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Effect of Fish Consumption Patterns on Stunting Toddlers in the Lowlands of South Kalimantan Province, Indonesia

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Abstract

This study aims to determine effect of fish consumption patterns on stunting toddlers in the lowlands of South Kalimantan Province, Indonesia. This type of research is descriptive quantitative research. Data collection methods in this study used several methods including observation, interviews, 24-hour recall, and documentation. The analytical technique used is multiple linear regression analysis using the SPSS 20 application. The results show that amount of fish consumption and frequency of fish consumption have a simultaneous effect on incidence of stunting. Coefficient of determination, amount of fish consumption and frequency of fish consumption effect on incidence of stunting by 43.8%. The partial significant test results show that amount of fish consumption has a significant effect on incidence of stunting, and frequency of fish consumption has a significant effect on incidence of stunting.

Keywords
amount; frequency; fish consumption; incidence of stunting

I. Introduction

Indonesia is a maritime country that is divided into islands and part of its territory is a fairly wide water area. There is a wide potential in the Indonesian sea which has various kinds of abundant natural resources, including various species of fish, especially fish that can be consumed.

Fisheries is one of the sub-sectors of agriculture that has an important role in meeting the consumption and nutritional needs of the people in Indonesia (Badan Pusat Statistik, 2019). Based on data from the Directorate General of Capture Fisheries, Indonesian fishery production has increased in the last 4 years. In 2015 the number of Indonesian capture fisheries reached 6.67 million tons and in 2018 the total production soared to reach 7.3 million tons.

South Kalimantan is a province with an area of 37,530.52 km^2 with a population of nearly 4.2 million people in 2019. One of the mainstay sectors of South Kalimantan is the fisheries sector.

Hulu Sungai Utara Regency is one of the regencies in South Kalimantan Province which is located in the lowlands and its territory is dominated by swampy swamps and rivers. These natural conditions make this district potential in the fisheries sector. This is evident from the relatively high yields of fishery production consisting of capture fisheries and aquaculture.

Danau Panggang District is the sub-district with the highest level of fish production in Hulu Sungai Utara Regency in the last 3 years, in 2018 the fish production of Danau Panggang District reached 3,748.39 tons, in 2019 production increased by 3,786.68 tons, and in 2020 reached 3,882.77 tons. Although fish production in this area has increased in the last 3 years, the level of fish consumption is still relatively low.

Fish itself is a solution in overcoming nutritional problems, because fish contains many nutrients that are important for the body including vitamins A, D, B12, calcium, zinc, protein to omega 3. The nutritional content of fish plays an important role in the health and growth of the community, especially in toddlers who are still in their infancy. Lack of nutritional intake for toddlers can cause serious problems for growth and development. Lack of nutrition and continuous nutritional intake for toddlers can cause stunting.

Stunting is a problem because it is associated with an increased risk of morbidity, mortality, and suboptimal brain development (Mitra, 2015). Stunting is a growth problem experienced by the body due to a continuous lack of nutritional intake during the growth period. Stunting occurs due to various things, one of which is the lack of consumption of animal protein in the body. Stunting is a problem for the government of Hulu Sungai Utara Regency, because the prevalence of stunting in Hulu Sungai Utara Regency is still high. Data shows that in 2020 the prevalence of stunting in Hulu Sungai Utara Regency reached 23.13% with a total weighing of 15,734 toddlers.

Danau Panggang District is at a relatively high prevalence of stunting reaching 29.34% with a total weighing of 1,312 toddlers. The number of short toddlers reaches 285 people, and very short toddlers reach 100 toddlers. This contrasts with the high level of fish production in the area. Whereas fish meat is a good source of animal protein for the level of nutritional adequacy of toddlers.

This study aims to determine effect of fish consumption patterns on stunting toddlers in the lowlands of South Kalimantan Province, Indonesia.

II. Research Method

This research was conducted in Danau Panggang District, Hulu Sungai Utara Regency, South Kalimantan Province which is located in a lowland area with an altitude of 0 -7 meters above sea level.

This type of research is descriptive quantitative research which describes effect of fish consumption patterns on stunting toddlers in children under five. Descriptive quantitative research is a systematic scientific study of the parts and phenomena and the causality of their relationships (Pandiangan, 2015; Pandia et al., 2018; Asyraini et al., 2022). The purpose of descriptive quantitative research is to develop and use mathematical models, theories and/or hypotheses related to natural phenomena (Octiva et al., 2018; Octiva et al., 2021; Pandiangan, 2018; Pandiangan et al., 2018).

Data collection methods in this study used several methods including observation, interviews, 24-hour recall, and documentation. Observation is a technique in collecting qualitative data by making direct observations in the field or research environment (Pandiangan et al., 2021). Interviews is a question and answer activity orally to obtain information. The form of information obtained is stated in writing, or recorded in audio, visual, or audio visual form (Pandiangan et al., 2022). Documentation is a way to provide documents using accurate evidence from recording specific sources of information from essays/writings, wills, books, laws, and so on (Octiva, 2018; Pandiangan, 2022).

The analytical technique used is multiple linear regression analysis using the SPSS 20 application. Multiple linear regression analysis refers to a statistical technique that uses two or more independent variables to predict the outcome of a dependent variable. The technique enables analysts to determine the variation of the model and the relative contribution of each independent variable in the total variance (Tobing et al., 2018).

III. Results and Discussion

3.1 Results

a. Toddler Fish Consumption (Normal and Stunting)

1. Amount of Fish Consumption

Table 1. Distribution of Amount of Fish Consumption of Stunting Toddler in Danau Panggang District, Hulu Sungai Utara Regency

No.	Respondent Code	Nutritional Status	24 Hour Recall			Total	Average
			1	2	3		
1	Respondent 1	Stunting	20	20	-	40	13.3
2	Respondent 2	Stunting	20	10	-	30	10
3	Respondent 3	Stunting	20	-	-	20	6.6
4	Respondent 4	Stunting	-	-	10	10	3.3
5	Responden t5	Stunting	20	10	10	40	13.3
6	Respondent 6	Stunting	-	12.5	-	12.5	4.16
7	Respondent 7	Stunting	100	10	-	110	36.6
8	Respondent 8	Stunting	20	-	10	30	10
9	Respondent 9	Stunting	10	-	-	10	3.3
10	Respondent 10	Stunting	10	-	30	40	13.3
11	Respondent 11	Stunting	-	10	-	10	3.3
12	Respondent 12	Stunting	-	20	-	20	6.6
13	Respondent 13	Stunting	-	-	-	0	0
14	Respondent 14	Stunting	10	-	10	20	6.6
15	Respondent 15	Stunting	-	10	10	20	6.6
16	Respondent 16	Stunting	-	-	20	20	6.6
17	Respondent 17	Stunting	-	25	-	25	8.3
18	Respondent 18	Stunting	-	20	10	30	10
19	Respondent 19	Stunting	30	-	10	40	13.3
20	Respondent 20	Stunting	40	-	30	70	23.3
21	Respondent 21	Stunting	25	-	10	35	11.6
22	Respondent 22	Stunting	-	-	-	0	0
23	Respondent 23	Stunting	20	20	-	40	13.3
24	Respondent 24	Stunting	30	-	10	40	13.3

Source: Primary Data Processing (2021)

Table 2. Distribution of Amount of Fish Consumption of Normal Toddler in Danau Panggang District, Hulu Sungai Utara Regency

No.	Respondent Code	Nutritional Status	24 Hour Recall			Total	Average
			1	2	3		
1	Respondent 25	Normal	20	20	30	60	30
2	Respondent 26	Normal	-	100	-	100	33.3
3	Respondent 27	Normal	30	10	20	60	20
4	Respondent 28	Normal	20	20	20	60	20
5	Respondent 29	Normal	10	20	10	40	13.3
6	Respondent 30	Normal	20	90	30	130	43.3
7	Respondent 31	Normal	30	35	20	85	28.3
8	Respondent 32	Normal	20	12.5	30	62.5	20.8
9	Respondent 33	Normal	30	30	-	60	20
10	Respondent 34	Normal	30	10	10	50	16.6
11	Respondent 35	Normal	20	30	20	70	23.3
12	Respondent 36	Normal	30	40	30	100	33.3
13	Respondent 37	Normal	20	40	20	80	26.6
14	Respondent 38	Normal	20	10	30	60	20
15	Respondent 39	Normal	20	40	-	60	20
16	Respondent 40	Normal	20	12.5	30	62.5	20.83
17	Respondent 41	Normal	50	10	-	60	20
18	Respondent 42	Normal	30	45	-	75	25
19	Respondent 43	Normal	30	20	10	60	20
20	Respondent 44	Normal	15	10	10	35	11.6
21	Respondent 45	Normal	20	25	20	65	21.6
22	Respondent 46	Normal	30	20	30	70	23.3
23	Respondent 47	Normal	30	-	20	50	16.6
24	Respondent 48	Normal	30	30	15	75	25

Source: Primary Data Processing (2021)

2. Frequency of Fish Consumption

Table 3. Distribution of Frequency of Fish Consumption of Stunting Toddler in Danau Panggang District, Hulu Sungai Utara Regency

No.	Respondent Code	Nutritional Status	Frequency of Fish Consumption per 3 Days			Total
			1	2	3	
1	Respondent 1	Stunting	1	2	-	3
2	Respondent 2	Stunting	2	1	-	3
3	Respondent 3	Stunting	2	-	-	2
4	Respondent 4	Stunting	-	-	1	2
5	Respondent 5	Stunting	2	1	1	4
6	Respondent 6	Stunting	-	1	-	1
7	Respondent 7	Stunting	1	1	-	2
8	Respondent 8	Stunting	2	-	1	3
9	Respondent 9	Stunting	1	-	-	1
10	Respondent 10	Stunting	2	-	2	4
11	Respondent 11	Stunting	-	1	-	1
12	Respondent 12	Stunting	-	2	-	2
13	Respondent 13	Stunting	-	-	-	0
14	Respondent 14	Stunting	1	-	1	2
15	Respondent 15	Stunting	-	1	1	2
16	Respondent 16	Stunting	-	-	2	2
17	Respondent 17	Stunting	-	2	-	2
18	Respondent 18	Stunting	-	2	1	3
19	Respondent 19	Stunting	2	-	1	3
20	Respondent 20	Stunting	3	-	2	5
21	Respondent 21	Stunting	2	-	1	3
22	Respondent 22	Stunting	-	-	-	0
23	Respondent 23	Stunting	2	1	-	3
24	Responden 24	Stunting	2	-	1	3

Source: Primary Data Processing (2021)

Table 4. Distribution of Frequency of Fish Consumption of Normal Toddler in Danau Panggang District, Hulu Sungai Utara Regency

No.	Respondent Code	Nutritional Status	Frequency of Fish Consumption per 3 Days			Total
			1	2	3	
1	Respondent 25	Normal	1	1	2	4
2	Respondent 26	Normal	-	1	-	1
3	Respondent 27	Normal	2	1	1	2
4	Respondent 28	Normal	2	1	1	4
5	Respondent 29	Normal	1	2	1	4
6	Respondent 30	Normal	1	1	2	4
7	Respondent 31	Normal	2	2	1	5
8	Respondent 32	Normal	1	1	2	4
9	Respondent 33	Normal	2	2	-	4
10	Respondent 34	Normal	2	2	1	5
11	Respondent 35	Normal	1	2	1	4
12	Respondent 36	Normal	2	2	2	6
13	Respondent 37	Normal	1	2	1	4
14	Respondent 38	Normal	1	1	2	4
15	Respondent 39	Normal	2	2	-	4
16	Respondent 40	Normal	1	1	2	4
17	Respondent 41	Normal	2	1	-	3
18	Respondent 42	Normal	1	2	-	3
19	Respondent 43	Normal	2	1	1	4
20	Respondent 44	Normal	2	1	1	4
21	Respondent 45	Normal	1	2	1	4
22	Respondent 46	Normal	2	1	2	5
23	Respondent 47	Normal	2	-	1	3
24	Respondent 48	Normal	2	2	1	5

Source: Primary Data Processing (2021)

b. Multiple Linear Regression Analysis

1. Coefficient of Determination (R^2) Results

Table 5. Coefficient of Determination (R^2) Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.662[a]	.438	.413	.88322

a. Predictors: (constant), Frequency of Fish Consumption, Amount of Fish Consumption

Source: Primary Data Processing (2021)

Coefficient of determination, amount of fish consumption and frequency of fish consumption effect on incidence of stunting by 43.8%.

2. Simultaneous Test (F) Results

Table 6. Simultaneous Test (F) Results

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.382	2	13.691	17.551	.000[b]
	Residual	35.103	45	.780		
	Total	62.485	47			

a. Dependent Variable: Incidence of Stunting
b. Predictors: (Constant), Frequency of Fish Consumption, Amount of Fish Consumption
Source: Primary Data Processing (2021)

The results show that amount of fish consumption and frequency of fish consumption have a simultaneous effect on incidence of stunting.

3. Partial Test (t) Results

Table 7. Partial Test (t) Results

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-3.589	.324		-11.062	.000
Amount of Fish Consumption	.052	.016	.449	3.218	.002
Frequency of Fish Consumption	.242	.118	.287	2.053	.046

a. Dependent Variable: Incidence of Stunting
Source: Primary Data Processing (2021)

The partial significant test results show that amount of fish consumption has a significant effect on incidence of stunting, and frequency of fish consumption has a significant effect on incidence of stunting.

3.2 Discussion

Based on the analysis, it was found that fish consumption had a positive effect on stunting in the Danau Panggang District. This research is supported by the results of research conducted by Sudayasa et al. (2019), the results of his research show that there is a significant effect between the variable of fish consumption and the nutritional status of

children under five. The OR value of 2.789 indicates that respondents who consume less fish are 2.789 times more at risk of experiencing poor nutritional status compared to respondents who consume sufficient amounts of fish.

According to Uliyanti's research (2017), one of the direct factors that influence the incidence of stunting is nutritional intake. Nutrient intake has a major role in the growth of children to adolescents. This is needed in accelerating cell division and deoxyribonucleic acid during the growth period, especially protein (Susetyowati, 2016).

Sjarif et al. (2019), showed that animal protein intake had a significant relationship with stunting (OR 0.36, 95% CI 0.17-0.73, p=0.005).

A higher intake of animal protein sources is associated with a reduction in stunting (Kaimila et al, 2019). Animal protein sources have a higher essential amino acid composition than plant foods and increase the absorption of minerals such as iron and zinc (Schonfeldt and Hall, 2012).

Animal protein intake increases the body length or height of toddlers which is associated with a decrease in stunting in toddlers.

Sufficient protein will be able to perform its function for the growth process (Almatsier, 2010). If a person has an adequate protein intake pattern, then the growth process will run smoothly and will also cause the immune system to work properly (Mitra, 2015).

Protein deficiency will have implications for impaired growth in height or stunting. Impaired growth is a nutritional problem that is influenced by lack of consumption in the long term.

The results in this study are in accordance with the results of research conducted by Regar and Sekartini (2013) which examined the relationship between protein intake adequacy and nutritional status according to the TB/U index with the study population of children aged 5-7 years which gave the result p=0.037.

Motivation comes from the Latin word movere which means drive or driving force. Motivation in management is only aimed at human resources in general and in particular subordinates (Purba and Sudibjo, 2020). Lund and Burk (1969) suggested the children's food consumption behavior model, namely that children's food consumption depends on the attitude, knowledge, and three main motivations for food, namely biological, psychological, and social needs which are strongly influenced by the family and school environment (Suhaimi, 2019). This means that the food consumption of toddlers is largely determined by the family and the surrounding environment. Knowledge of a mother plays an important role in food consumption for toddlers, one of which is fish consumption for toddlers. It is very important for a mother to have knowledge of how to introduce the importance of fish consumption to toddlers, and how to get toddlers to like fish as an important food for growth. The attitude of a mother is very necessary in overcoming the consumption tastes of toddlers which are fickle and not the same as the consumption tastes of adults. As in this study, it can be concluded that parents of toddlers play a major role in introducing fish to children, the introduction of fish consumption from an early age is very important to familiarize toddlers with consuming fish and knowing the benefits of fish.

According to Enoch and Sumartono (1987) which states that eating habits are passed down from one generation to another in the culture of the community concerned. The toddlers in Danau Panggang District tend to follow the family's consumption habits, what is consumed by the family, toddlers also consume it, even though the energy intake needs of toddlers are different from the amount of energy intake of adults. The loss of several cultures, one of which is where mothers who sort fish meat for toddlers no longer exist, so this also results in the consumption of fish under five in Danau Panggang District is still

very low. In the past, mothers of toddlers gave fish consumption to their toddlers by sorting and separating fish meat from the bones, from this small thing, toddlers are not afraid to consume fish from a young age so that in the past toddlers really liked to eat fish because there was an urge to eat fish culturally from mothers and parents of toddlers themselves.

Fish is a food commodity that contains many nutrients such as high animal protein. Consuming fish is one of the government programs that is carried out with the hope of reducing the prevalence of stunting in Indonesia. In addition to fish that contain lots of nutrients and nutrients, fish is also a commodity that is easily obtained and the price is affordable. Even for some areas, fish is one of the leading commodities whose production is quite a lot. One of them is in Danau Panggang District, but with this fishery potential, it is unfortunate that not many people, especially mothers and parents know about how to process fish properly and do not damage the nutritional content in it so that fish nutrition should be high and beneficial for health and well-being growth is reduced due to incorrect or inappropriate processing.

The Indonesian government currently really hopes that a program called GEMARIKAN can be a solution to reduce the number of toddlers who are stunted in Indonesia. In this study, it can be seen that fish have a significant influence in their role in preventing stunting. Although several previous studies stated that fish consumption was not very related to stunting, this was because previous studies looked at the adequacy side not in terms of quantity and its effect on the standard deviation.

IV. Conclusion

The results show that amount of fish consumption and frequency of fish consumption have a simultaneous effect on incidence of stunting. Coefficient of determination, amount of fish consumption and frequency of fish consumption effect on incidence of stunting by 43.8%. The partial significant test results show that amount of fish consumption has a significant effect on incidence of stunting, and frequency of fish consumption has a significant effect on incidence of stunting.

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