward the utilization of taro flour and kepok banana in snack bar production. The integration of local food resources into practical training activities represents a sustainable approach to improving household nutrition and empowering communities, particularly in supporting the dietary needs of young children.

4. Conclusions

The community service activity involving education and training on the production of snack bars made from taro flour and kepok banana in Bangun Rejo Village successfully improved participants' knowledge and strengthened their practical skills in local food processing. The significant increase in knowledge scores and categories indicates that combining educational sessions with hands-on practice is an effective approach for knowledge and skill transfer. Participants' consistently positive attitudes toward local food utilization contributed to the overall success of the program. The use of taro and kepok banana as snack bar ingredients has potential to support improved child nutrition, local food diversification, and community empowerment through the development of nutritious local food products. As a follow-up plan, continuous mentoring and periodic monitoring activities are needed to support participants in independently producing and developing snack bar products at the household scale. Future programs may also include training on packaging, product marketing, and small-business management to expand the economic benefits of the activity and encourage wider community participation. Through sustainable implementation and collaboration with local stakeholders, this program is expected to contribute to community food security and the broader utilization of local food resources.

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