

Original Research Article

The relationship between energy intake with stunting and wasting among toddlers in Aertembaga subdistrict, Bitung city

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Received: 08 November 2023

Revised: 30 January 2024

Accepted: 01 February 2024

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ABSTRACT

Background: Stunting and wasting are forms of malnutrition that can occur in toddlers. Stunting and wasting can increase the risk of physical and cognitive growth retardation. One of the factors directly causing stunting and wasting is energy intake. The purpose of this study was to determine the relationship between energy intake with stunting and wasting in toddlers.

Methods: This study was a type of quantitative research with an analytical survey method using a cross-sectional design conducted in Aertembaga district, Bitung city. The sample taken was 205 respondents using purposive sampling technique and met the inclusion and exclusion criteria. Data were analyzed univariately and bivariate using the chi square statistical test.

Results: The percentage of stunted toddlers was 45.9%, not stunted was 54.1%. The percentage of toddlers with wasting was 8.3% and not wasting was 91.7%. Energy intake of toddlers in the sufficient category amounted to 35.6%, the less category amounted to 33.2% and the more category amounted to 31.2%.

Conclusions: There was an association between energy intake and stunting ($p=0.005$) and wasting ($p=0.037$) in toddlers. Optimization of stunting and wasting prevention programs is needed to reduce stunting and wasting rates among under-fives in Aertembaga sub-district, Bitung city.

Keywords: Energy intake, Stunting, Wasting

INTRODUCTION

Stunting and wasting are forms of malnutrition that can occur in toddlers. A stunted toddler is a toddler whose height-for-age is below minus 2 standard deviations while a wasting toddler's weight-for-height or length-for-age is below minus 2 standard deviations based on the World Health Organization's growth standards.¹ This standard has also been implemented in Indonesia.

The 2018 basic health research showed that the national prevalence of stunting was 30.8%. This figure decreased compared to the prevalence of stunting in 2017 of 37.2%, consisting of 18.0% short and 19.2% very short toddlers.² The prevalence of stunting in Indonesia ranks as the fifth largest stunting prevalence rate in the world.³ The proportion of stunting according to the basic health research report of north Sulawesi province was 25.46%. In Bitung city, the prevalence of stunted toddlers is higher than the proportion of stunting in north Sulawesi

province, which is 29.97% with a division of the category of very short at 5.71% and short at 24.26%.⁴

Unlike stunting, which is a chronic nutritional problem, wasting is an acute malnutrition problem. The proportion of wasting among toddlers in Indonesia was 10.2%, down from 12.1% in 2013.² In north Sulawesi province, the proportion of children under five years old with wasting was 9.53%. In Bitung city, the prevalence of wasting among toddlers was 11.34%, with the category of very thin at 3.38% and very thin at 7.96%. A prevalence of 10-14% for wasting is an indicator of a serious public health problem and is considered critical when it is $\geq 15.0\%$.⁴

While stunting and wasting in children under five years of age can hamper cognitive development and their susceptibility to disease, stunting and wasting that occur during the 1,000 HPK also pose a risk to physical growth. These obstacles will affect the level of intelligence and productivity of children in the future.⁵ Wasting and stunting are closely related to increased mortality, which is especially likely when both types of malnutrition occur in the same child.⁶

Direct causes of malnutrition include unbalanced food intake and infectious diseases, while indirect causes include food security, parenting, health services and environmental health.⁷ Energy intake affects the growth of children, not only affects growth, but also plays a role in the immune system, supporting intellectual abilities, and emotional formation. Food consumed by toddlers must meet nutritional adequacy.⁸ Therefore, it is important at this time that nutrients sourced from foodstuffs need to be given appropriately with the best quality.⁹ Various studies on energy intake and its relationship with malnutrition both stunting and wasting have been proven in various studies. Research conducted by Rahmawati and Puspawati concluded that there was a relationship between energy and protein intake with stunting in toddlers in Nyemoh village, Semarang regency.¹⁰ Research by Syarfaini showed a significant relationship between energy intake and wasting in toddlers in North Polombangkeng district, Takalar regency.¹¹

METHODS

This research was a type of quantitative research with an analytical survey method using a cross-sectional design conducted in Aertembaga district, Bitung city. This research was conducted from July to September 2022. The sample in this study was 205 respondents who met the criteria, namely mothers of toddlers willing to become respondents and toddlers were not sick or physically disabled which affected the measurement process. The sampling technique in this study was purposive sampling.

Data collection was carried out by visiting mothers of toddlers and conducting interviews and measurements directly. Data collection began by explaining the purpose

and objectives of the study then asking the respondent's willingness to sign a sheet of willingness to participate in the study (informed consent). Respondents who were willing to be interviewed using a questionnaire were then measured body weight and height of toddlers.

Measurement of energy intake using a 24-hour recall formular was conducted twice. Stunting was analyzed based on anthropometric indicators of height-for-age while wasting was analyzed based on weight-for-length indicators. Univariate analysis was conducted to see the characteristics of research respondents such as age, gender, education and parental work, energy intake and stunting and wasting status of toddlers. Bivariate analysis was used to see the relationship between variables using the chi square statistical test.

RESULTS

Overview of stunting and wasting

The subjects in this study were mostly in the age category of 36-47 months as many as 84 toddlers (41.0%) while the least at the age of 24-35 months as many as 56 toddlers (27.3%). Male gender as many as 113 toddlers (55.1%) more than female toddlers as many as 92 toddlers (44.9%). Toddlers with energy intake in the sufficient category were 73 toddlers (35.6%) and 68 toddlers (33.2%) in the less category.

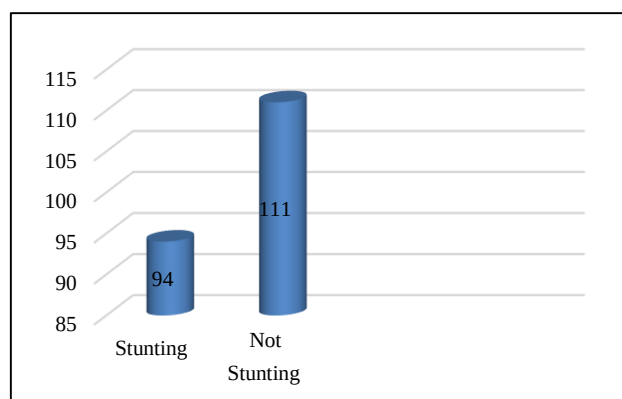


Figure 1: Percentage of stunting status of toddlers.

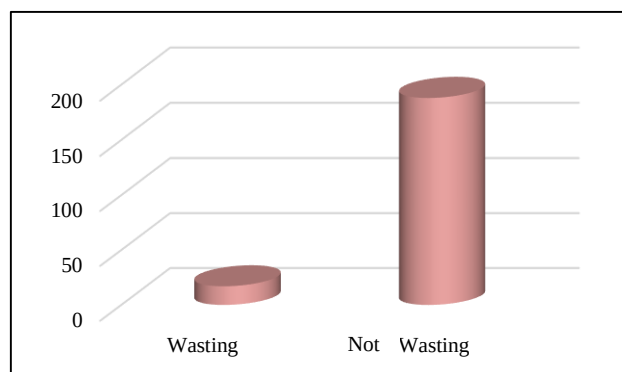


Figure 2: Percentage of wasting status of toddlers.

The results of the calculation of nutritional status based on the anthropometric index of height for age (TB/U) showed that the percentage of toddlers in the stunting category was 94 (45.9%) respondents, not stunting was 111 (54.1%) respondents (Figure 1). Toddlers who experienced wasting based on the anthropometric index of body weight according to height (BB/TB) were 17 (8.3%) respondents and normal were 188 (91.7%) respondents (Figure 2).

Relationship between energy intake and stunting

Toddlers with energy intake in the sufficient category and not stunting amounted to 81 (61.4%) toddlers while toddlers with less energy intake and stunting amounted to 43 (58.9%). The statistical test results show that there was a relationship between energy intake and stunting in toddlers ($p=0.005$) (Table 1).

Table 1: Distribution of stunting based on energy intake.

Nutrition intake/status	Not stunting		Stunting		Total		P value
	N	%	N	%	N	%	
Enough (>80%)	81	61.4	51	38.6	132	100	0.005
Not enough ($\leq 80\%$)	30	41.1	43	58.9	73	100	

Table 2: Distribution of wasting status based on energy intake.

Nutrition intake/status	Not wasting		Wasting		Total		P value
	N	%	N	%	N	%	
Enough (>80%)	125	94.7	7	5.3	132	100	0.037
Not enough ($\leq 80\%$)	63	86.3	10	13.7	73	100	

Relationship between energy intake and wasting

There were 125 (94.7%) toddlers with sufficient energy intake and normal nutritional status, while 10 (13.7%) toddlers with less energy intake and wasting. Statistical test results showed that there was an association between energy intake and wasting in toddlers ($p=0.037$) (Table 2).

DISCUSSION

Stunting is a long-term malnutrition that can be experienced by toddlers. The results showed that there was a relationship between energy intake and stunting in toddlers in Aertembaga district, Bitung city. The results of this study are in line with Waliulu which states that there is a significant relationship between energy intake and the incidence of stunting in toddlers aged 24-59 months in Haria village ($p=0.002$).¹² Another study conducted by Fitri et al on toddlers 2-5 years old in Pekanbaru city showed a significant relationship between toddler intake and stunting with a value of ($p=0.001$).¹³ The results of research conducted by Yuliantini et al on toddlers in Bengkulu city stated that toddlers with low energy adequacy levels had a 9.5 times higher risk of stunting than toddlers with adequate energy levels.¹⁴ Meanwhile, research conducted by Aisyah and Yunianto also states that energy intake and protein intake are factors associated with the incidence of stunting in toddlers in Karanganyar village, Kawalu district, Tasikmalaya city.¹⁵

Wasting is another type of malnutrition. Unlike stunting, wasting is an acute malnutrition that occurs in toddlers. Lestari showed that there are five factors associated with wasting in toddlers, namely food intake, immunization completeness, mother's education and employment and family income.¹⁶ The results of this study indicate that there is a relationship between energy intake and wasting in toddlers in Aertembaga district, Bitung city. This study is in line with research conducted by Afifah which states that there is a relationship between energy intake and nutritional status in toddlers 6-59 months in Lenteng district, Sumenep regency.¹⁷ Wedani and Utari concluded that inadequate energy intake is the dominant factor of wasting in children in Pagedangan, Tangerang regency.¹⁸ Energy intake is one of the direct causes of malnutrition besides infectious diseases.

The limitation of this study is that the variable studied is only one of the direct variables that cause stunting and wasting, other factors are not observed.

CONCLUSION

The results showed that the percentage of toddlers who were not stunted was more than stunted toddlers. Normal toddlers based on the anthropometric index of body weight according to height are more than wasting toddlers. Statistical tests show that there is a relationship between energy intake and the incidence of stunting and wasting in toddlers in Aertembaga district. Adequate energy intake allows toddlers to achieve optimal nutritional status according to age.

ACKNOWLEDGEMENTS

The author would like to thank the Institute for Research and Community Service, University of Sam Ratulangi Manado so that this research can be carried out well.

Funding: This research was funded by a budget from the Institute for Research and Community Service (LPPM), Sam Ratulangi University, Manado

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Punuh MI, Akili RH, Tucunan A. The relationship between energy intake with stunting and wasting among toddlers in Aertembaga subdistrict, Bitung city. Int J Community Med Public Health 2024;11:1045-8.