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Relationship Between Diet And Nutritional Status In Children Under Two Years Old (Baduta) In The Highest Stunting Prevalence Area In South Sulawesi

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Abstract

The high prevalence of stunting in Enrekang Regency is inversely proportional to the high HDI in Enrekang, which is the second position in South Sulawesi. The purpose of this study was to determine the relationship between nutritional status and eating patterns of children under two years old (baduta) in the area with the highest prevalence of stunting in South Sulawesi. This study is part of the research on Iodine Deficiency Disorders (IDD) as a specific risk factor for the high prevalence of stunting in Enrekang Regency. The design of this research is cross-sectional in 2021 in Buntu Batu District, Enrekang Regency. A total of 72 children aged 6-23 months participated in this study. The data collected in the form of socio-demographic characteristics, anthropometric data, and data on food intake. Data analysis using chi-square test. Results of this research is all stunting children had an iodine intake of less than 72 of the total MP-ASI children. There are (55.31%) stunting children who have insufficient zinc intake and 61.53% of stunting children have sufficient intake. Based on the chi-square analysis, there is no significant relationship between children's eating patterns and the incidence of stunting. IDD is one of the factors causing stunting in children under the age of five in Enrekang Regency. Iodine mineral nutrient plays an important role in growth hormone.

Keywords: Iodine, Zinc, Diet, Stunting, Children Under Two

Introduction

Stunting is a form of stunted growth in children, caused by malnutrition for a long time, so that it becomes a chronic nutritional problem experienced by developing countries, including Indonesia. Children under two years old are used as subjects to see the incidence of stunting at an early age and targets to improve nutritional status, because at this time children have not been exposed to many external factors such as food intake that affects child growth.

According to the WHO Child Growth Standards, stunting is categorized based on the index of body length for age (PB/U) or height for age (TB/U) with a limit (z-score) <-2 SD. Stunting in toddlers can inhibit physical development, growth, motor and mental abilities of children, and is associated with an increased risk of illness, death and decreased intellectual ability (Sulistyaningsih et al., 2018)

Based on data from UNICEF/WHO/World Bank in 2019, 21.3% or around 144 million children under five in the world experienced stunting. Based on data from the 2013 Basic Health Research (Riskesdas) shows the prevalence of stunted toddlers in Indonesia is 37.2%. In 2018, there was a slight decrease to 30.8%. The prevalence of stunting decline at the national level was 6.4% over a 5 year period. This number is still above the World Health Organization (WHO) stunting limit, which is <20%. This means that around 8.9 million Indonesian children experience suboptimal growth, or 1 in 3 Indonesian children experience stunting (Ministry of Health, 2018).

The incidence of stunting can be influenced by two factors, namely indirect factors and direct factors. Indirect factors that affect stunting include parenting, income, health services and food security. While the direct factors that influence are nutrient intake and infectious diseases. Children who experience infection are susceptible to a decrease in nutritional status and if left unchecked can lead to growth disorders such as stunting (Sulistyaningsih, et al. 2018).

Intake of macronutrients and micronutrients if they do not meet the needs will interfere with the physical growth and intelligence of children. One of the micronutrients that affect growth hormone is iodine and zinc. Poor nutrition during preconception and pregnancy is a contributing factor to stunting (Young et al., 2018). The condition of inadequate maternal micronutrients has an unfavorable contribution to pregnancy outcomes and infant development. Micronutrient status plays an important role in pregnancy and birth (Kusrini, 2016).

A study that looked at the factors of stunting in children aged 24-59 months by Mentari and Hermasnyah (2018) in the working area of the Siantan Hulu Health Center. Researchers found that the risk factors for stunting, namely infectious diseases, diet and birth length, were associated with stunting in children aged 24 – 59. The same study was also conducted by Fiyanita et al (2019) in children aged 6 – 24 months from Papuan and non-Papuan ethnic groups. -papua. The results of the study showed that parenting, energy intake, protein intake, type of food and diarrhea were significantly related to the incidence of stunting.

research conducted by dwi arum, et al (2018) looking at iodine status based on EIU and iodine intake in stunted children aged 12-24 months found that there was a significant relationship between protein intake (p=0.00), zinc (p=0 0.01), vitamin A (p=0.00) with body length and There is no relationship between iodine status and body length in stunted children. Based on the research and explanation above, the researcher is interested in conducting research to see if there is a relationship between diet and nutritional status in the highest stunting prevalence area in South Sulawesi.

Methods

This study used a cross-sectional research design with purposive sampling. The total sample is 72 respondents at the age of 6-23 months. The research was conducted in July – August 2021. in Buntu Batu District, Enrekang Regency, South Sulawesi, Indonesia in 3 villages (Buntu Mondong Village, Potokullin Village, and Latimojong Village). The research technique of collecting data in this study is measuring PB and BB using a fixation board and baby scales which will be interpreted using the WHO Anthro 2005 application. The eating pattern uses a semi-FFQ (Semi Quantitative Food Frequency Questionnaire) which will be processed using Nutrisurvey. The data was processed using the SPSS 24 software program, using the Chi-Square test and presented in the form of a table.

Results and Discussion

Based on table 1, the distribution of consumption patterns of iodine-sourced food among children under two years old, it can be seen that the most frequently consumed type of iodine-sourced food is milk with a score of 13, meaning it is consumed 3-6 times a week. While the category sometimes consumed is eggs

with a score of 11 which means it is consumed 1-2x/week. Food sources of iodine that are rarely consumed are potatoes and sea fish with a score of 4.4 and 4.27. The most consumed intake of iodine was found in seafood, which was 5.01 g.

Table 1 Distribution of Iodine Source Food Consumption Patterns in Baduta in Enrekang Regency, 2021

No	Food Ingredients	Amount	Frequency of Consumption of Iodine Source Food						Total	Score	Iodine intake/day (µg)
			>3x/day(50)	1x/hr(25)	3-6x/mg(15)	1-2x/mg(10)	1-2x/month(5)	Never(0)			
1	Potato	n	0	0	4	19	16	36	75	4.4	0.11
		Score	0	0	60	190	80	0	330		
2	Chicken meat	n	0	0	0	0	23	52	75	1.53	0.07
		Score	0	0	0	0	115	0	115		
3	Sea food	n	0	0	8	19	2	46	75	4.27	5.01
		Score	0	0	120	190	10	0	320		
4	Salted fish	n	0	0	1	6	0	68	75	1	0
		Score	0	0	15	60	0	0	75		
5	Egg	n	0	11	33	5	1	25	75	11	2.44
		score	0	275	495	50	5	0	825		
8	Milk	n	17	5	0	0	0	53	75	13	0
		Score	850	125	0	0	0	0	975		

Based on table 2, the distribution of consumption patterns of goitrogenic sources of food in children under two years old, it can be seen that the most common type of goitrogenic source of food is tempeh with a score of 11, meaning it is consumed 3-6 times a week. While the categories sometimes consumed are tofu and spinach with a score of 11 and 9.07, which means they are consumed 1-2x/week.

Table 2 Distribution of Goitrogenic Sources of Food Consumption Patterns in Baduta in Enrekang Regency, 2021

No	Food Ingredients	Amount	Frequency of Consumption of Goitrogenic Sources of Food						Total	Score	Intake of Goitrogenic Substances (g)
			>3x/day(50)	1x/hr(25)	3-6x/mg(15)	1-2x/mg(10)	1-2x/month(5)	Never(0)			
1	Kale	n	0	0	22	19	8	26	75	7.47	5.52
		Score	0	0	330	190	40	0	560		
2	Spinach	n	0	4	21	24	5	21	75	9.07	6.76
		Score	0	100	315	240	25	0	680		
3	Beans	n	0	0	4	9	12	50	75	2.1	1.28

		Score	0	0	60	90	60	0	210		
4	Cabbage	n	0	0	0	4	4	67	75	0.8	0.29
		Score	0	0	0	40	20	0	60		
5	Cassava leaves	n	0	0	7	6	2	60	75	2.41	1.60
		Score	0	0	105	60	16	0	181		
6	Mustard greens	n	0	0	3	13	9	50	75	2.87	1.34
		Score	0	0	45	130	40	0	215		
7	Eggplant	n	0	0	2	5	3	65	75	1.27	0.64
		Score	0	0	30	50	15	0	95		
8	Corn	n	0	0	7	21	15	32	75	5.2	2.63
		Score	0	0	105	210	75	0	390		
9	Tempe	n	0	4	40	10	5	16	75	11	14.08
		Score	0	100	600	100	25	0	825		
10	Know	n	0	0	41	14	3	17	75	10.27	13.10
		Score	0	0	615	140	15	0	770		
Total										**52.46**	**47.24**

Table 3 shows that all stunting children had an iodine intake of less than 72 of the total under-employed children. There are (55.31%) stunting children who have insufficient zinc intake and 61.53% of stunting children have sufficient intake. Based on statistical analysis, namely the ch-square test, it was found that there was no significant relationship between children's intake (MP-ASI) and the incidence of stunting ($p>0.05$).

Table 3 Relationship between Baduta Eating Patterns and Stunting Incidents in Baduta Children in Enrekang Regency, 2021

Nutrient Intake		**Nutritional status**						
		Stunting		**Normal**		**Total**		p
		n	%	n	%	N	%	
Iodine	Not enough	42	57.53	31	42.46	72	72.00	-
	Enough	0	0	0	0	0	0	
zinc	not enough	26	55.31	21	44.68	47	47	0.543
	Enough	16	61.53	10	38.14	26	26	

Diet is also one of the factors that cause stunting. The state of stunting in school-age children occurs because of a poor diet such as a lack of protein, iodine, zinc and fat intake which causes a high prevalence of stunting. The fulfillment of macro and micro nutrients such as adequate complementary feeding plays a role in linear growth and is very important to avoid the risk of stunting. In addition to MP-ASI, foods that are high in protein, zinc, iodine, calcium and vitamin A also have a function in spurring children's height growth. Normal growth patterns can be spasmed with adequate nutritional intake.

From these findings, there is no relationship between children's eating patterns (MP-ASI) and the incidence of stunting. The results of research by Basri Aramico, Toto Sudargo and Joko Susilo (2013) regarding the relationship between diet and nutritional status showed a significant relationship ($p < 0.001$) and OR 6.01. These results show that children with a poor diet are 3 times more likely to become stunted. Research in Brazil also found that children who have a poor diet or who consume protein below the nutritional adequacy rate have 1.5 times the risk of stunting ($p = 0.004$). Atica Ramadhani's research (2020) also shows that children who consume fat below the average daily consumption are at risk of 2 (1.98) times being stunted (Mirna et al., 2013)..

In Waladow's research (2012) it is said that a good diet does not necessarily contain the right nutritional intake. Many toddlers have a good diet but do not meet the amount and composition of nutrients that meet the requirements of balanced nutrition. A balanced nutritional intake of food plays an important role in the child's growth process. Eating patterns can be caused by mothers who pay less attention to feeding their children.

One of the nutrients that play a role in growth is iodine, but this substance can be inhibited due to the presence of goitrogenic substances. based on observations of goitrogenic substances that are often consumed by cassava, tempeh, tofu, kale, spinach. Mustard and corn. Iodine absorption inhibitors or also called goitrogenic substances are another contributing factor to disorders due to iodine deficiency (IDD) in addition to the main causative factor, namely insufficient iodine consumption. Thiocyanate, the result of cyanide detoxification, is one of the potential goitrogenic substances. The mechanism by which thiocyanates interfere with thyroid function is by inhibiting iodine uptake and interfering with thyroid peroxidase activity. In line with research in the IDD endemic area of Gunung Kidul, there is a relationship between the consumption of food with goitrogenic substances and urinary iodine excretion in pregnant women.

In addition to iodine, zinc also plays a role in growth hormone. If the body is deficient in zinc, there will be disturbances in the GH receptors, making them resistant to GH production, resulting in reduced synthesis of Liver Insulin Growth Factor (IGF-1) and the protein that carries it (binding protein), namely IGFBP. -3. In toddlers, the risk of zinc deficiency is greater because they require large amounts of zinc for growth processes which are also needed during pregnancy, infancy, and puberty (Mentari et al., 2019)

Zinc can function as neurotransmitter release, maturation, neurogenesis, neuron migration and synapse formation. Mothers who lack zinc intake can affect the decrease in fetal movement, heart rate variability, decrease the stability of the autonomic nervous system, and decrease the child's preferential behavior, and can change the function of the hypothalamus in the brain (Adani et al., 2017).

Conclusion

Lack of nutrients is very influential on the growth of children or height and there are several nutrients that affect the incidence of stunting, namely protein, zinc, iodine and iron. In this study, there is no relationship between diet and the incidence of stunting, we assume there are other factors. In theory, the causes of stunting are multifactorial. There are direct and indirect factors. The direct factor is the pattern of infectious diseases and the indirect factor is health services, environmental health, parental education and food security.

Conflict of interest

The authors declare no conflict of interest.

Confession

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References

Adani F.Y, Nindya T.S. (2017). Differences in Intake of Energy, Protein, Zinc, and Development of Stunting and Non Stunting Toddlers. Amerta Nutr. 1(2):46.

Mentari S, Hermansyah A. (2019). Factors Relating to Stunting Status of Children aged 24-59 Months in the Upk Work Area of Siantan Hulu Health Center. Pontianak Nutr J.1(1):1.

Ministry of Health of the Republic of Indonesia. (2018). Riskesdas 2018 Report. National Riskesdas Report 2018, 53(9), 154–165. http://www.yankes.kemkes.go.id/assets/downloads/PMK No. 57 of 2013 concerning PTRM.pdf

Mirna K, Rivolta G. M, Walalangi J. S. RC. (2013) Parenting and Eating Patterns as Risk Factors for Stunting Toddlers Age 6-24 Months Papuan and non-Papuan ethnic groups. Home Eco. 35(5):175–83.

UNICEF, WHO, & World Bank. (2020). Levels and trends in child malnutrition: Key findings of the 2020 Edition of the Joint Child Malnutrition Estimates. Geneva: WHO, 24(2), 1–16.

Waladow, G., Warouw, SM, & Rottie, JV (2013). Relationship between diet and nutritional status in children aged 3-5 years in the Tompaso Community Health Center, Tompaso District. Ejournal of Nursing, Volume 1 Number 1.

Young, MF, Nguyen, PH, Gonzalez Casanova, I., Addo, OY, Tran, LM, Nguyen, S., Martorell, R., Ramakrishnan, U., P, HN, I, GC, Addo, Y ., L, TM, Nguyen, S., Martorell, R., & Ramakrishnan, U. (2018). Role of preconception nutrition in offspring growth and risk of stunting across the first 1000 days in Vietnam. PLoS One, 2–10.

Young, MF, Nguyen, PH, Gonzalez Casanova, I., Addo, OY, Tran, LM, Nguyen, S., Martorell, R., Ramakrishnan, U., P, HN, I, GC, Addo, Y ., L, TM, Nguyen, S., Martorell, R., & Ramakrishnan, U. (2018). Role of preconception nutrition in offspring growth and risk of stunting across the first 1000 days in Vietnam. PLoS One, 2–10.