

# The Influence of Nutrition Education on Consumption Fish and Z-Score Height for Age Children Stunting and Non Stunting Age 4-6 Years in the Integrated PAUD with Posyandu in Lubuk Pakam and IV Jurai Districts

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**Abstract:** Stunting is a condition that exceeds a deficit of 2 SD (Standard Deviation) below the median population height, becoming a national problem because an increase in prevalence and its impact can increase less competitive human resources, affect work productivity, increase the risk of obesity and obesity, and trigger metabolic syndrome disease. The causes of stunting are very complex, insufficient food intake and infectious diseases are direct factors, indirect factors in maternal nutritional care for children which are influenced by educational and behavioral factors. Increasing maternal knowledge and increasing fish consumption in children as a step to reduce stunting rates requires an integrative treatment. Efforts to reduce stunting will be more effective if specific and sensitive nutrition interventions are carried out in an integrated or integrated manner. The purpose of this study was to determine the effect of nutrition education on mothers, fish consumption and zscore TB/U in stunting and non-stunting children. This research is a quasi-experimental, with a control group design research design pre and post test. The sample is children aged 4-6 years in two districts. The study was conducted from September to November 2020. Interventions for mothers and children with nutrition education, training in fish processing and feeding of fish based on samples for 30 days. Data collection by measuring sample height, 3 x 24 hours food recall. The collected data was checked, then processed with computer aids. Data analysis of dependent and independent T test with  $\alpha = 0.05$ . The nutrition education intervention carried out to mothers and the provision of Lemuru food to stunting and non-stunting PAUD children provided increased knowledge and attitudes of mothers about fish consumption, increased fish consumption in children and z-score height for age children, where there was a difference the mean of the variables before and after the intervention. In both stunting and non-stunting groups, there was no significant difference with knowledge, maternal attitudes, fish consumption and child z-score height for age. It's necessary to continue nutrition education activities by PAUD teachers and Posyandu cadres so that mothers will understand and become more skilled in providing food made from fish, especially for children who are stunted so that optimal height growth can be achieved.

**Keywords:** Nutrition Education, Knowledge, Attitude, Fish Consumption, Z-Score Height for Age, Stunting, Children Aged 4-6 Years, PAUD.

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## 1. Introduction

Stunting is a stunting condition that exceeds a 2 SD deficit (Standard Deviation) below the median population height of the international reference. Stunting becomes a national problem because of the increasing prevalence and its impact which can increase less competitive human resources, affect work productivity, increase the risk of obesity and obesity, and trigger metabolic syndrome. The prevalence of very short and short according to Riskesdas 2007, 2010, 2013 and 2018 shows very small changes at both the national and provincial levels. The prevalence of very short and short for Indonesia

36.8%; 35.6%; 37.2%; 30.8%, while the prevalence at the provincial level of North Sumatra and West Sumatra based on Riskesdas 2018 is still above 30%. This shows that the prevalence rate is still quite high, and health problems in the community are considered severe if the prevalence of stunting is 30-39% and serious if the prevalence of stunting is  $\geq 40\%$  (Balitbangkes, 2013; Widiyanto, 2018).

The factors causing a child to be stunted are very complex, insufficient food intake and infectious diseases are direct factors. At the household level, the state of nutrition is influenced by the ability of the household to provide food in sufficient quantities and types, nutrition care for mothers and children which is influenced by educational and behavioral factors, and the health condition of household members. Chronic malnutrition is always related to low intake and quality of food consumed.

Sari, et al. (2016) stated that the low height for age in children was due to low protein intake along with low consumption of iodine and zinc. It was found that micronutrient intake was significantly lower in stunted children compared to non-stunting children. Growth failure can be caused by inadequate intake of one or more nutrients such as intake of micronutrients, namely calcium and zinc (Kartini, et al, 2016). De Onis, et al (2006) in Kusumawati, et al (2015) also stated that there are several nutrients related to stunting such as protein, iron, zinc, calcium and vitamins D, A and C. In addition to hormone, genetic and low factors. Parents' knowledge of care, poverty, low environmental sanitation, and low food accessibility at the family level, especially for poor families, also determine.

In Mazengia's Research et al. (2018) said that education and knowledge are important risk factors for stunting in Indonesia, South China and Abeokuta, Southwest Nigeria. Educated mothers may be more open to the media, less illiterate, have a better understanding of nutrition and health, mothers may also have more authority at home and can increase productivity to improve the nutritional status of children and families. In a study by Masresha et al. (2013) in Sidama, South Ethiopia, it was concluded that the practice of feeding children to most mothers did not meet WHO recommendations.

Provision of a proper diet for toddlers in an effort to improve nutritional status will be realized if the mother has a good level of nutritional knowledge. Ignorance of information about nutrition can lead to a lack of quality or nutritional quality of family food, especially food consumed by toddlers (Sjahmien, 2003 in Ni'mah, Khoirun and Siti Rahayu Nadhiroh (2015). The level of maternal nutritional knowledge affects attitudes and behavior in choosing food ingredients. which will further affect the nutritional state of his family (Ni'mah, Khoirun & Nadhiroh, 2015).

One of the efforts to overcome the problem of food-based stunting continues to be done to reduce the prevalence of stunting children. Local-based alternative foods, one of which is fish, is a regional food source whose potential can be increased for an accelerated program to overcome stunting problems (Litbangkes, 2014). Fish have an

important role as a source of energy, protein and a variety of essential nutrients which account for about 20% of total animal protein. Protein from fish is an important nutritional component for countries with high populations where the adequacy of protein is at a low / low level.

No less important attention is focused on fishery products as a source of micronutrients such as vitamins and minerals. This is especially true for small fish species that are consumed entirely from head to bone, which can be excellent sources of essential minerals such as iodine, selenium, zinc, iron, calcium, phosphorus and potassium, as well as vitamins such as vitamin A and vitamin D, and several vitamins from group B (Rachim et al., 2017).

Fish consumption in toddlers is still low because fish is still the second source of protein after meat. Fish consumption is low because the fish processing level is often only fried, to increase fish consumption may require additional skills to process and serve fish suitable for young consumers. Lack of knowledge about how to cook fish is one of the obstacles in consuming fish.

The problem of increasing maternal knowledge and increasing fish consumption in children as a step to reduce stunting rates requires an integrative treatment. In general, integration is a process of unification between two or more elements which results in the creation of a desire that goes well and correctly. Efforts to reduce stunting will be more effective if specific and sensitive nutrition interventions are carried out in an integrated or integrated manner. Several studies both from within and outside the country have shown that the success of an integrated approach carried out on priority targets to prevent and reduce stunting.

PAUD which is integrated with Posyandu is the most appropriate place for early childhood learning activities. Maintenance and care for the welfare of mothers and children from an early age is a strategy in the fulfillment of basic services which include improving the degree of good health and nutrition, a healthy and safe environment, psychosocial development, language skills and cognitive ability development (thinking and creativity. ) as well as child protection against neglect (Mahardika, 2018). The partnership of the PAUD Unit with parents and other relevant agencies will greatly support the success of the objectives of program implementation. Especially in matters that are closely related to efforts to reduce stunting rates in children under five and anticipating it.

In addition, PAUD units can also weigh students' weight, height, head circumference, and arm circumference. This is done as an effort to detect early growth and development. If a problem is found from these activities, the teacher can sit down with the parents to discuss how to solve it. If needed, it can be immediately referred to an expert in order to immediately receive the right intervention. In the parenting dimension, PAUD units can organize parenting education programs for parents/guardians of students

regularly and periodically with topics tailored to their needs. Topics discussed with parents could include health, nutrition, educational stimulation, and protection for children. Partnerships with families and communities as part of an educational trip center will also be able to support.

The preliminary survey by measuring the height of children aged 4-6 years in three integrated PAUD with posyandu in Lubuk Pakam district, Deli Serdang Regency, namely PAUD Intan, Ceria and Tunas Baru from a total of 83 PAUD students, the results of height screening on 56 students were found 26.78% with stunting status. Meanwhile, in Jurai IV district, Pesisir Selatan Regency, in three PAUD integrated with Posyandu, namely PAUD Timbulun Permai, Kasih Bunda and Rasoda from a total of 99 PAUD students, the results of height screening for 78 students were found to be 23.07% with stunting status. From the screening results, it turns out that PAUD which has been integrated with Posyandu still has a prevalence of students with stunting status > 20%. Therefore it is necessary to carry out integrated nutrition education so that the prevalence of stunting does not increase again by utilizing local local food, in this study using lemuru fish which is cheap and affordable, with a variety of processing preferred by children aged 4-6 years.

## 2. Method

This study is a Quasi Experimental study with pre and post test control design control group design. This design, allows researchers to measure the effect of treatment (intervention) in the experimental group, by comparing between the treatment group (before an after the intervention) and also between thr treatment group with the control group.

This study was conducted in two different districts but have the same location, namely in an area near the coast. The results of the initial survey show that these two districts have children aged 4-6 years with a stunting status with a prevalence of > 20%, and are fish-producing areas. Children aged 4-6 years are students in integrated PAUD with Posyandu. Intervention of nutrition education and provision of fish-based snacks as well as assistance to mothers of children aged 4-6 years were carried out for 30 days, 23 September - 7 November 2020.

The population in this study were all children aged 4-6 years in PAUD integrated with Posyandu in Lubuk Pakam and IV Jurai districts. The sample is children aged 4-6 years who are in integrated PAUD with Posyandu in Lubuk Pakam and IV Jurai districts. Samples were determined by screening according to the following criteria: Integrated PAUD children with Posyandu aged 4-6 years do not experience chronic infectious diseases; Children aged 4-6 years are not allergic to fish and eggs; Mothers of PAUD children aged 4-6 years are willing to work together until the nutrition education activities are finished. All children aged 4-6 years who were in integrated PAUD

Posyandu were sampled in this study, according to the results of screening and the willingness of mothers to become study respondents, namely 21 stunting and 48 non-stunting children. This study has obtained the approval of research code of ethics from the health research ethics commission with the number 01.1101/KEPK/POLTEKKES KEMENKES MEDAN 2020.

**Types and Methods of Data Collection:** Data on knowledge and attitudes of mothers about fish consumption were obtained by conducting interviews with a questionnaire. Fish consumption data for PAUD children was obtained by conducting a 24-hour food recall for 3 days in a row. The 24-hour food recall was conducted by interviewing respondents at the hour and time agreed between the researcher and the respondent. Interviews were conducted in PAUD. Data on height of children aged 4-6 years was carried out by measuring the height of children aged 4-6 years in PAUD integrated with Posyandu, using a microtoa measuring instrument.

Nutrition education was carried out 3 times in the form of lectures and discussions and 1 time in the form of processing Lemuru fish into fish nuggets and fish balls. Giving food made from lemuru fish in the form of nuggets and fish balls, as a snack for 30 days, starting from September 30 to November 5, 2020. It is given every day by taking them to the PAUD where the child is educated or home if the PAUD is off or the students not present. The food made from lemuru is processed at the enumerator's house (Pesisir Selatan Regency) and in the food technology laboratory of the Nutrition Department of the Medan Health Polytechnic. Every day at 10.00 am (except Sundays) the food is delivered to PAUD by the enumerator and the child ensures that the food is finished.

All data were processed by computer, univariate analysis was performed to describe each variable presented in the frequency distribution table and the average value table. Bivariate analysis to see the difference in the mean value of knowledge, attitudes, fish consumption and z-score height for age between stunting and non-stunting children, before and after giving the intervention. For research data, before the statistical test was carried out using a different test, namely paired t test and Independent samples test, the data normality test was carried out using the One-Sample Kolmogorov-Smirnov Test. The data obtained from knowledge, z-score height for age and fish consumption for PAUD children were normally distributed, then the test was continued using the paired t test and Independent samples test, while the attitude variables were not normally distributed, so the Wilcoxon test was used. After the test is carried out, the conclusion is determined that if the p value  $< \alpha$  (0.05), then there is a difference in the average value of the variables studied before and after the intervention, and there is a difference in the average value of the studied variables between stunting and non-stunting children.

**3. Result and Discussion**

**Characteristics of Early Childhood Children aged 4-6 years and Respondent (Mothers)**

The distribution of PAUD children by age and gender can be seen in table 1 below:

**Table 1. Distribution of PAUD Children by Age and Gender**

	Stunting Group		Non Stunting Group	
	n	%	n	%
Gender:				
- Male	10	47,6	17	35,4
- Female	11	52,4	31	64,6
Age:				
- 4 years	7	33,3	22	45,8
- 5 years	14	66,7	24	50
- 6 years	0	0	2	4,2
<b>Total</b>	<b>21</b>	<b>100</b>	<b>48</b>	<b>100</b>

In the two groups of PAUD children, namely the stunting and non-stunting groups, they have the same gender characteristics, namely > 50% in the female gender. In the stunting group, it was found that more women were found at 52.4%, this is in line with the results of Ni'mah and Lailatul Muniroh's (2015) study which also found more stunting in girls (50%) than boys.

Likewise with the age of PAUD children, in both groups the majority of PAUD children were 5 years old, so that more PAUD children who experienced stunting were also at the age of 5 years at 66.7%. The problem of stunting is a long-standing problem of malnutrition. Toddler age is a period that is prone to experiencing malnutrition problems, because at this time the body experiences rapid growth and development, when currently experiencing a lack of nutritional intake it will determine the quality of growth in the future. With the assumption that the possibility of stunting PAUD children has lagged behind in height growth before the age of 5 years.

The distribution of respondent by age and level of education can be seen in table 2 below:

**Table 2. Distribution of Respondent by Age and Level of Education**

	Stunting Group		Non Stunting Group	
	n	%	n	%
Age:				
26-30 years	6	28,6	16	33,3
31-35 years	10	47,6	18	37,5
36-40 years	2	9,5	9	18,8

41-45 years	2	9,5	3	6,2
46-50 years	1	4,8	2	4,2
Level of Education:				
ElemEntary School	3	14,3	4	8,3
Yunior High School	4	19,0	6	12,5
Senior High School	11	52,4	26	54,2
College	3	14,3	12	25,0
<b>Total</b>	<b>21</b>	<b>100</b>	<b>48</b>	<b>100</b>

The age of mothers in the stunting and non-stunting groups was mostly at the age of 31-35 years, followed by the age group of 25-30 years. This shows that most mothers are still in their productive age. While the mother's education > 50% is at the SMA, SMP and SD education levels, only a small proportion of mothers have a DIII/Bachelor degree. This description of the level of education shows that the level of education of some mothers is still low. The level of education is closely related to the ability of mothers to receive information about nutrition and health.

### Respondent Knowledge and Attitude Before and After Intervention

The average value of respondents' knowledge can be seen in table 3 below:

**Table 3. Average Value Respondent Knowledge**

Knowledge	Stunting Group		Non Stunting Group	
	Before	After	Before	After
Average	12,04	14,61	11,45	13,87
Standard Deviation	2,31249	2,06098	2,77495	2,47219
Minimum Value	5	10	5	8
Maximum Value	14	19	18	20
p value	0,0001		0,0001	
Mean Different	2,57		2,42	
n	21		48	

Changes in respondent knowledge can be seen by categorizing knowledge scores into three categories of knowledge, namely good, enough an less, as shown in Table 4.

**Tabel 4. Distribution of Respondent on Knowledge**

Knowledge	Stunting Group				Non Stunting Group			
	Before		After		Before		After	
	n	%	n	%	n	%	n	%
Good	0	0	7	33,3	2	4,2	11	22,9
Enough	14	66,7	12	57,1	22	45,8	31	64,6
Less	7	33,3	2	9,5	24	50	6	12,5
<b>Total</b>	<b>21</b>	<b>100</b>	<b>21</b>	<b>100</b>	<b>48</b>	<b>100</b>	<b>48</b>	<b>100</b>



Knowledge about nutrition is the initial process that determines behavior change regarding the improvement of children's nutritional status, so that knowledge is an internal factor that influences behavior change. Mother's knowledge of nutrition will determine the mother's behavior in providing food for the family. Mothers with good nutritional knowledge can provide the right type and quantity of food to support the growth and development of their children. In order to increase maternal nutrition knowledge, one of the activities that can be carried out is nutrition education.

Nutrition education activities carried out for mothers who have children aged 4-6 years in PAUD integrated with Posyandu are an activity they have already received, especially when there are Posyandu activities that are carried out once a month, cadres and nutrition workers from the Puskesmas also provide counseling for them. They still rarely receive specific explanations about the role of fish in children's development, especially the use of lemuru, which is a very cheap fish that can be processed into a food that is liked by children. From the pretest results by asking the questions in the questionnaire, some mothers had difficulty answering questions about stunting, nutritional content of fish, nutrients that affect children's growth and development as well as children's nutritional needs in a day and the amount of fish that is good for consumption every day. This causes some mothers to be less aware that their children have slowed growth in height compared to their children.

Therefore, in order for the nutrition education to be carried out to be well received, the use of the 'booklet' tool which has been arranged in such a way that it is easy to understand for mothers with various levels of education and also contains recipes made from lemuru fish with a processing preferred by the child. Booklets are printed books with a special appearance in the form of books, which can be used to show examples, so that mothers who have limited access to source books can gain knowledge by reading books in a short time and under any circumstances. The booklet will give the reader an impression if it is presented with an attractive image so that the booklet is not formal and rigid (Listyarini et al., 2020).

The results showed, in the stunting and non-stunting groups, it was known that the average value of mother's knowledge was mostly in the sufficient category, mothers experienced an increase in knowledge but not all mothers had passed the sufficient score, only a few mothers had good categories. One of the contributing factors is the low level of education of mothers, where 33.3% of mothers who have stunted and non-stunting children are mothers with primary and junior high school education levels. However, the two groups of mothers experienced an increase in knowledge with almost the same score, which means that the mother's ability to absorb the knowledge given was almost the same. The independent t test results also showed that there was no difference in the knowledge of mothers in the stunting and non-stunting groups of children after the nutrition education intervention.



In theory, it can be said that mothers who have good nutritional knowledge are likely to apply their knowledge in feeding their children according to the child's nutritional needs so that the child does not experience lack of nutritional intake. The effect of improving maternal knowledge is actually seen in practice, in this case the effect is very real in the improvement of Zscore TB / U and the average amount of fish consumption, both for mothers with stunting and non-stunting children.

Increased knowledge is one of the factors that can indirectly affect the nutritional status of children, including stunting by first improving mother's behavior. The results of a previous literature review showed that one case control study in Mozambique with 282 samples concluded that nutritional interventions to increase knowledge were a determining factor for stunting problems in children (Budiasutik, 2019 in Rachmah, et al, 2020. In line with this, Yisak et al. (2015) in Rachmah et al. (2020) also provide an argument that nutrition education provided to mothers or child caregivers can be an alternative to preventing stunting.

In line with Hestuningtyas research (2014); Dewi (2016), that the implementation of nutrition education in the treatment group significantly increases maternal knowledge, feeding behavior to children is influenced by maternal nutrition education and knowledge, with good nutritional knowledge, mothers can choose and serve food to families that meet the requirements of balanced nutrition. thus there will be efforts to improve, especially the condition of stunting in children.

**Table 5. Average Value Respondent Attitudes**

Knowledge	Stunting Group		Non Stunting Group	
	Before	After	Before	After
Average	12,09	14,33	11,79	14,12
Standard Deviation	1,75798	0,79582	1,86751	0,93683
Minimum Value	8	12	4	12
Maximum Valuen	14	15	14	15
p value	0,0001		0,0001	
Mean Different.	2,23		2,33	
n	21		48	

Changes in respondent attitudes can be seen by categorizing attitude scores into three categories of attitudes, namely good, enough and less, as shown in table 6.

**Tabel 6. Distribution of Respondent on Attitudes**

Knowledge	Stunting Group				Non Stunting Group			
	Before		After		Before		After	
	n	%	n	%	n	%	n	%
Good	16	76,2	21	100	29	60,4	48	100
Enough	3	14,3	0	0	17	35,4	0	0
Less	2	9,5	0	0	2	4,2	0	0
<b>Total</b>	<b>21</b>	<b>100</b>	<b>21</b>	<b>100</b>	<b>48</b>	<b>100</b>	<b>48</b>	<b>100</b>

Attitude is a readiness to respond consistently positively or negatively to an object or situation. Attitude is a tendency to act from individuals in the form of closed responses to certain stimuli or objects. Attitude indicates a reaction suitability to a stimulus that already involves a person's opinion and emotional factors.

The results of this study indicate that the attitudes of mothers before the intervention of nutrition education and feeding of lemuru fish in the stunting and non-stunting children group were in a good category (> 60%), and after the intervention activities all mothers in both groups had an increase in attitudes towards good category (100%). Although the attitude is still a closed response, these results show that the mother has a positive attitude to improve the child's diet, especially fish consumption, so that the child has optimal growth and development. The results of the dependent t test prove that the mother's initial attitude has a significant difference with the mother's final attitude. And the results of statistical tests with the independent t test also proved that the two groups did not have a difference in terms of increasing attitude scores.

Several questions on the pretest questionnaire about the benefits of marine fish, prioritizing children's food in the family, providing fish-based snacks for children, considering the preparation of menus based on children's preferences, and calculating children's nutritional needs still received negative answers from some mothers, some mothers even assumed that fish Good sea fish is sea fish with high prices, monotonous fish processing and children's dislike of eating fish, causing mothers to be less inclined to serve fish in the family menu. From the results of the food recall on the children's menu, it was also found that most mothers often provide protein sources from chicken and eggs. After nutrition education was carried out, it included conducting a cooking demonstration for the processing of lemuru fish (tampan), which is a fish that is rarely glanced at by mothers because it contains high spines, after being processed into fish nuggets and fish balls which are liked by children, it causes changes in the mother's attitude.

The positive attitude of the mother after the nutrition education activities was carried out due to several things, including the good ability of the mother to receive information and the mother's desire to apply what she received in an action. This positive attitude of mothers should be maintained so that this positive attitude continues to give good results so that in the end it can reduce nutritional problems, in this case the problem

of stunting. This positive attitude can be seen from a number of mothers who have raised fish in their children's menu and the increase in TB / U Zscore for stunted children towards a better TB / U Z score. In this case, it is hoped that PAUD teachers and Posyandu cadres who participate in this nutrition education activity to continue in the form of nutrition training or counseling, and mothers who have stunted children may need to be more specialized in education so that children can still catch up.

**Z-Score Height for Age and Fish Consumption Before and After Intervention**

The average value of fish consumption for early childhood education can be seen in table 7 below:

**Table 7. Fish Consumption Average Value of PAUD Children**

Fish Consumption	Stunting Group		Non Stunting Group	
	Before	After	Before	After
Average	16,34	35	21,56	39,51
Standard Deviation	7,29572	8,72417	7,28844	6,34842
Minimum Value	6,67	21,67	6,67	26,67
Maximum Valuen	30	50	40	56,67
p value	0,0001		0,0001	
Mean Different.	18,65		19,95	
n	21		48	

Food consumption is one of the factors that is directly related to the nutritional status of children. The low food consumption or the insufficient intake of nutrients from the food consumed results in delayed children's growth. Increasing fish consumption can be one way to combat stunting, it's just that fish consumption in children under five is still low because fish is the second source of protein after meat.

The results of this study indicate that fish consumption in children in the stunting group has increased from an average amount of 16.34 g/day after the intervention to an average of 35 g/day with an average increase of 18.65 g/day, so also in the non-stunting children group, from the average consumption amount of 21.56 g / day after the intervention was carried out to an average of 39.51 g / day with an average increase of 19.95 g / day. The t dependent statistical test concludes that there is a difference in the average fish consumption of stunting and non-stunting children before and after the intervention, while the independent t statistical test concludes that there is no difference in the average fish consumption of stunting and non-stunting children.

Fish is a good source of protein, protein needs of children aged 4-6 years are 35 g / day, 60% of this need should be contributed from animal protein sources, which is 21 g / day. 100 grams of lemuru contains 21.4 grams of protein. In the intervention, lemuru fish nuggets were given to stunting and non-stunting PAUD children for 30 days with the aim of getting children to like sea fish, in one serving consisting of 50 grams of lemuru

fish with a protein content of 10.7 gr / day. If it is analyzed the daily fish consumption of PAUD children from their daily diet after nutrition education intervention has not reached fish consumption of 50 gr / day. The results of the food recall on children's food have seen fish in children's diets but they still dominate eggs and chickens. Fish that are often served by mothers in their daily diet are tilapia, catfish, dencis, mackerel and mackerel. Whereas increasing fish consumption can be one way to overcome stunting, fish consumption at the household level is low because fish processing is more often fried and chili sauce. To increase fish consumption, mothers need fish processing skills that are suitable for young consumers. It turns out that PAUD children like fish processing in the form of nuggets and fish balls. It is evident that they are willing to finish the food that is given every day.

This research is in line with the research of Sutrio and Roza Mulyani (2020) in the Lampung area where most of the parents' work as fishermen found that the amount of fish consumption of elementary school children with abnormal nutritional status was still lacking (50%) so it was concluded that students with less protein intake were at risk 2,730 times the nutritional status becomes abnormal compared to students whose protein adequacy level is normal. Fish is a food source of protein that has a fairly complete nutritional composition, therefore fish is very important for human needs, apart from being relatively affordable, fish contains various kinds of vitamins, minerals and unsaturated fatty acids that are needed by the body (Bukcle et al., 2007) in Sutrio & Roza Mulyani (2020).

**Table 8. Z-Score Height For Age Average Value of PAUD Children**

Knowledge	Stunting Group		Non Stunting Group	
	Before	After	Before	After
Average	-2,64	-2,56	-0,84	-0,77
Standard Deviation	0,44142	0,45394	0,87569	0,89576
Minimum Value	-3,38	-3,30	-1,90	-1,82
Maximum Valuen	-2,01	-1,94	2,63	2,63
p value	0,0001		0,002	
Mean Different.	-0,08		-0,07	
n	21		48	

Stunting is a condition of malnutrition related to the inadequacy of nutrients in the past so that it is a chronic nutritional problem. Stunting is measured as nutritional status by taking into account the child's height or length, age and sex. The habit of not measuring height makes it difficult to realize the incidence of stunting.

The results showed that stunting and non-stunting children, after intervention in nutrition education for mothers and feeding lemuru for 30 days to children, experienced an increase in height as well as Z-score height for age. The height increase in stunted children was 0.8 cm, while the non-stunting children were 0.89 cm, while the Z-score height for age increase in stunted children was -0.08 and non-stunting was -0.07. From

the results of the t dependent test for the two groups before and after the intervention had a significant difference with the conclusion that there was a difference in the average Z-score height for age of children before and after the intervention. From the results of the independent t test, it was concluded that there was no significant difference in the Z-score height for age in stunting and non-stunting children. With the understanding that nutrition education and the provision of food made from lemuru fish both provide the same height increase in both groups.

This study is in line with the research of Oslida Martony, Dini Lestrina and Zul Amri (2020), where the intervention of maternal empowerment and giving lemuru fish nuggets to children aged 1-3 years for 21 days gave an increase in Z-score height for age of -0.21 in the group. empowerment and -0.11 in the non-empowerment group. The mean different Z-score height for age was higher in that study with the current study possibly due to the different factors of sample age and activity. If children pay attention to their food consumption, according to their needs and physical activities have a significant impact on height increase, even in this case, stunted children can equalize the average height increase value with non-stunting children, so it can be concluded if the mother pays attention to children's nutritional intake. and providing food as needed, then opportunities to catch up with height can be achieved. This research is also in line with the research of Oslida Martony, Dini Lestrina, Novriani Tarigan, Ginta Siahaan (2020), who provided additional food in the form of nuggets from lemuru fish in grade 1 elementary school children who were stunted for 30 days giving an average increase in Z-score height for age of -0.08.

Several other studies such as research by Oktaviana (2015) and Juhartini (2016), which conducted research by providing additional food from various ingredients such as biscuits and tempeh flour cake, moringa mixed biscuits, food ingredients mixed with rice flour, tempeh flour and catfish flour gave a high increase. The body of a child is stunted, meaning that even though stunting occurred due to lack of nutrition in the past, it can still be improved at this time, especially at the age of 1-5 years and puberty of age. The nutritional intake of children that meets their needs will increase their height, especially if the supplementary food made from sea fish contains protein, calcium and zinc which are very necessary in the formation of the bone matrix.

### **Comparison of Respondent Knowledge and Attitudes, Fish Consumption and Z-Score Height for Age of PAUD Children between Stunting and Non-Stunting Groups**

The difference in the mean value of the variables studied in stunting and non-stunting PAUD children can be seen in table 9 below:

**Table 9. Differences in the Mean Value of the Studied Variables in Stunting and Non-Stunting PAUD Children**

Variable	Stunting Group	Non Stunting Group	p value
Knowledge of Respondent	2,57	2,42	0,778
Attitudes of Respondent	2,23	2,33	0,829
Z-Score Height for Age of PAUD Children	-0,08	-0,07	0,715
Fish Consumption in PAUD Children (gr)	18,65	17,95	0,742
Increase in Height in PAUD Children (cm)	0,8	0,89	0,514

In accordance with the results of statistical tests carried out, it is known that for the variable knowledge and attitudes of mothers, fish consumption and z-score height for age for PAUD children who are stunted and non-stunted have no significant differences, meaning that nutrition education for mothers and provision of food made from lemuru fish in both groups. provide increased knowledge and attitudes of the same mother and increased fish consumption and the same z-score height for age value. So it can be concluded that both mothers who have stunted and non-stunted children can absorb the material taught through nutrition education and the amount of fish consumption of children and the value of zscore has increased to achieve optimal height growth. This is in line with the research of Oslida Martony, Dini Lestrina, Zul Amri (2019) which also showed that there was no difference in the average intake of protein, calcium and z-score height for age between the treatment group (stunting children) and the control group (non-stunting children). after the empowerment of mothers is carried out to improve fish consumption patterns of children aged 1-3 years.

The period before puberty is the second time to catch up, so this is very good for the group of stunting children to catch up with the lags in height growth by providing foods that contain high protein, calcium and zinc and also educating mothers to have knowledge and attitudes. about good nutrition for stunting children so that they can practice it in the form of parenting and eating patterns that meet the needs of stunting children.

#### 4. Conclusion

Nutrition education increases maternal knowledge and attitudes, fish consumption and Z-score height for age children, both for stunting and non-stunting children in PAUD integrated with Posyandu. There was no significant difference in the knowledge and attitudes of mothers, fish consumption and Z-score height for age children between groups of stunting and non-stunting children in integrated PAUD and Posyandu.

So that early childhood teachers and Posyandu cadres can continue nutrition education activities so that children's fish consumption can be increased, especially for



children who are stunted so that their height can reach normal. It is necessary to carry out fish processing training activities with a variety of processing that is preferred by children to mothers with toddlers, so that it is not an excuse for mothers not to provide fish at home because children do not like fish. In this study, it has been proven that PAUD children like the nuggets and lemuru fish balls that are given every day. It is also necessary to collaborate with the Education Office, Health Service and Nutrition Department, Health Polytechnic of the Medan Ministry of Health, so that nutrition education activities become an activity in PAUD. And especially to educate children to want to consume sea fish, it is necessary to design a fun learning method with interesting media to educate PAUD children to like fish.

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