International Journal of Community Medicine and Public Health
Kapantow NH et al. Int J Community Med Public Health. 2022 Dec;9(12):4363-4367
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20223193

Original Research Article

Association of infectious disease history with wasting among Indonesian toddler in coastal areas

Nova Hellen Kapantow[1], Ralph Kairupan[2], Yulianty Sanggelorang[1]*

[1]Faculty of Public Health, [2]Faculty of Medicine, Universitas Sam Ratulangi, Manado, North Sulawesi, Indonesia

Received: 19 September 2022
Accepted: 01 November 2022

***Correspondence:**
Yulianty Sanggelorang,
E-mail: y.sanggelorang@unsrat.ac.id

ABSTRACT

Background: Wasting prevalence in Indonesian toddler has been decreasing from 2013 to 2018 (12.12-10.19%), but this number remains in medium category according to WHO. Identification of risk factors by looking at infectious disease history as the cause of wasting can provide information to appropriate intervention. This research aimed to analyze the association between infectious disease history with wasting in toddler.
Methods: This research was an observational analytic study with cross sectional approach, which was carried out for 6 months, from April to October 2021. The sample population was children aged 36-59 months, who lived with their mothers in the coastal areas of the Siau Tagulandang Biaro Regency, North Sulawesi Province. Sampling was done by purposive sampling to get 221 samples. Data collection using questionnaires by interview, secondary data in the maternal and child health (MCH) book, and anthropometric measurements namely body mass index by age, for wasting variables.
Results: The results showed the history of infectious disease (p value =0.045; OR=3.491) and mother's education (p value =0.025) have significant relationship with wasting among Indonesian toddler. The results of the analysis on history of exclusive breast feeding, birthweight, immunization status and father's education, showed no significant relationship with wasting (p>0.05).
Conclusions: Wasting among toddler can be prevent by controlling many factors, such as keeping them safe from infectious diseases, also ensure that every mother and mother-to-be gets a proper education.

Keywords: Coastal area, Infectious disease, Wasting

INTRODUCTION

Wasting is one of the public health problems that is still ongoing today. This health problem has become a global health problem because it is experienced by all countries, therefore in 2015 all countries are committed through the SDGs to eliminate the problem of malnutrition by 2030, wasting is one of them. The target is <5% in 2025 and <3% in 2030.[1] According to WHO, children with a BMI for age less than -2SD are categorized as wasted and less than -3SD are severely wasted.[2] Malnutrition in children can have negative impacts such as poor cognitive levels, vulnerability to disease, less productive which will hamper economic growth. The impact is not only on children but also on the country as a whole.[3] Therefore, more attention to overcoming this kind of nutritional problems is needed nowadays.

Data form United Nations International Children Emergency Fund (UNICEF) in 2017 showed there are 92 million (13.5%) children under five in the world experience underweight, 151 million (22%) stunting and 51 million (7.5%) wasting. Newest data from the same source showed that in 2020 there's a decreasing in wasting prevalence (6.7% or affected 45.5 million toddler). Most of them comes from Africa and Asia.[4,5] Basic Health Research (Riskesdas) 2018 showed an improvement in nutritional status of under-five from 2013 to 2018. Underweight prevalence has decreased from 19.6% to 17.7%, stunting decreased from 37.2% to

30.8%, and the prevalence of wasting decreased from 12.1% to 10.2%.[6] However, this numbers remain in the high category by limit threshold for prevalence of malnutrition as a problem public health established by WHO.[7]

Factors leading to wasting have been explained by UNICEF and has used globally. First, the direct causes are food intake or infection disease, or a combination of both. Second, the causative factor or indirectly factors, such as the availability of food at the family level, parenting, and health services and the hygiene also sanitation (environmental factor). Third, the main problem is poverty, family characteristics, and sociodemographic. Fourth, the basic problem, such as political and economic crisis.[8] Infection contributes to deficiency of energy, protein, and other nutrients due to decreased appetite. Toddler who gets infectious disease in their first five years shown nonoptimal growth. Study of Mgongo et al in Tanzania, showed children who gets infectious disease in the past month increases the risk of wasting.[9] Another research from Gezahegn, Kassahun, and Dube in Ethiopia, showed that diarrhoea related to the incidence of wasting in children.[10] Based on the data above, it is necessary to conduct research that aimed to analyse the association infectious diseases history with wasting among Indonesian toddler in coastal area.

METHODS

This was an observational study with cross sectional study design. The study was conducted in Siau Tagulandang Biaro Regency on April-October 2021. The population was people residing in Siau Tagulandang Biaro Regency in Indonesia for at least 6 months consecutively. Sample was taken by cluster sampling, namely 5 subdistricts in Siau Tagulandang Biaro (East Siau, West Siau, East South Siau, Tagulandang and North Tagulandang) by questionnaire about subject characteristics, socio-economics data, exclusive breastfeeding history, and infectious disease history. The subject was toddler (36-59 months) in each household, taken by purposive sampling and total of subjects were 221 toddlers.

All participants involved in this study were told about the purpose of the study, and the confidentiality of the data. Participation of subjects was entirely voluntary, and before been recruited into the study, mother of the toddler has to sign the informed consent. In cases where the respondent is illiterate, we ask an educated person from the community to read the consent form and explain it to the family. Then we got the respondent's thumbprint. In those cases, people who read the consent form also sign as witnesses.

Inclusion criteria

The inclusion criteria were family who had a toddler (36-59 months), the parent able to be respondent in this study with signing the inform consent and toddler be able to measure body height.

Exclusion criteria

The exclusion criteria were the parent of toddler live in other area, toddler wasn't a biological child and toddler was hospitalized. To assess nutritional status parameters using anthropometry for toddler (body mass index (BMI)/age (A).

Secondary Data using from Maternal Child Health (MCH) book, such as birth weight. Data were analysed quantitatively by univariate, and bivariate. Statistical test using Chi-Square and Fisher Exact with confidence interval (CI) 95%.

RESULTS

Subject characteristics

Most toddler's nutritional status according to BMI/A were classified as well nourished (76%). Using the same index, toddler was classified as poor nourished and lack nourished; 3.6% and 3.2%. In this study, toddler who had index BMI/A less than -2 SD according to WHO standard (wasted and severely wasted) categorized as wasting. Result of this study showed 7.7% toddlers were born <2.5 kg, 5.9% had un-complete immunization status and 55.2% toddlers had the infectious disease (Table 1).

Table 1: Subjects characteristics.

Characteristic		n	%
Gender	Male	121	54.8
	Female	100	45.2
Exclusive breastfeeding	No	110	49.8
	Yes	111	50.2
Birth weight	<2.5 kg	17	7.7
	≥2.5 kg	204	92.3
Immunization status	Incomplete	13	5.9
	Complete	208	94.1
Infectious disease history	Yes	122	55.2
	No	99	44.8
Father's education	Low	81	36.7
	High	140	63.3
Mother's education	Low	54	24.4
	High	167	75.6
Nutritional status	Poor nourished (<-3SD)	8	3.6
	Lack nourished (-3 to -2 SD)	7	3.2
	Well nourished (-2 to +2 SD)	168	76
	Excess nourished (>+2SD)	38	17.2

Association of infectious disease history with wasting in toddler

Most of toddler who have received complete immunizations were classified as normal (87.8%) and there were 3.2% toddlers who were not exclusively breastfed were classified as wasting, most of toddlers who were born ≥2.5 kg were on normal group. Meanwhile, 5.4% children who have suffered from infectious diseases were classified as wasting. Then for mother's education, those who have mothers with higher education were mostly in the normal nutritional status group. Further analysis of this study showed that there was a significant relationship between the history of infectious disease and mother's education with wasting. Those who had an infectious disease were 3.491 times more likely to become wasting than the group that never had infectious diseases (Table 2).

Table 2: Association of exclusive breastfeeding, birth weight, immunization, infectious disease history, parent's educational history with wasting.

Variable		Nutritional Status				P value	OR
		Wasting		Normal			
		N	%	N	%		
Exclusive breastfeeding	No	7	3.2	103	46.6	0.803*	0.875
	Yes	8	3.6	103	46.6		
Birth weight	<2.5 kg	3	1.4	14	6.3	0.096**	3.429
	≥2.5 kg	12	5.4	192	86.9		
Immunization status	Uncomplete	1	0.5	12	5.4	1.000**	1.155
	Complete	14	6.3	194	87.8		
Infectious disease history	Yes	12	5.4	110	49.8	0.045*	3.491
	No	3	1.4	96	43.4		
Father's education	Low	6	2.7	75	33.9	0.78*	1.164
	High	9	4.1	131	59.3		
Mother's education	Low	0	0.0	54	24.4	0.025**	0.000
	High	15	6.8	152	68.8		

*Chi-square test; **Fisher exact test.

DISCUSSION

Based on Riskesdas data in 2018, the number the prevalence of wasting was 10.7%.[6] If number of this prevalence is compared with the wasting prevalence rate in Sitaro Regency, it was seen that wasting in Sitaro was lower, which was only 6.8%. According to the definition of health problems from the WHO, this figure was in the low category.[7] However, it is still a health problem.

The first two years of a child's life are critical period of growth, because it becomes the most sensitive period of failure growth (growth faltering), and is the right time to do recovery or catch up on delays when there are disturbances development.[11] When the state of wasting in infancy continues, it can result in cognitive development and poor learning abilities, reduced lean body mass, short adult stature, impaired glucose metabolism, and low productivity. In addition, wasting also increases the incidence of mortality three to nine times higher than children who have not wasted.[12,13]

Functionally, malnutrition is divided into acute and chronic malnutrition. acute malnutrition characterized by wasting, and chronic malnutrition characterized by stunting.[11] According to Cirmanova wasting associated with reduced fat mass in the body, where fat serves to secrete the hormone leptin which has the effect of anabolic directly in the bone with stimulate stem cells to differentiate become osteoblasts.[14,15] This explains the relationship between wasting that occurred before stunting.

Result of this study showed significant association of infectious disease with wasting among toddler. Those who have experienced infectious disease were 3.491 times more likely to become wasting than those who have never had an infectious disease. Infectious diseases have an influence of wasting. Infectious diseases play a major role in causing malnutrition because increased demand and high energy expenditure, loss of energy nutrition due to vomiting, diarrhea, indigestion, mal-absorption, and increased use of nutrients, as well as impaired metabolic balance.[16] Malnutrition including wasting can increase the risk of infection, whereas infection can cause nutritional deficiencies that lead to into a vicious circle. Children who are malnourished, have low resistance of disease, fall ill easily, and will become increasingly malnourished, thereby reducing its capacity to fight disease and etc. This is also called infection malnutrition.[17]

Parental education will affect parenting children, because with a high education in parents will understand the important role of parents in the growth of children. In

addition, with a good education, it is estimated to have good nutrition knowledge Better educated mother tend to be easier to receive nutritional information and apply knowledge in parenting and in the practice of giving food.[18] The result of this study has the same results as research Putri and Wahyono in Indonesia showing that mother's education has significant relationship with wasting in children.[18]

The limitations of this research are difficulty in digging up information about toddler because when visiting Posyandu which was limited due to the COVID-19 pandemic, some respondents answered in a hurry and enumerators took longer to collect data because if they were not obtained during the current month's Posyandu visit, they would be interviewed at the following month's visit.

CONCLUSION

The conclusions of this research are the prevalence of wasting (5.05%) in children in Sitaro Regency has been classified as low based on the threshold prevalence of malnutrition as a health problem set by WHO, also study result showed significant association of infectious disease (p value =0.045; OR=3.491) and mother's education (p value =0.025) with wasting among toddler. However, if there is no further intervention, the prevalence is likely to increase and be high. There needs to be more socialization program regarding the prevention of wasting through improving hygiene and sanitation, fulfilling children's nutritional needs, and emphasizing the importance of proper education for mothers and mothers-to-be.

ACKNOWLEDGEMENTS

We gratefully acknowledge to Universitas Sam Ratulangi's grant funding. We also thank to all our enumerators and participants to follow this study from first to finish. We disclosed receipt of the following financial support for the research, authorship, and/or publication of this article.

Funding: This study was funded by Universitas Sam Ratulangi
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Food and Agriculture Organization, United Nations High Commissioner for Refugees, United Nations Children's Fund, World Food Programme, World Health Organization. Global action plan on child wasting: a framework for action to accelerate progress in preventing and managing child wasting and the achievement of the Sustainable Development Goals. World Health Organization; 2020:15.
2. World Health Organization. WHO child growth standards: training course on child growth assessment. Geneva: WHO Press; 2008.
3. Soetjiningsih, Ranuh I. Child Development. II. Jakarta: EGC; 2013.
4. UNICEF. Malnutrition in Children. 2017. Available from: https://data.unicef.org/topic/nutrition/malnutrition/. Accessed on 2 December 2021.
5. UNICEF, WHO, Bank W. Levels and trends in child malnutrition. Available from: https://data.unicef.org/wp-content/uploads/2021/07/JME-2021-United-Nations-regions-v2.pdf. Accessed on 2 December 2021.
6. Balitbangkes. Riset Kesehatan Dasar. Jakarta, 2018. Available from: https://ghdx.healthdata.org/record/indonesia-basic-health-research-2018. Accessed on 2 December 2021.
7. World Health Organization. Physical status: The use of and interpretation of anthropometry, Report of a WHO Expert Committee. World Health Organization; 1995.
8. UNICEF. UNICEF's approach to scaling up nutrition for mothers and their children. 2015. Available from: http://www.acp.int/sites/acpsec.waw.be/files/UNICEF.pdf. Accessed on 2 December 2021.
9. Mgongo M, Chotta NA, Hashim TH, Uriyo JG, Damian DJ, Stray-Pedersen B, et al. Underweight, stunting and wasting among children in Kilimanjaro region, Tanzania; a population-based cross-sectional study. Int J Environ Res Public Health. 2017;14(5):509.
10. gezahegn y, kassahun w, dube l. factors associated with acute malnutrition among south Sudanese children in Tierkidi refugee camp: a case-control study. Qual Prim Care. 2017;25:253-8.
11. Shrimpton R, Victora CG, de Onis M, Lima RC, Blossner M, Clugston G. Worldwide timing of growth faltering: implications for nutritional interventions. Pediatrics. 2001;107(5):e75.
12. Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, et al. Maternal and child undernutrition: consequences for adult health and human capital. Lancet. 2008;371(9609):340-57.
13. Richard SA, Black RE, Gilman RH. Wasting is associated with stunting in early childhood. J Nutr 2012;142(7):1291-6.
14. Cirmanova V, Bayer M, Starka L, Zajickova K. The effect of leptin on bone-an evolving concept of action. Physiol Res. 2008;57.
15. Briend A, Khara T, Dolan C. Wasting and stunting-similarities and differences: Policy and programmatic implications. Food Nutr Bull. 2015;36:S15-23.
16. Asfaw M, Wondaferash M, Taha M, Dube L. Prevalence of undernutrition and associated factors among children aged between six to fifty-nine

months in Bule Hora district, South Ethiopia. BMC Public Health. 2015;15(1):1-9.
17. Tomkins A, Watson F. Malnutrition and infection: a review. ACC/SCN State-of-the-Art Series. Nutrition Policy Discussion Paper (UN/ACC). no. 5. 1989.
18. Putri DSK, Wahyono TYM. Direct and indirect factors of wasting in children aged 6 to 59 months in indonesia. Media Litbangkes. 2013;23:110-21.

Cite this article as: Kapantow NH, Kairupan R, Sanggelorang Y. Association of infectious disease history with wasting among Indonesian toddler in coastal areas. Int J Community Med Public Health 2022;9:4363-7.