RESEARCH
www.commprac.com
ISSN 1462 2815

FOOD CONSUMPTION PATTERNS AND NUTRITIONAL ADEQUACY OF STUNTING TODDLERS IN THE COASTAL AREA OF SERAM BEACH IN THE WESTERN PART OF MALUKU

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DOI: 10.5281/zenodo.13890023

Abstract

Stunting is a chronic nutritional problem that has an impact on the growth and development of toddlers. One of the causes of stunting is food consumption patterns, including the type of food ingredients and nutritional adequacy. The aim of this research is to determine food consumption patterns and the relationship between toddler nutritional adequacy and the incidence of stunting in the coastal area of West Seram, Maluku. The type of research is analytical observational research with a cross sectional approach which was carried out from July to August 2023. The sample was 156 toddlers, which was calculated using the Lemeshow formula. The sampling technique is purposive sampling. The instruments in this research were a 24 hour recall form and microtoice. Data on types of food ingredients were analyzed descriptively and nutritional adequacy data using the chi-square test. The results of the descriptive analysis show that the main type of food consumed by stunted and non-stunted toddlers is rice, vegetables are leaves (cassava), animal food is fresh fish and only a few consume fruit and milk as well as snacks. The chi-quare test results showed that energy adequacy (p=0.004), Vitamin A (p=0.002), zinc (p=0.001 and calcium (p=0.033) were related to the incidence of stunting in toddlers. Protein adequacy (p=0.211) and iron (p=0.067) is not related. It can be concluded that energy adequacy, Vitamin A, Zinc and Calcium are related, while protein and iron adequacy are not related to the incidence of stunting in children under five in the West Seram Coastal area.

Keywords: Stunting, Food Consumption Patterns, Nutritional Adequacy, Toddlers.

INTRODUCTION

Children's health problems that are currently the main priority that the government wants to improve are regarding child growth and development. Many growth and development problems occur in children, one of which is stunting (Noorhasanah, 2020). Stunting is a chronic nutritional problem caused by a lack of nutritional intake for a long time and feeding patterns that do not meet the nutritional needs of toddlers (Najib et al, 2023; Moesijanti et al, 2020). It is recorded that 7.8 million or more than a third of Indonesia's children under five experience stunting, in Southeast Asia Indonesia is the 4th highest stunting case after Timor Leste, Laos and Cambodia (Noorhasanah, 2020).

Based on the Indonesia Nutrition Status Survey (SSGI) of the Indonesian Ministry of Health, it shows that the prevalence of stunting children under five in Indonesia reached 21.6% in 2022. This figure decreased by 2.8 points from the previous year. There are 18 provinces with a prevalence of stunting under five above the national average. The remaining 16 provinces are below the national average stunting rate. Maluku is one of the provinces that has a prevalence of stunting children under five above the national average, reaching 26.1%. This figure puts Maluku province in the 13th national ranking. West Seram Regency is one of the districts in Maluku that has a stunting prevalence rate that exceeds the national and provincial figures, namely 27.5% (Ministry of Health, 2022). The work area of the Kamarian Health Center

includes 3 villages located in coastal areas that have a stunting incidence rate close to the national figure, namely out of 426 toddlers, there are 86 toddlers who are stunted (20.19%), so that in 2023 Kamarian village will become a stunting locus village.

Many problems will arise due to stunting, namely reducing the level of welfare of the community. In adulthood, stunting sufferers are at risk of developing diet-related diseases such as heart disease and suboptimal performance that can reduce productivity. In the end, stunting will reduce the country's economic growth rate and have an impact on other sectors (Wahid et al., 2020).

Stunting is caused by various factors, one of which is the lack of access to nutritious food (Febriana & Nurhaeni, 2019). Likewise, the nutritional adequacy of the food consumed must be able to meet all nutritional needs so that it can support the growth of toddlers (Mahmudiono et al., 2018). The food consumed must be varied from various food ingredients so that it can contribute to the fulfillment of daily nutrition (Basri et al, 2021). Some of the nutrients that play a role in the occurrence of stunting are energy, protein, zinc and vitamin A. Energy plays an important role in the growth process for the formation of new tissues and metabolism in cells, so lack of energy can inhibit growth. Likewise with the intake level of protein, zinc and vitamin A, because the intake of macronutrients and micronutrients affects the linear growth of children (Leo et al., 2018).

Several villages in the working area of the West Seram Kamarian Health Center ecologically have abundant marine natural resource potential because they are located on the coast. As we know that coastal areas tend to have a wealth of fresh fish and processed products that are rich in nutrients for increased intelligence. Although the villages in the working area of the Kamarian Health Center are located on the coast, the reality is that there are still many children under five who are stunted. Therefore, it is necessary to conduct research on the consumption pattern of stunted children under five in the Seram Coastal Region of Western Maluku.

METHODS

The type of research used is a survey research with a cross sectional approach conducted in the working area of the Kamarian Seram Health Center in the western part of Maluku, namely Kamarian, Seriawan and Waralohi villages in January. The sample taken was calculated using the Lemeshow formula, so that there were 156 children under five. The technique used for sampling was a purposive sampling technique with the following sample criteria: 1) Toddlers who are 2-5 years old, 2) Toddlers who are stunted, 3) Toddlers who are not sick at the time of the study, 4) Toddlers who have KMS, 5) Their mothers are willing to be respondents. Data collection is data on food types, and nutritional adequacy using a 24-hour recall form. The recall data is processed using the Nutrisurvey software by entering the amount of each type of food per toddler, so that energy intake, protein, vitamin A, iron, zinc and calcium can be known. Then it is compared with the Nutritional Adequacy Number (AKG) of each nutrient and is classified as less if the level of nutrient adequacy is < 80% of the AKG. In addition, the height of toddlers was measured by researchers using microtoise and determining stunting using a Z-score value of <-2 SD. Data analysis descriptively found out the type of food consumed by children under five. The analysis used a chi-square test with a significance level of 0.05 to determine the relationship between nutritional adequacy and the incidence of stunting in toddlers.

RESULT & DISCUSSION

1. Characteristics of Resonden and Toddlers

Characteristics of respondents and toddlers based on mother's education and employment age, family income, age of toddlers, gender of toddlers and stunting incidence, in the working area of the West Seram Kamarian Health Center which can be seen in the following table.

Table 1: Characteristics of Respondents and Toddlers

Characteristics of Respondents and Toddlers	n	%
Mother's Age		
< 20 Years	41	26.28
20-35 Years	78	50.00
>35 Years	37	23.72
Maternal Education		
Primary school	11	7.05
Junior High School	28	17.95
Vocational High School/Senior High School	89	57.05
Academic/College	28	17.95
Mother's work		
Not working (Housewives)	96	61.54
Work	60	38.46
Family Income		
< 2.812.827 (UMK)	74	47.44
≥ 2.812.827 (UMK)	82	54.56
Toddler Age		
2-3 Years	75	48.08
> 3 Years	81	51.92
Gender of Toddlers		
Man	80	51.28
Woman	76	48.72
Stunting incidence		
Stunting	54	34.61
No stunting	102	65.39

The data in Table 1 shows that the mother's age is divided into three categories, namely: (1) < 20 years old, (2) 20-35 years old, and (3) > 35 years. The highest percentage is in the age group of 20-35 years, which is 78 people (50%). The most maternal education is high school/vocational school with 89 people (57.05%).Mother's work, the most is not working or as a housewife (61.54%) and family income < MSEs 47.44% The distribution of the largest number of toddlers is at the age of > 3 years (51.92%). Based on gender, the most male children under five were 51.28%. 54 toddlers (34.61%) were stunted.

2. Food Consumption Patterns and Nutritional Adequacy Levels of Children Under Five Stunted and Non-Stunted.

Table 2: Types of Foodstuffs Consumed by Children Under Five Stunted and Not Stunted Based on 24-hour Recall

No	Types of Groceries	Balita Stunting (54 toddlers)	Toddlers Not Stunted (102 toddlers)
1.	**Staple Foods**		
	a. Rice	54	102
	c. Papeda	12	8
	d. Cassava	10	13

	e. Sticky rice	3	2
2.	**Vegetable Ingredients**		
	a. spinach	8	10
	b. kale	7	7
	c. mustard greens	1	4
	d. Chayote	5	8
	e. Ganema	30	46
	f. long beans	4	4
	g.“kasbi” (cassava) leaves	50	96
	h. moringa leaves	5	5
	i. katok	21	30
	j. Bottled vegetables	10	15
	k. Matel leaves	4	6
	l. Young papaya	4	4
	m. Eggplant	1	1
	n. Fern Leaves	40	85
	o. Bamboo Shoots	48	55
	p. Soups (potatoes, carrots,chickpeas, col)	6	7
3.	**Animal Side Dish Ingredients**		
	a. fresh fish	50	98
	b. Meat	15	16
	c. Chicken Eggs	30	50
	d. Quail Eggs	4	10
4.	**Types of Plant-Based Side Dishes**		
	a. tempe	8	15
	b. green beans	12	24
5.	**Fruit**		
	a. Needle banana	16	24
	b. Lemon		
	c. papaya	18	34
	d. watermelon	11	12
	e. Carambola	0	7
6.	**Food Distractions**		
	a. banana fried	3	4
	b. Toast	15	26
	c. Sponge cake	14	16
	d. Other cakes	30	43
7.	**Milk**	19	22

Based on Table 2. It shows that all children under five both stunted and non-stunted as a whole consume rice in the form of rice/porridge, and very few consume papeda, cassava and sticky rice. The type of vegetable that is widely consumed is cassava leaf vegetables, followed by the consumption of bamboo shoots, melinjo, katok and other vegetables.

The most widely consumed types of animal food are fresh fish and the types of vegetable side dishes consumed by toddlers are only tempeh and mung beans. Very few stunted and non-stunted toddlers consume fruits. While the most consumed interlude food is other types of cakes and only a few toddlers consume milk.

The adequacy of energy, protein, Vitamin A, Iron, Zinc and Calcium nutrients for the categories is more or less stunted in stunted toddlers than in non-stunted toddlers.The less energy consumption of Protein, Vitamin A, Iron, Zinc and Calcium, the more risk of stunting.

Table 3: Nutritional adequacy of stunted and non-stunted children under five

Nutrient Adequacy	Stunting incidence		PR	95% CI	P Value
	Yes	No			
Energy					
Less	34(63.0)	38 (37.3)	2.863	1.447 - 5.667	0.004
Enough	20 (37.0)	64 (67.7)			
Protein					
Less	22 (64.3)	24 (35.7)	1.650	0.828 - 3.290	0.211
Enough	32 (42.6)	78(57.4)			
Vitamin A					
Less	40 (74.1)	48 (47.1)	3.214	1.561 - 6.618	0.002
Enough	14 (25.9)	54 (52.9)			
Iron					
Less	28 (51.9)	36 (35.3)	1.974	1.010 - 3.861	0.067
Enough	26 (48.1)	66 (64.7)			
Zink					
Less	41 (75.9)	49 (48.0)	3.411	1.636 - 7.133	0.001
Enough	13 (24.1)	53 (52.0)			
Calcium					
Less	39 (72.2)	30 (29.4)	3.228	1.201 - 8.675	0.033
Enough	15 (27.8)	72 (70.6)			

The level of nutritional adequacy of stunted and non-stunted children under five can be seen in Table 3 which shows that the adequacy of energy (p=0.004), Vitamin A (p=0.002), Zinc (p=0.001 and Calcium (p=0.033) is related to the incidence of stunting in toddlers because the value of p<.α 0.05 The adequacy of protein (p=0.211) and iron (p=0.067) is not related to the incidence of stunting in toddlers with a p value of ≥ α 0.05. Although the adequacy of protein and iron is not related to the incidence of stunting in toddlers, it is still a risk factor for stunting in children under five because of the PR (Prevalence Ratio) value of > 1. Likewise, the adequacy of energy Vitamin A, zinc and calcium is a risk factor for stunting because of the PR value of > 1.

3. Discussion

a. Characteristics of Respondents (Mothers) and Toddlers

The results of the study showed that the average age of respondents was in the early adult category, namely 20-35 years old by 50%. Increasing age will mature the way of thinking, so it correlates with the increase in knowledge and experience that mothers get about stunting. This research is in line with the research of Femidio&Muniroh (2020) that most of the respondents' age is in the age range of 20-35 years. The education level of respondents who have stunted or non-stunted toddlers in this study is the highest number of high school/vocational schools (57.05%), this means that the respondents have adequate education. Improving parental education is a strong predictor of increasing the growth of toddlers (Vaivada et al, 2020). Education can affect the mother's ability to choose foods that are better in terms of quality and quantity will affect the adequacy of the nutrients consumed, so that it will affect the nutritional status of toddlers.

The work of respondents is mostly in the category of not working (housewives), which is 61.54%. so they do not have a fixed income. This research is in line with the research of Nur et al (2021) which shows that the majority (67.50%) of mothers' work is housewives. This study also shows that the family income of 54.56% is above

2,812,827 or above the Regency Minimum Wage. Family income is one of the factors that greatly determines the adequacy of food and nutrition for families (Rahayu et al. 2018). With good socio-economic conditions, children's nutritional needs can be met and have an impact on maintaining the stability of children's growth and development health, (Wahid, et al., 2020).

The characteristics of toddlers in this study include age, gender and the incidence of stunting in toddlers. Based on SSGI data from the Ministry of Health (2023), stunting cases in Indonesia are mostly found in toddlers aged 24-35 months with a percentage of 26.2%. This study found that the most toddlers were in the age group > 3 years as many as 81 toddlers (51.92%), but it was not classified by the researchers, which age group experienced more stunting. This research is in line with the research of Emilia et al (2023) and Azkia et al (2024) that most of the toddlers studied are > 3 years old. The most common gender of toddlers in this study was male. Research by Kusumawardani et al (2023) shows that male toddlers have a 1.87 times greater chance of stunting compared to girls. However, in this researcher, the researcher did not link the gender of toddlers with the incidence of stunting. Of the 156 toddlers who were stunted, 54 toddlers (34.61%), this study is in line with the research of Ahmad et al. (2020) obtained data on stunted toddlers at 34.6%.

b. Food Consumption Patterns and Nutritional Adequacy of Stunted Children under 5 in Coastal Areas

This study shows that there is a relationship between energy adequacy and stunting incidence (p= 0.004, and PR 2.863), which means that toddlers with low energy consumption are 2.863 times more likely to experience stunting. Most stunted toddlers have a lack of energy intake (63.0%). This research is in line with research conducted by Femidio&Muniroh (2020) which shows that there is a relationship between energy adequacy and stunting incidence in toddlers. Research by Elisanti et al (2023) showed that there was a difference in energy intake between stunted and non-stunted toddlers with the average energy of non-stunted toddlers higher than that of stunted toddlers. Energy sourced from food is needed for daily activities and affects growth if the energy sourced from food is less than expended, then there is an energy imbalance that causes weight loss and continues to be malnourished and inhibited in the process of height growth (Maulidah et al., 2019). 24-hour recall data shows that the energy adequacy for stunted and non-stunted toddlers in coastal areas is sourced from staple foodstuffs, namely rice, and only a small amount of other local foods such as papeda (sago flour) and cassava. This shows that there is a dependence on rice whose price has increased from year to year while local food is very abundant.

Protein adequacy is not related to the incidence of stunting, with a value of p= 0.211, but is still a risk factor for stunting in toddlers because of the PR value of 1,650, meaning that if toddlers lack protein consumption, the risk of stunting is 1,650 times greater. This study also shows that the protein intake of stunted and non-stunted toddlers is mostly in the sufficient category. Based on the results of the 24-hour recall, the type of protein source food consumed by toddlers is fresh fish. The results of the interview with the toddler's mother stated that the toddler prefers to eat fish. This is of course due to the fact that all stunted and non-stunted toddlers live in coastal areas that are rich in marine food products, so their eating habits are supported by the availability of nature. This study shows that there is a relationship between vitamin A adequacy and stunting incidence (p= 0.002, and PR= 3.214). The less vitamin A

consumption, the greater the risk of stunting. Most stunted toddlers have a lack of vitamin A intake (74.1%). This is also evidenced by the results of a 24-hour recall of types of foodstuffs, especially vegetables which are the main source of Vitamin A, for children under five (Table 2), these results show that most stunted children under five do not consume vegetables and fruits as well as chicken or beef, causing the intake of Vitamin A in stunted toddlers to be very low. Vitamin A is needed for the development of bones and epithelial cells that form the enamel in tooth growth. Vitamin A deficiency can increase a child's risk of infectious diseases. Therefore, children who suffer from vitamin A deficiency will experience growth failure (Kundarwati et al., 2022).

This study showed that there was no relationship between iron adequacy and stunting incidence, ($p = 0.067$, and PR = 1.974), although not significantly related, it was still a risk factor because of a PR value of > 1, meaning that toddlers who lacked iron consumption were 1.974 times more likely to be stunted. This study also shows that some stunted toddlers have a low iron intake (51.9%). This study by Mutumba et al (2023) shows that Ugandan stunted toddlers also experience iron deficiency. The sufficiency of iron is insufficient, so the iron stores in the spinal cord used to produce Hemoglobin (Hb) also decrease. As Hb decreases, free protoporphyrin erythrocytes will increase which causes heme synthesis to decrease and the size of erythrocytes to decrease (microcytic erythrocytes). Conditions like this will result in iron anemia and a decrease in the body's immune ability, so that infectious diseases easily enter the body. If toddlers experience prolonged infectious diseases, it will have an impact on their linear growth (Dewi &Nindya, 2017).

Zinc adequacy is related to the incidence of stunting, (p value = 0.001, and PR 3.411), meaning that toddlers with less zinc consumption are 3.411 times more likely to experience stunting. Most stunted toddlers in this study had zinc intake in the low category (75.9%). 24-hour recall data shows that stunted toddlers consume less zinc-containing foods such as beef, beans, eggs, spinach vegetables and milk as well as processed foods, thus the zinc intake in toddlers is also less. This research is in line with research conducted by Kundarwati et al., (2022), that there is a relationship between zinc adequacy and stunting incidence. Zinc plays a role in children's growth because of its function in nucleic acid metabolism and protein synthesis. In addition, zinc also plays a role in cell growth, cell replication, and immunity. Zinc deficiency can affect growth hormones such as IGF-1, Growth Hormone (GH) receptors and GH Binding Protein mRNA in the body to be low. A low growth hormone regulatory system is able to inhibit linear growth. Although the need is small, zinc plays an important role in stunting prevention (Femidio&Muniroh, 2020). Calcium adequacy is related to the incidence of stunting, p value = 0.033, and PR 3.228, meaning that toddlers who lack zinc consumption are 3.228 times more likely to experience stunting. Most stunted toddlers in this study had calcium intake with a low category (72.2%). Based on the 24-hour recall, it shows that one of the main sources of calcium for stunted toddlers is only fish, and few consume milk, nuts, and green vegetables. Thus, calcium intake in toddlers will also be less.

CONCLUSION

Based on the results of the study, it was found that the types of foodstuffs consumed by toddlers, both stunted and not, mostly consist of rice as a staple food, with a consumption rate of 100%. For vegetables, the most commonly consumed are leafy

vegetables, such as cassava leaves. Meanwhile, the most widely consumed type of animal food is fresh fish. Fruit and dairy consumption is relatively low, and the most commonly consumed interlude food is cakes.

Furthermore, adequate intake of energy, vitamin A, zinc, and calcium showed a relationship with the incidence of stunting in toddlers. However, protein and iron adequacy did not show a significant relationship with the incidence of stunting in toddlers.

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