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Research Article

Improving the Nutritional Status of Stunted Children through Providing Additional Fish-Based Food

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Abstract:
For toddlers who are stunted, processed fish food can be utilized as an additional source of healthy nutrients. This study set out to assess how supplementing fish-based meals affected the nutritional status of toddlers who were stunted. 37 stunted toddlers in Lubuklinggau City received Additional Fish-Based Food for ninety days, from September to December 2023, as part of the study's sample. This research approach used an experimental design with a pre- and post-test strategy without control. Pairwise comparison tests were employed to do statistical analysis by evaluating the nutritional status of toddlers prior to and following the intervention. The research will be finished by December 2023. 6 (16.21%) of the toddlers had improved to a normal nutritional state, according to the data. The nutritional status of toddlers differed significantly before and after the intervention, as evidenced by a p-value of 0.000 (0.05). Thus, it can be said that giving toddlers extra fish-based meal treatments for ninety days can enhance their nutritional status and lower the incidence of stunting in the toddlers who are the target population.
Keywords: Fish-Based Food, Improving, Nutritional Status, Stunted

1. INTRODUCTION

The vision of a Golden Indonesia that must be achieved by 2045 is to realize a better and more equitable level of welfare for the Indonesian people with higher human quality, an improved Indonesian economy which will make Indonesia a developed country and become one of the world's 5 largest economic powers. The year 2045 coincides with 100 years of Indonesia's Independence, with a demographic bonus. At that time, thirty percent of Indonesians were unproductive (under 14 and over 65), while seventy percent of the country's population was of working age (15–64 years). If this demographic bonus is not utilized properly, it will have negative impacts, triggering the emergence of social problems such as poverty, low health status, poverty and high crime rates (Yudiana, 2022).

Children that are stunted sometimes have anemia and shortages in certain micronutrients (Mutumba et al., 2024). In order to address the issue of stunting cases in Indonesia, the Ministry of Maritime Affairs and Fisheries is directed by Presidential Instruction (INPRES) No. 1 of 2017 to establish the Healthy Living Community Movement (GERMAS) and initiate the Fish-Eating Popularization Movement (GEMARIKAN) (Kementerian Kelautan dan Perikanan, 2018a).. Fish is one dietary item that can be an excellent and affordable source of nourishment. Fish meat is high in fatty acids and protein, both of which are beneficial to children's development and health (Sidiq et al., 2022).

The consumption patterns of Indonesians with regard to animal food sources, particularly fish, remain low. The community's fish intake in 2017 fell short of the average objective of 47 kg, or roughly 128 grams per capita per day, which was set at 37.30 kg per year, or roughly 102.19 grams per capita per day. The average fish consumption in society is 39.57 kg/capita/year, or roughly 108.41 grams/capita/day, compared to the national objective of 50.65 kg/capita/year, or 138 grams/day, set in 2018. While Lampung Province's fish consumption rate in 2018 was 33.05 kg/capita, it was still below the national average of 54.49% kg/capita. Nevertheless, the province of Lampung's fish consumption rate grew by 7,000 percent annually (Kementerian Kelautan dan Perikanan, 2018b).

Two strategies for meeting toddlers' nutritional needs are to give them more food and to educate their parents. supplying extra food in the form of snacks made with different ingredients Fish can help children under five who are malnourished (Nadimin, 2022). The results of research conducted on 26 stunted toddlers in Lubuklinggau City in 2022 found that there were significant results on the nutritional status of toddlers after providing a fish-based supplementary food program (Nugroho et al., 2023).

Simorangkir et.al., (2020) found that low protein intake has an 89% chance of stunting.There are animal and vegetable proteins, currently consumption of animal protein is expected to increase. Research that has been conducted shows that there is a strong relationship between stunting and consumption of animal protein, both milk, meat/fish and eggs.

Fish is a source of animal protein which is very appropriate to support programs to improve community nutrition and handle stunting, because fish is a source of protein that has various advantages compared to other animal products. Stunting needs to be handled well to prevent Indonesia from losing a golden generation in the future (Damayanti et al., 2024; Hartaty et al., 2020).

The aim of this research is to find out how effective the provision of fish-based supplementary food is in reducing the prevalence of stunting in target toddlers.

2. MATERIAL AND METHOD

The experimental method is the research strategy employed. A total of 37 stunted toddlers from the Lubuklinggau City region made up the sample. A height/age measuring sheet from the target toddler's weight was the equipment utilized in this study. Prior to receiving an intervention, the first test variable evaluated the stunted toddlers' nutritional status. The intervention itself involved giving the toddlers supplemental breast milk made from fish. The study was conducted in 2023 between October and December. A last test was to determine the toddlers' nutritional status at the conclusion of the intervention. The paired samples T test was then used to assess the intervention program's efficacy.

3. RESULT AND DISCUSSION

The nutritional worth of extra fish-based diet was calculated as an intervention for 37 toddler target samples. The Lubuklinggau Association of Indonesian Nutritionists used the Nutrisurvey tool to calculate the nutritional values, which are as follows:

Table 1. Nutritional Value of Additional Fish-Based Food

Nutritional Value	
Calorie	209 Kal
Fat	7,94 gr
Protein	9,83 gr
Carbohydrate	24,04 gr

As shown in the following image, the ntervention product is additional processed fish food that can be given to stunted toddlers as a supplementary diet. The menu items include dim sum, meatballs, pempek, tekwan, nuget, sempol, and otak-otak.

Figure 1. Provision of Fish-Based Supplementary Food

Posyandu cadres, with support from nutrition officers at the health center and regular supervision by Lubuklinggau City Fisheries Office staff, provide this extra fish-based food to the beneficiaries every day for ninety days in a row.

1. Results of Developmental Nutritional Status of Target Toddlers

Children under five had their nutritional status measured before, during, and after receiving additional fish-based food therapies. A photo and chart showing the findings of the toddlers' nutritional status measurements, which were done in September, October, November, and December of 2023, are provided below:

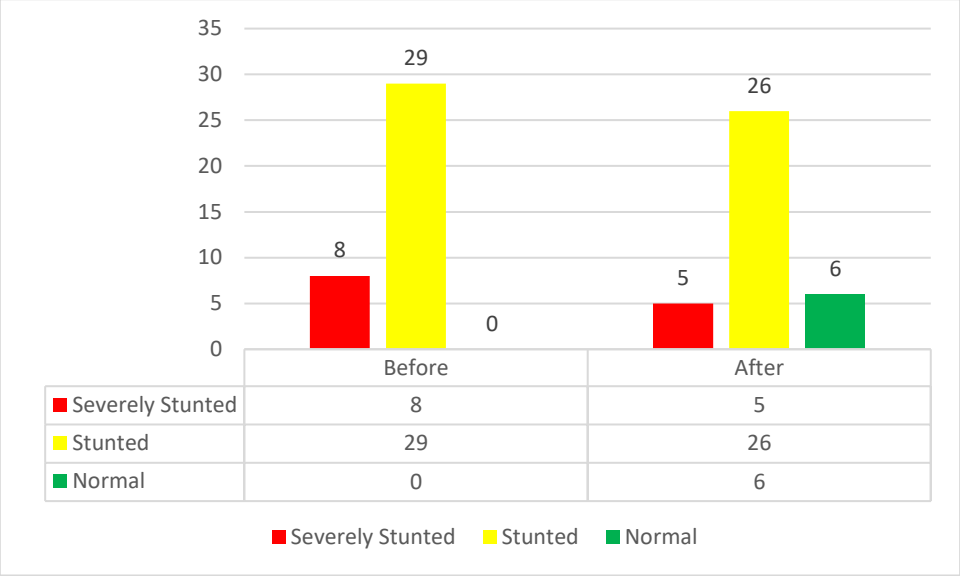

Figure 2. Graph of Target Toddlers Nutritional Status Measurement Results During Intervention

During weighing operations, nutrition officials and posyandu cadres assess the goal nutritional status of toddlers. Officers and cadres will visit the toddler's house to take the appropriate action if they are not present at the posyandu.

Table 2. Results and Percentage of Target Toddler Nutritional Status Measurement During Intervention

No	Nutritional Status	Nutritional Status Measurement Month	
		Before	After
1	Severely Stunted	8 (21,62%)	5 (13,51%)
2	Stunted	29 (78,37)	26 (70,27%)
3	Normal	0 (0%)	6(16,21%)
	Amount	37(100%)	37 (100%)

Prior to receiving additional fish-based food, it was found that, out of the 37 target toddlers, 8 (21.62%) had a nutritional status that was severely stunted, and 29 (78.37%) had stunting in the early stage. Anthropometric measures, such as the toddler's height and weight, were obtained following a 90-day intervention consisting of increased fish-based diet. Five toddlers (13.51%) had a severely stunted nutritional status, twenty-six toddlers (70.27.1%) had a stunted nutritional status, and six toddlers (16.21%) had a normal nutritional status after receiving more fish-based diet.

2. Statistical Test Results

Following the collection of data on nutritional status both before and after the intervention, data analysis was done using the Paired Sample T Test in SPSS Version 25. The findings were as follows:

Table 3. Data Distribution

	Mean	N	Std Deviation	Std Error Mean
Before	81.7027	37	5.66723	.93169
After	83.7432	37	5.83779	.95973

According to the above data, there were N = 37 samples total before and after the intervention, with a median height (mean height) of 81.7027 cm before and 83.7432 cm after the intervention. Prior to the intervention, the standard deviation was 5.66723; following the intervention, it was 5.83779. Before the intervention, the mean standard error was 0.93169; following the intervention, it was 0.95973.

Table 4. Paired Samples Correlations

	N	Correlation	Sg
Before& After	37	.977	.000

It is known from the product moment correlation test results that when toddlers receive an intervention in the form of extra fish-based food, there is a relationship between their height before and after the intervention (significance value of 0.00 ≤0.05).

Table 5. Paired Sample T Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std Deviation	Std Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Before - After	-2.04054	1.24888	.20531	-2.45694	-1.62414	-9.939	36	<.000

The following interpretation of the statistical test table's results is possible:

1. Given that the height of the toddlers before and after the intervention differs significantly (significance value = 0.000 ≤ 0.05), it can also be concluded that providing additional fish-based food interventions for 90 days can increase the height of the toddlers, thereby lowering the number of toddlers who are stunted.
2. T count = -9.939 <t table 2.042 indicates that, statistically speaking, the target toddlers' heights differed before and after receiving additional fish-based meal intervention for 90 days.

Animal-source foods (ASFs) are a dietary category of interest for interventions aiming at lowering stunting and other inadequate development parameters in early childhood (Shapiro et al., 2019). Protein from fish is beneficial for growth (Sutrio & Mulyani, 2020). The amount of fish consumed is still low; multiple studies indicate that fish has not been cooked in a more creative or varied way to pique consumers' interest in eating it, particularly young ones who truly benefit from the fish's nutritious worth (Tisngati & Genarsih, 2022). Fish is beneficial because it is a good source of protein and omega-3 fatty acids, which can help the government and community work together to address stunting and ensure that populations affected by catastrophes receive the nutrition they need (Handayani, 2022). Research indicates that children who receive fish nuggets as part of their intervention exhibit changes in their weight, height, and head circumference (Saranani et al., 2023).

In India, exposure to a completely vegetarian diet during early life, or through maternal nutrition in utero, may be a substantial risk factor for malnutrition due to the high calorie content, high quality protein, and spectrum of essential micronutrients found in ASFs (Headey & Palloni, 2020). In Indonesia, fish is the most commonly consumed animal source meal due to its high nutritional content (Ickowitz et al., 2023). Research by Pasaribu et al., (2020) in the Merauke region of Papua, Indonesia, indicates that C. striata fish, with a high protein content and an appealing amino acid and fatty acid profile, is a rich source of amino acids and fatty acids. C. striata has the potential to be employed as a nutrient-rich diet to reduce stunting due to its high nutritional content.

Finding that children of women with only a minimal education or no formal education had a significant prevalence of stunting, as do children born too small or who don't get enough colostrum at the appropriate period (Castro-Bedriñana et al., 2021). In order to prevent stunting, it is also necessary to take into account the characteristics of mothers under the age of five. A number of maternal characteristics have been linked to the incidence of stunting in under-fives in Bandar Lampung, including maternal height, the use of iron tablets during pregnancy, the status of the pregnancy, the history of ANC, the presence of a helper during childbirth, and the length of time the mother has used a smartphone (Hermawan et al., 2023).

In order to increase this influence through modification and addition of nutrients from fish-based supplementary food by adding other nutrients, it is hoped that further research on this topic will be focused on the impact of fish-based supplementary food on toddlers' height.

4. CONCLUSION

It can be concluded that providing additional fish-based food interventions for 90 days is very effective

in increasing toddler height and lowering the rate of stunting, given that the results of a statistical test with a significance level of 0.00 ≤ 0.05 show a significant difference in the target toddler's height between before and after receiving the intervention. The figures above show that one of the most effective intervention programs to reduce the incidence of stunting in toddlers is to give them extra fish-based meals for ninety days.

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