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## **Effect of giving premix cookies with mung beans and anchovy (Stolephorus) for stunting prevention on toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency**

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### **Abstract**

Stunting is when a child's body length or height is less than their age. Several factors cause stunting, including energy and nutritional intake, and babies born with low birth weight (LBW). Apart from being found in milk, sources of protein and calcium can also be found in various other foods, both animal and vegetable. One source of protein and calcium is green beans and anchovies. This research was conducted in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency. This research aims to determine how giving premix cookies mung bean and anchovy prevents toddler stunting. This type of research is quasi-experimental with a pretest–post-test research design. The sample in this study was 60 toddlers, with 30 intervention groups and 30 control groups. Where before and after the treatment, body height was measured. Analysis was carried out in the research using the t-test with a confidence level of 95%. The results of the study showed that the mean TB/U before giving premix cookies mung bean and anchovy in the intervention group was  $-0.99 \pm 2.332$ , and after giving the results showed it was  $-0.02 \pm 1.562$ , while the control group had a TB / U of  $-0.05 \pm 1.785$ . Conclusion: The results of the dependent t-test obtained  $p=0.001$  ( $p \leq 0.05$ ), which means that there is a significant effect before and after giving premix cookies mung bean and anchovy on the prevention of stunting in toddlers with a difference in the average TB/U of toddlers of  $-0.97$ .

**Keywords:** anchovy, mung bean, toddlers, stunting

### **Introduction**

According to WHO, toddlers are children under three years of age, with the age of 2-3 years often referred to as the critical period (Organization, 2006). During this period, children need a balanced nutritional intake in quantity and quality to achieve optimal weight and height.

Toddlers are a critical period because there are efforts to create excellent and quality human resources; toddlers are in the golden age, where brain cells are in optimal development and growth.(Munawaroh et al., 2022).

Malnutrition among toddlers is still a public health problem in Indonesia. According to the results of Basic Health Research(Kementrian Kesehatan Re, 2018), the prevalence of undernutrition among children under five in Indonesia based on BW/U has not decreased significantly in the last five years, from 13.9% in 2013 to 13.8% in 2018. One of the provinces in Indonesia with the highest rate of malnutrition among children under five is Central Java province, at 14%.

Based on data from the Central Statistics Agency, 2020 in North Sumatra, data on short and very short toddlers has increased, with short toddlers 15.1% (2016), 16% (2017), 19.2% (2018) and very short toddlers 9, 34% (2016), 12.5% (2017) and 13.2% (2018)<sup>2</sup>. The number of stunting cases is high in North Sumatra (North Sumatra). In 2019, the prevalence reached 30.11 percent, only a decrease of 2.3 percent compared to the previous year. The prevalence of stunting in 2020 and 2021 in Deli Serdang Regency decreased by 3.07 and 1.52. Tanjung Morawa with a prevalence of 2.17 and 0.43(Statistik, 2020)

Malnutrition in toddlers hurts hampering the growth and cognitive development of toddlers (Laksmi, 2023). The relationship between protein and growth means that a child who lacks protein intake will experience slower growth than a child who has sufficient protein intake, and in worse cases, a lack of protein for a long time can result in the growth process stopping.

Factors causing stunting are influenced by energy intake, nutrition, gender, number of members in the family, education of the mother and father, occupation of the mother and father, area of residence, economic status of the family, and babies born with low birth weight (LBW).(Nursyamsiyah et al., 2021). The negative impacts caused by stunting in the short term are disruption of brain development, physical growth disorders, and metabolic disorders in the body. In contrast, the long-term impacts of stunting that can be caused are decreased cognitive abilities and learning presentations, decreased immunity so that people get sick quickly and have a high risk of developing diabetes, obesity, heart disease, cancer, stroke, and disability in old age(Fahrina & Taupik, 2023; Imelda et al., 2018; Pulungan & Lestari, 2024). The government's management of stunting prevention has created a review program aimed at preventing stunting in children under three years (toddlers) to obtain data on macro and micronutrients in food.(Hardani & Zuraida, 2019). Like cookies, anchovy is a high-quality food because all parts of its body can be consumed. Anchovy bones contain a lot of protein and calcium; 100 grams of fresh anchovies contain 77 kcal of energy; Protein 16 gr; Fat 1.0 gr; Calcium 500 mg; Iron 1.0 mg; Vitamin A 47; and Vit B 0.1 mg. The nutritional content of fresh and dried anchovies is higher than other fish(Aryatika et al., 2024; Pulungan & Lestari, 2024).

Apart from being found in milk, sources of protein and calcium can also be found in various other foods, both animal and vegetable. One source of protein and calcium is green beans and anchovies. As a source of vegetable protein, mung bean plants are beneficial for fulfilling family nutrition and can be produced in limited irrigation conditions, such as in NTT.

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Green beans are rich in proteins such as Isoleucine 6.95%, Leucine 12.90%, Lysine 7.94%, Methionine 0.84%, Phenylalanine 7.07%, Threonine 4.50%, Valine 6.23%, and amino acids nonessential (Sulfi, 2021). Apart from protein, calcium is one of the micronutrients essential for linear growth. As much as 70% of bone weight consists of calcium phosphate crystals; this shows the importance of calcium intake for optimal bone growth (Chairunnisa et al., 2018). Anchovies are a good calcium source because anchovies are consumed whole with the bones. Green beans and anchovies are made into flour and cookie food products to simplify the homogeneous substitution process. Research result (Ningrum et al., 2018) There is an influence of providing local supplementary food and government programs (biscuits) on improving the nutritional status of toddlers in the working area of the Mokoau Community Health Center and the Benu-Benua Community Health Center working area. Research result (Hadju et al., 2023) There is a significant influence between local PMT and changes in the nutritional status of toddlers. Providing additional food based on local food can be a supplementation strategy to overcome nutritional problems in toddlers.

Both children and adults like snacks in the form of cookies. Many people like cookies because they taste delicious, tend to be sweet, have a crunchy texture, and are relatively easy to make. Cookies can be stored for quite a long period of time, so they are more practical. They can be consumed repeatedly and at any time.

### **Literature Review**

Research results from (Purhadi et al., 2019), The Effect of Giving Mung bean Porridge on Changes in Weight of Toddlers with Malnutrition Status in the Tawangharjo Community Health Center Working Area, Grobogan Regency. This study aims to determine the effect of giving mung bean porridge on changes in body weight of toddlers with malnutrition in the Tawangharjo Community Health Center Working Area, Grobogan Regency. Mung bean porridge is an additional food for nutritional recovery that is enriched with vitamins and minerals. Mung bean porridge contains complete protein, which can help the formation of body cells and growth and increase body weight. The research design used in this research is Pre-Experiment with a One Group Pre Test Post Test Design approach. The results of this study showed a test of the difference in body weight before and after being given mung bean porridge using the Paired t-test using the known calculated t value (3.658) > t table (2.228) and pv value (0.004) <  $\alpha$  (0.05). Based on the results of the paired t-test, it was concluded that giving mung bean porridge had an effect on changes in the body weight of toddlers with malnutrition status in the Tawangharjo Community Health Center Working Area, Grobogan Regency. The increase in toddler weight after being given intervention could also be due to mothers paying more attention to giving mung bean porridge in addition to their daily food.

Research results from (Pulungan & Lestari, 2024) with the title The Effect of Giving Anchovy Cookies (Stolephorus Sp) on Stunting Prevention in Toddlers in I Paluh Mardan Hamlet, Pematang Cengal Village, Kec. Tanjung Pura District. Langkat 2023. This research aims to discover the effect of giving anchovy cookies (Stolephorus Sp) on preventing stunting

in toddlers in I Paluh Mardan Hamlet, Pematang Cengal Village, Kec. Tanjung Pura District. Langkat 2023. The type of research used is Quasi-Experimental with a one-group pretest and post-test design. The sample in the study was 28 people. Research Results/Discussion: The results of research on the experimental group showed that the average increase in height in male toddlers was 89.4 cm and the average increase in height and length was 1.1778 cm, while in female toddlers, the average increase in height was 90.6 cm with an average increase of 1.1526 cm. The analysis results using the t-dependent test with a confidence level of 95% show a sig (2-tailed) value  $<0.05$ , which means that giving anchovy cookies prevents stunting in toddlers. Conclusion: It is hoped that Hamlet I Paluh Mardan, Pematang Cengal Village, will You can use anchovies to be processed into cookies or processed forms of anchovies to increase height in toddlers or as additional food for preventing stunting.

## Research Method

This research was conducted in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency. This research aims to determine how giving premix cookies mung bean and anchovy prevents toddler stunting. This type of research is quasi-experimental with a pretest–post-test research design. The population in this study were all toddlers aged 12 months to 59 months in Telaga Sari Village, Tanjung Morawa District, Deli Regency with a sample of 60 people. The sampling method was consecutive sampling, where all subjects who came and met the selection criteria were included in the study until the required number of subjects was met. The sample in this study was 30 toddlers who received premix cookies from mung bean and anchovy, and 30 toddlers were controls. Data collection and height checks were carried out in collecting data on toddlers who were used as respondents. Toddlers are given premix cookies to consume daily, monitored by an enumerator. Every month, there will be an evaluation of cookie consumption, and every six months, monitoring and evaluation will be carried out regarding weight gain and height, which are recorded in the observation sheet. Analysis was carried out in the research using the t-test with a confidence level of 95% using SPSS Version 23.

## Results

### Demographic Data

The demographic data of toddlers examined in this research includes age and gender, the complete results of which can be seen in the following table.

Table 1. Demographic data on toddlers in Telaga Sari Village, Tanjung Morawa District Deli Serdang Regency

Demographics	Intervention group		Control group	
	n	%	n	%
Age				
12-20 months	3	10.0	7	23.3
21-30 months	8	26.7	6	20.0
31-40 months	7	23.3	3	10.0
41-50 months	5	16.7	8	26.7

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51-59 months	7	23.3	6	20.0
Total	30	100.0	30	100.0
<b>Gender</b>				
Man	17	56.7	17	56.7
Woman	13	43.3	13	43.3
Total	30	100.0	30	100.0

The results of the research on age characteristics in the table above show that the majority of toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency in the intervention group were aged 31-40 months and 51-60 months, seven people (23.3%), and a few were aged 11- 20 months as many as three people (10%). In the control group, it was found that most toddlers were 41-50 months old, eight people (26.7%), and three people (10%) aged 31-40 months at least. From the results of this study, it is known that there were 17 male toddlers in the intervention group (56.7%) and 13 female toddlers (43.3%); the exact distribution of numbers was also found in the control group.

The effect before and after giving premix cookies mung bean and anchovy on preventing stunting in toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency. The test uses the dependent t-test statistical test because the results of the normality and homogeneity tests show that the data is normally and homogeneously distributed ( $p>0.05$ ), and the complete results can be seen in the following table.

Table 2. The effect of giving premix cookies mung bean and anchovy to prevent stunting in toddlers in Telaga Sari Village, Tanjung Morawa District Deli Serdang Regency

<b>Group</b>	<b>Observation</b>	<b>Mean±SD</b>	<b>P</b>
Intervention	Before	-0.99±2.332	0.001*
	After	-0.02±1.562	
Control		-0.05±1.785	

The research results in the table above show that the mean TB/U before giving premix cookies mung bean and anchovy in the intervention group was  $-0.99 \pm 2.332$ , and after administration, it was  $-0.02 \pm 1.562$ , while the control group had a TB/U of  $-0.05 \pm 1.785$ . The results of the dependent t-test obtained  $p=0.001$  ( $p \leq 0.05$ ), which means that there was a significant effect before and after giving cookies with a mixture of green beans and anchovies on the prevention of stunting in toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency with an average difference in TB/U under five of  $-0.97$ .

## **Discussion**

Research on the effect of giving premix cookies mung bean and anchovy to prevent stunting was carried out on 60 toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency. The toddlers were divided into two groups, the intervention group and the control group, each with 30 toddlers.

From the results of research on the age characteristics of toddlers, the majority of toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency in the intervention

group were aged 31-40 months and 51-60 months, seven people (23.3%), and a few were aged 11-20 months. as many as three people (10%). In the control group, it was found that most toddlers were 41-50 months old, eight people (26.7%), and three people (10%) aged 31-40 months at least. From the results of this research, it is known that there were 17 male toddlers in the intervention group (56.7%) and 13 female toddlers (43.3%); the exact distribution of numbers was also found in the control group. Stunting is a problem of nutritional status where toddlers are less tall compared to their age. This condition is measured by body length or height, which is less than minus two standard deviations of the median child growth standard from WHO. Demographic data on the age characteristics of stunted toddlers in this study found that the ages of toddlers in both groups were 12-59 months old. The same research results were found in research by (D. C. Utami & Azizah, 2023) that 62 toddlers who experienced nutritional problems in the work area of the Kutasari Community Health Center were aged 12-59 months. 17 Other research conducted by (Hatijar, 2023) also found things that aligned with this research. The toddlers who experienced the most stunting were in the age range of 12-59 months.

Age is an internal factor that determines that at the age of under six months, most babies are still in good status, while in the age group after six months, the number of toddlers with good nutritional status has decreased to 50%. 16 Children under five aged 12-59 months are the age group. Who are vulnerable to health and nutritional problems. At this age, their needs increase, while they cannot ask for and look for their food. Often, at this age, they are no longer paid attention to, and the management is handed over to other people so that the risk of malnutrition is even greater. Children who are malnourished will experience a decrease in endurance, so the child is vulnerable to infectious diseases (Sapitri et al., 2022).

Malnutrition can occur due to an imbalance between nutritional intake and needs, while malnutrition occurs due to low nutritional intake. Under five years of age is a developmental stage susceptible to diseases that occur due to excess or lack of nutrition (Ramlah, 2021). Malnutrition in babies and toddlers over a long period can increase the risk of stunting in children. Stunting is a condition of chronic malnutrition due to lack of nutritional intake for a long time which causes growth disorders in children, where the child is shorter than the age standard (Hizriyani, 2021). Therefore, nutritional problems in children need special attention and appropriate treatment. In overcoming nutritional problems, the Indonesian government has issued a policy to improve community nutrition through a supplementary food program (PMT) in the form of PKMK (Processed Food for Special Medical Conditions) biscuits, which are distributed through community health centers to be given to babies or toddlers with malnutrition (Andriani et al., 2023). The supplementary feeding program (PMT) is regulated by the Republic of Indonesia Minister of Health Regulation number 51 of 2016 concerning Nutritional Supplementation Product Standards, where the provision of supplementary food is focused on macronutrients and micronutrients for toddlers and pregnant women in the context of preventing Low Birth Weight (LBW) Babies and stunted toddlers.

Nutritional status is a measure of success in providing nutrition for children, as indicated by the child's weight and height. This research uses premix cookies made from green beans and Medan anchovies, which are intended to prevent stunting (Manaf, 2023). Based on the research results, it was stated that giving premix cookies could improve the nutritional status

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of toddlers by changing their height by -0.97. Premix cookies made from green beans and Medan anchovies can be used as a food ingredient to prevent stunting in toddlers.

Research result (Ningrum et al., 2018): There is a relationship between providing additional food with mung bean porridge and government programs (biscuits) and improving the nutritional status of toddlers in the Mokoau Health Center and Benu-Benua Health Center working areas between after-treatment and before treatment in the mung bean porridge and biscuits group. The results of independent tests showed that there was a difference between body weight and body length before and after treatment for toddlers.

This is also supported by research (Andriani et al., 2023). There is an effect of providing local food (moringa granola) as an additional food to prevent stunting in malnourished toddlers, and the effectiveness of providing moringa granola is 0.4 (effectiveness in the medium category). Likewise, research (Irwan & Lalu, 2020) shows that Providing modified PMT based on local wisdom can be an alternative program to eradicate stunting and malnutrition in villages.

A child's growth greatly influences food consumption, thereby influencing the child's nutritional status. Good nutritional status occurs when the body obtains enough nutrients efficiently to enable physical growth, brain development, workability, and general health. The increase in children's nutritional status after giving premix cookies, seen by changes in height in this study, was caused by the nutritional content and benefits of green beans and anchovies. According to theory, green beans have several benefits, including strengthening bones, calcium content helping bone growth, and preventing malnutrition; protein can increase cell production and help growth, while Medan anchovies are a superior marine product in North Sumatra Province, which contains high nutrition. Such as protein, calcium, iron, phosphorus, minerals, and vitamins which help keep bones strong because anchovies are rich in calcium and phosphorus, which are suitable for bone health (Aprialdi, 2020; Harisudin, 2004; Sihotang, 2023; Tob, 2019; P. Utami, 2010)

### **Conclusion**

Based on the research results, it can be concluded that premix cookies made from green beans and Medan anchovies can increase the height of toddlers in Telaga Sari Village, Tanjung Morawa District, Deli Serdang Regency. Premix cookies made from green beans and Medan anchovies can be used as a food ingredient to prevent toddler stunting. It is hoped that mothers with toddlers in Telaga Sari Village will apply premix cookies mung bean and anchovy to increase their height.

Provide the conclusion to your study, and final words on the value of your analysis, research, or paper. Limitations of your study should be addressed. Recommendations for future research related to your topic should also be mentioned.

### **Declaration of conflicting interest**

The author declares that all authors have no conflict of interest.

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