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The Knowledge Enhancement of Stunted Children's Parentals Through Training on Processing Additional Foods with White Oyster Mushroom, Taro Flour, and Fish Raw Materials

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Abstract. The problem of malnutrition that has received much attention recently is the problem of chronic nutrition in the form of stunting. One of the factors that cause stunting in toddlers is food intake. The provision of supplementary food containing complete nutrition can be used as an effort to prevent stunting in children. This community service was carried out in Bangun Rejo Village, Tanjung Morawa District, Deli Serdang Regency with the target community being the PKK Cadre group and mothers with stunting children. The purpose of this community service activity is to convey information about stunting children and how to prevent it, as well as train the target community to utilize and process food ingredients such as white oyster mushrooms, taro flour, catfish, rebon shrimp and lemuru fish into nuggets as a snack for children. stunting. The results of community service activities showed an increase in the participants' knowledge about stunting and how to prevent it, as well as skills to make catfish, rebon shrimp, lemuru fish, and oyster mushroom nuggets as snacks for stunted children.

Keyword: Stunted's Children, Malnutrition, Bangun Rejo Village, Nuggets

Abstrak. *Masalah kekurangan gizi yang banyak mendapat perhatian akhir-akhir ini adalah masalah gizi kronis dalam bentuk anak pendek (stunting). Salah satu faktor penyebab stunting pada balita adalah asupan makanan. Pemberian makanan tambahan yang mengandung gizi lengkap dapat dijadikan sebagai salah satu upaya pencegahan stunting pada anak. Pengabdian pada masyarakat ini dilakukan di Desa Bangun Rejo Kecamatan Tanjung Morawa Kabupaten Deli Serdang dengan masyarakat sasaran yaitu kelompok Kader PKK dan ibu-ibu yang memiliki anak stunting. Tujuan kegiatan pengabdian pada masyarakat ini adalah untuk menyampaikan informasi tentang anak stunting dan cara pencegahannya, serta melatih masyarakat sasaran untuk memanfaatkan dan mengolah bahan pangan berupa jamur tiram putih, tepung talas, ikan lele, udang rebon dan ikan lemuru menjadi nugget sebagai makanan selingan untuk anak stunting. Hasil dari kegiatan pengabdian masyarakat menunjukkan adanya peningkatan pengetahuan peserta kegiatan tentang stunting dan cara pencegahannya, serta keterampilan untuk membuat nungget ikan lele, nugget udang rebon dan nugget ikan lemuru sebagai makanan selingan bagi anak stunting.*

Kata Kunci: *Anak Stunting, Malnutrisi, Desa Bangun Rejo, Nuget*

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1. Introduction

According to the World Health Organization (WHO), stunting refers to children under 5 years of age who have low height for their ages. Children are considered as stunted if the z score value of their height-for-age (TB/U) is less than -2 below the WHO child growth standard [1]. Short term impact caused by stunting is that children have low immune system which effects on their susceptibility to disease, while in the long term it includes an increase of morbidity and mortality, poor cognition and educational performance, a high risk on noncommunicable diseases in adult life, and lost productivity [2].

In 2019, the prevalence of stunting in Indonesia and North Sumatera were 27.7% and 30.1%, which decreased in 2021 by 24.4% and 25.8%, respectively [3]. Stunting can be caused by some factors such as inadequate nutritional status during pregnancy, delay in breastfeeding practice, lower consumption of additional foods, infections, and other distal risk factors namely educational status, food system, health care, clean water, sanitation, infrastructure, and residence [6]. The government put some efforts in the declining stunting case through the Global Nutrition Targets 2025 program which indicates lower stunting on children as one of the program's six purposes [4] and Sustainable Development Goals with a key indicator namely Zero Hunger [5]. Thus, in accordance with these programs, this community service program needs to be carried out to drop stunting cases focusing on increasing the consumption of additional food for children.

One of the most favorable additional foods for children is nuggets, commonly made from chicken with additional binder such as wheat flour and spices. The utilization of local materials such as fish, white oyster mushroom, and taro flour to substitute chicken and wheat flour as protein source and flour is expected to raise the nutritional value of nugget as additional food. Furthermore, the price will be affordable, especially for the middle-class residents.

In this program, the protein source used for nuggets processing is the combination of catfish, Lemuru fish, Rebon shrimp, and white oyster mushroom. These materials are selected based on the nutritional contents which will help children's growth and development. The high content of leucine and lysine makes catfish preferred over other animal products. Leucine ($C_6H_{13}NO_2$) is an essential amino acid stimulating the growth of children and maintaining nitrogen balance [7]. Meanwhile, every 100 g of Lemuru fish (Sardinella lemuru) contain 3 g of omega-3 fatty acids, 20 g of protein, 20 mg of calcium, 100 mg of phosphor, 1 mg of Fe, and 10,05 m of vitamin B [8]. As in Rebon shrimp, it usually processes into dried shrimp or shrimp paste in which every 100 g contain 73.59% of protein, 13.3% of ash and 69.45% of calcium [9].

White oyster mushrooms (Pleurotus ostreatus) also can be utilized as a protein source of nuggets. Every 100 g of white oyster mushrooms contain 128 g of calories, 27% of protein (urea), 1.6% of fat, 58% of carbohydrate (cellulose, hemicellulose, and lignin), 51 mg of calcium ($CaCO_3$ and

CaSO4), 6.7 mg of iron, and 0.1 mg of vitamin B [10]. Based on these nutritional values, the nuggets produced in this program will provide high protein contents, complete amino acid composition, and organoleptic properties, especially taste, aroma, and texture which is acceptable and favorable to children.

The purpose of this community service program is to educate, and train stunted children's paternal to utilize local food materials such as white oyster mushrooms, taro flour, catfish, Rebon shrimp, and Lemuru fish to produce nuggets containing zinc and iron (Fe) as additional food for stunted children.

2. Method

The community service program was held in Desa Bangun Rejo Kecamatan Tanjung Morawa Kabupaten Deli Serdang. The participants were 25 parents whose children diagnosed stunting. This program was divided into two activities. The first activity was aimed to provide some informations about stunting and its prevention, while the second activity contained a training on processing taro flour, white oyster mushrooms, catfish, Lemuru fish, and Rebon shrimp into nuggets as stunting prevention.

2.1 Counseling and Dissemination of Information about Stunting in Children

Each participant was asked to do a pretest to measure their knowledge about stunting. The counseling activity was then carried out by providing information about stunting and the prevention, followed by discussion. At the end of the counseling activity, participants were given post-test questions to find out the enhancement in participants' understanding of stunting in children.

2.2 Training on processing the combination of Taro flour, white oyster mushrooms, catfish, Lemuru fish, Rebon shrimp into nuggets as additional food for stunted children

The nuggets consisted of the same main dough, which was white oyster mushrooms and taro flour. Three formulas were developed based on three different materials, such as catfish, Lemuru fish, and Rebon shrimp. Each ingredient was added to the main dough to produce three different nuggets.

2.2.1 Training on processing the combination of Taro flour, white oyster mushrooms, catfish, Lemuru fish, Rebon shrimp into nuggets as additional food for stunted children

400 g of white oyster mushrooms and 60 g of taro flour were mixed until homogeneous. The mixture was added by 3 cloves of garlic, 2 cloves of shallots, 2 teaspoons of seasoning, 2 teaspoons of ground pepper, and 4 teaspoons of salt, then stirred again until homogeneous. The variations of the nuggets made consisted of three different protein and mineral sources, such as

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catfish, Lemuru fish and Rebon shrimp. Each ingredient was added in varying amounts, such as 10%, 20%, 30% and 40%, so that 12 nugget formulations were obtained as shown in Table 1. The nuggets dough was mixed until homogeneous, then placed on a baking sheet and steam for 15 minutes. The cooked nuggets dough was then cut into square shapes in the same size before being dipped in beaten egg and coated with breadcrumbs. The nuggets were fried until golden brown.

Table 1. Nutrition composition of snakehead fish nugget per 100 g

Variant	Protein Source	Composition				
		Taro Flour (g)	White Oyster Mushrooms (g)	Catfish (g)	Lemuru Fish (g)	Rebon Shrimp (g)
1	Catfish	400	90	10	0	0
2		400	80	20	0	0
3		400	70	30	0	0
4		400	60	40	0	0
5	Lemuru	400	90	0	10	0
6	Fish	400	80	0	20	0
7		400	70	0	30	0
8		400	60	0	40	0
9	Rebon	400	90	0	0	10
10	Shrimp	400	80	0	0	20
11		400	70	0	0	30
12		400	60	0	0	40

2.3 Evaluation of The Program

The evaluation was conducted by the pretest and posttest activity to measure the knowledge of stunted children's parentals on stunting, the prevention, and the nuggets from white oyster mushrooms and taro flour processing with the addition of three different seafood materials. Each pre and posttest was held for 30 minutes.

The questions given during the pre-test and post-test were divided into 3 categories of questions, such as knowledge, attitudes and actions categories. In the knowledge category, the questions given included indicators of healthy children, principles of consuming healthy foods for the growth and development of children, types of foods that are sources of protein, and how to choose healthy foods. In the attitude category the questions given included a mother's attitude about good child growth and development and providing nutritious food to prevent stunting in children. In the action category, the questions asked included what actions mothers take in dealing with difficulty eating children and actions in providing healthy food to children.

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3. Results and Discussion

3.1 Counseling and Dissemination of Information about Stunting in Children

Counseling and dissemination of information was carried out to 25 parents of stunted children in Desa Bangun Rejo Kecamatan Tanjung Morawa Kabupaten Deli Serdang. The information provided includes the causes and prevention of stunting and conditions of stunting in children. While participants already had sufficient information about stunting in general before, some of those were still unfamiliar with this topic. After the counseling, the knowledge of participants about stunting successfully increased which led them to participate in curing the stunted children.

3.2 Training on processing the combination of Taro flour, white oyster mushrooms, catfish, Lemuru fish, Rebon shrimp into nuggets as additional food for stunted children

In this program, the community service team provided a training and demonstration directly about the processing of nuggets made from taro flour, white oyster mushrooms, catfish, Lemuru fish, and Rebon shrimp (Figure 1). The nuggets were then served as additional food for stunted children in Desa Bangun Rejo Kecamatan Tanjung Morawa Kabupaten Deli Serdang. Based on observation, participants showed some enthusiasm. During training, the team explained the benefits of using the materials which are rich in nutritional values such as Fe, Ca, and Zn [10]. Furthermore, the team elaborated how to process Lemuru fish spines by steaming, followed by grinding.

During the nugget manufacturing stage, 12 nugget variants were made, which differed in terms of the type and amount of added protein and mineral sources. Based on panelist acceptance level tests for aroma, taste, texture, and overall acceptance, the formulation of nuggets with the addition of 40% catfish, 40% Lemuru fish, and 40% Rebon shrimp was favorable. Figure 2 illustrated the nuggets made from taro flour and white oyster mushrooms with the addition of catfish, Lemuru fish, and Rebon shrimp.

Figure 1. Training activities in nugget making

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Figure 2. Nugget product from a mixture of taro tuber flour, oyster mushroom, catfish (a), Lemuru fish (b), and Rebon shrimp (c)

Participants were divided into 3 groups which had different assignments. The first group made nuggets from catfish, while the second group and third group made nuggets from Lemuru fish and Rebon shrimp, respectively. The results of this practical activity showed that the participants were able to process nugget products from taro flour, oyster mushrooms with the addition of catfish, Lemuru fish, and Rebon shrimp. Based on the preference assessment of the products, the participants stated that Lemuru fish nuggets were preferred in terms of color, aroma, taste and texture.

3.3 Evaluation of The Community Service Program

Evaluation of the participants were carried out by the pretest and posttest which were given to the participants before and after the activity. The assessment included knowledge, attitudes, and actions of the participants.

3.3.1 The Knowledge Evaluation Results

The result showed the knowledge of participants increased after the counseling and training section. The average score of pretest and posttest was shown on Table 2.

Table 2. Pre-test and Post-Test Results of Participants

Variable	n	Mean	SD	Min	Max
Pre test	25	15.60	4.856	5	25
Post test	25	19.40	2.630	15	25

The pre-test result showed that the average score of the participants before training was 15.60, classified as lack of knowledge about stunting. Meanwhile, the post-test result showed an increase on the average score of participants by 4.2, altering the classification into a good knowledge of stunting.

Table 3 demonstrated the classification of participants before and after the training. Before training, the participants had 32% of knowledge about stunting which then increased to 80% after the training. Knowledge is the result of what someone perceives about objects through the senses that are owned and influenced by attention and perception of objects. Knowledge about environmental health can be the basis for people to behave well [11].

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Table 3. Participants Score Categories Before and After Training

Variable	Category	n	%
Before Training	Low	1	4,0
	Satisfactory	16	64,0
	Good	8	32,0
	Total	25	100,0
After Training	Low	0	0
	Satisfactory	5	20,0
	Good	20	80,0
	Total	25	100,0

3.3.2 Evaluation Results on Participants' Attitude

Table 4 illustrated the assessment on participants' attitude before and after training. The attitude of participants rose from 12.12 to 13.48 which was categorized as a good score.

Table 4. Participants' Attitudes Before and After Training

Variable	N	Mean	SD	Min	Max
Before Training	25	12.12	2.279	8	15
After Training	25	13.48	1.686	9	15

The attitude score was categorized as low and good score. Table 5 showed that there was no significant difference in participants' attitude before and after training, in which the percentage of good score was 100%.

Table 5. Participants' Attitude Categories Before and After Training

Variable	Category	n	%
Before Training	Low	0	0
	Good	25	100
	Total	25	100
After Training	Low	0	0
	Good	100	100
	Total	25	100

Attitude refers to a reaction or response from someone to a stimulus or object. Attitude is a readiness or availability to act, not the implementation of certain motives. Attitude contains motivation. Attitude is not only a record of the past, but also the determination of someone's action towards something, the preference, the expectation, and will. Someone who has a good attitude towards nutrition will tend to behave well in meeting their nutritional needs. Lack of attitude to fulfill nutritional needs will lead to inadequate nutritional intake which will be related to health problems [11].

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3.3.3 Evaluation on Participants' Actions

The evaluation on participants' actions was shown on Table 6, indicating an increase on the average score before training (13.36) and after training (13.72).

Table 6. Participants' Actions Before and After Training

Variable	N	Mean	SD	Min	Max
Before Training	25	12.12	2.279	8	15
After Training	25	13.48	1.686	9	15

The action score categories of the participants in the training was shown on Table 7. Before training, the actions were categorized as good scores (100%) which made no difference after training.

Table 7. Participants' Action Categories Before and After Training

Variable	Category	n	%
Before Training	Low	0	0
	Good	25	100
	Total	25	100
After Training	Low	0	0
	Good	100	100
	Total	25	100

Attitude is not the same as behavior or action since people usually take actions that are contrary to the attitude and knowledge they have. This theory supported the results of this evaluation which indicated that participants had good behavior in meeting the nutritional needs of their children. In contrast, the participants might have less knowledge about food diversity and how to present food that is more attractive and varied to increase their children's appetite. Therefore, training in making nuggets with the basic ingredients of taro flour, oyster mushrooms, and various sources of protein such as catfish, Lemuru fish, and Rebon shrimp was expected to increase people's knowledge about food processing in order to produce varied and attractive food.

3.3.4 Evaluation on Participants' Actions

In this community service program, the participants were given some lessons about stunting and training on how to process food as prevention for stunting in children. By this action, there was an increase in the knowledge, attitude, and action of participants. This data was shown on Table 8.

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Table 8. The Effect of Training on Knowledge, Attitudes, and Actions of Participants

Variable	Pre-test		Post test		p-value (t-test)
	N (Number of Participant)	Standard Deviation	N (Number of Participant)	Standard Deviation	
Knowledge	25	4.856	25	2.630	0.002
Attitude	25	2.279	25	1.686	0.013
Action	25	1.075	25	0.843	0.131

Based on the t test, the p value of effect on training towards knowledge and attitude of participants was 0.002 and 0.0013, respectively. This result indicated that the training had a significant effect ($p<0.05$) on the participants. Meanwhile, the p value of effect of training on actions was 0.131, demonstrating that there was no significant difference ($p>0.05$) on the participants.

4. Conclusion

The participants of this community service program are a group of stunted children's parentals families in Desa Bangun Rejo Kecamatan Tanjung Morawa Kabupaten Deli Serdang. Training on processing taro flour, white oyster mushrooms, catfish, Lemuru fish, and Rebon shrimp as source of nuggets has successfully increased the participants' knowledge on the importance of food diversity in meeting the nutritional needs of children to prevent stunting. The nuggets produced are expected to be small business in the area.

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