Amerta Nutrition
e-ISSN: 2580-1163 (Online)
p-ISSN: 2580-9776 (Print)
Purwadi et al. | Amerta Nutrition Vol. 7 Issue 1SP (May 2023). 17-24

RESEARCH STUDY
English Version

OPEN ACCESS

Determinants of Wasted Among Age 6-59 Months: The Indonesia Family Life Survey 2014

Determinan Wasting pada Usia 6-59 Bulan: Indonesia Family Life Survey 2014

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ARTICLE INFO

Received: *30-01-2023*
Accepted: *17-04-2023*
Published online: *12-05-2023*

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DOI:
10.20473/amnt.v7i1SP.2023.17-24

Available online at:
https://e-journal.unair.ac.id/AMNT

Keywords:
Indonesia, Nutritional Status, Wasting

ABSTRACT

Background: Nutritional status is an issue of concern especially in developing countries. The Sustainable Development Goals (SDGs) include a wasting target, namely reducing the proportion of children suffering from wasting to <5% in 2025 and <3% in 2030. In Indonesia, in 2019 and 2021, the prevalence of wasting was 7.4% and 7.1%, respectively.
Objectives: The purpose of this study was to determine the determinants of wasting in children aged 6-59 months in Indonesia based on data from the fifth cross-sectional Indonesia Family Life Survey (IFLS) in 2014.
Methods: A Cross-sectional study from IFLS 2014 on 2672 children (6-59 months) was conducted. The independent variables were history of acute respiratory infection (ARI), history of diarrhea, frequency of meals, immunization, environmental health, monthly per capita expenditure (PCE), and the location of the child's residence. The dependent variable was wasting, which is measured by weight and height. Data analysis consisted of using the chi-square test.
Results: The results showed that there was a significant relationship between environmental health (p-value<0.01), monthly per capita expenditure (p-value<0.01), and the child's place of residence (p-value<0.01) with wasting in children aged 6-59 months.
Conclusions: There is a significant relationship between environmental health, monthly per capita expenditure, and location of residence and wasting among children aged 6-59 months. Priorities in making health policies to reduce wasting may differ from region to region.

INTRODUCTION

In developing countries, nutritional problems are generally the most basic problems. Toddlers is a group that is prone/vulnerable to nutritional disease problems. This is due to the high nutritional needs of toddlers to support the process of growth and development as well as the development of the immune system[1]. In Indonesia, one of the high nutritional problems is wasting based on the weight/height index which refers to the Z-score <-3 SD to <-2 SD[2]. According to the World Health Organization (WHO), wasting is a combination of the terms severely malnourished and malnutrition. Wasting or acute malnutrition occurs due to rapid weight loss or also known as failure to gain weight resulting in malnutrition. A child who experiences wasting has a high risk of dying[3].

Based on the theoretical framework for the causes of nutritional problems (wasting) determined by the United Nations Children's Fund (UNICEF), the determinants of wasting are divided into three. The roots of the wasting problem are caused by tradition, politics, economic development, food security and nutrition, poverty, education, purchasing power, access to food, information and health services. Additionally, the indirect causes are the pattern of giving exclusively breastfeeding, the availability and pattern of household consumption, the provision of complementary food for breastfeeding, psychosocial, and hygiene. While the direct causes are infectious diseases and food consumption. Wasting can have a short-term impact on individual health, which can result in mortality, morbidity and disability. While the long-term impact is that it causes disturbances to the child's height as an adult, children's cognitive abilities, economic productivity, reproductive health and can trigger non-communicable diseases[4,5].

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The Sustainable Development Goals (SDGs) include a wasting target of <5% in 2025 and 3% in 2030, but data from the United Nations International Children's Emergency Fund, World Health Organization (UNICEF, WHO) and the World Bank Group show that currently, it is estimated that 7.3% (50 million) of all children under five suffer from wasting[6]. In 2000 and 2019 the prevalence of wasting was 5.0% or 30.4 million children and 6.9% of children, then in 2020 the prevalence of wasting was 6.7% or 45.4 million children and 13.6 million of them were severeley malnourished. Wasting is most commonly found in South Asia as much as 14.7% or more than two thirds of children under 5 years suffer from it, and more than a quarter of toddlers with wasting is found in Africa[3,7].

In 2013 and 2018 the results of Basic Health Research found that the prevalence of wasting was 12.1% and 10.2%[8,9]. Meanwhile, based on data from the results of the Indonesian Nutritional Status Study (SSGI) in 2019 and 2021, the prevalence of wasting was 7.4% and 7.1%[10]. Previous research showed that the prevalence of acute malnutrition was 11.8% and there was a significant relationship between unprotected drinking water sources, absence of latrines, hand washing without soap, diarrheal disease in children and vaccination (immunization) of children with acute malnutrition[11]. Other research states that mothers' attitudes towards food and environmental hygiene are significantly related to poor nutritional status and undernutrition[12]. Based on the high prevalence of wasting in children in Indonesia, this study aims to identify the determinants of wasting in children aged 6-59 months in Indonesia based on data from the 2014 Indonesia Family Life Survey (IFLS).

METHODS

Data Collection

A cross-sectional study design based on the Indonesia Family Life Survey (IFLS), from October 2014 to April 2015 was used in this study. The IFLS is a longitudinal survey on socioeconomics and health. Registration on the Research and Development (RAND) corporation website is required to download the complete IFLS data.

The research data was obtained from IFLS 2014 because it contains the latest information regarding child health data. In addition, the IFLS survey is a survey representing around 83% of Indonesia's population. The 2014 IFLS sampling locations were conducted in 24 provinces in Indonesia[13]. Using a questionnaire, respondents were interviewed directly to collect individual, family and household information about health status, environmental health and economy[14]. IFLS was carried out in five waves, in 1993, 1997, 2000, 2007 and 2014, by collecting information from 50,148 individuals from 16,204 households[15].

The IFLS data used in this study is publicly available. The IFLS survey and study procedures were reviewed and approved by the Institutional Review Boards of the RAND Corporation in the United States and Gadjah Mada University in Indonesia with ethical clearance number s0064-06-01-CR01. Prior to data collection, written informed consent was required from all participants[16].

Population and Sample Size

The population that met the requirements for this study were 5,302 children with an age range of 6-59 months, both male and female in Indonesia, among which, 4,633 children provided height data. Researchers removed 1 child with a height >120 cm, 667 missing data on height, and issued 1 "no" answer on interview status. Then the researchers issued 4 missing data on body weight and 9 missing data on a history of acute respiratory infection (ARI) and diarrhea. Furthermore, the researchers issued 1,458 missing data on immunization and 174 answers "don't know" so that the population became 2,988 children. Next, the researchers issued 70 "other" and 2 missing answers on environmental health. Researchers also issued 174 missing on monthly per capita expenditure (PCE) and 2 "don't know" answers and 68 "breastfeeding" answers on meal frequency. Thus the total sample is 2,672 children who were analyzed in this study (Figure 1).

Statistical Analysis

The independent variables in this study were history of ARI, history of diarrhea, meal frequency, immunization, environmental health, monthly per capita expenditure (PCE), and the location of the child's residence. The history of ARI was measured using the questions: has your child ever had 1) colds? 2) Cough? 3) Shortness of breath? 4) hot/fever? for the last four weeks? Respondent's answer choices are "yes" or "no". Then a history of ARI is categorized as “has a history of ARI” (if you experience any of the symptoms of runny nose, cough, shortness of breath, and hot/fever) or “no history of ARI” (if you haven’t experience any of the symptoms of cold, cough, shortness of breath, and heat/fever). History of diarrhea was measured using the question: has your child ever had diarrhea, at least 3 times a day for the last four weeks? History of diarrhea was classified as “having a history of diarrhea” (if having diarrhea at least 3 times a day) or “no history of diarrhea” (if not having diarrhea at least 3 times a day).

The frequency of eating was measured using the question: how many times does your child usually eat? Based on the respondent's answer choices, the frequency of eating was categorized into two, namely "toddlers are fed 2-3 times a day" or "toddlers are fed <2 times a day". Immunization was measured by asking: can you tell us whether your child has received immunizations for 1) Bacillus Calmette Guerin (BCG), 2) Polio, 3) Diphtheria Pertussis Tetanus (DPT) 4) measles 5) hepatitis B. Answers were grouped into “incomplete, if one of the immunizations had not been carried out” or “complete, if all immunizations were carried out”.

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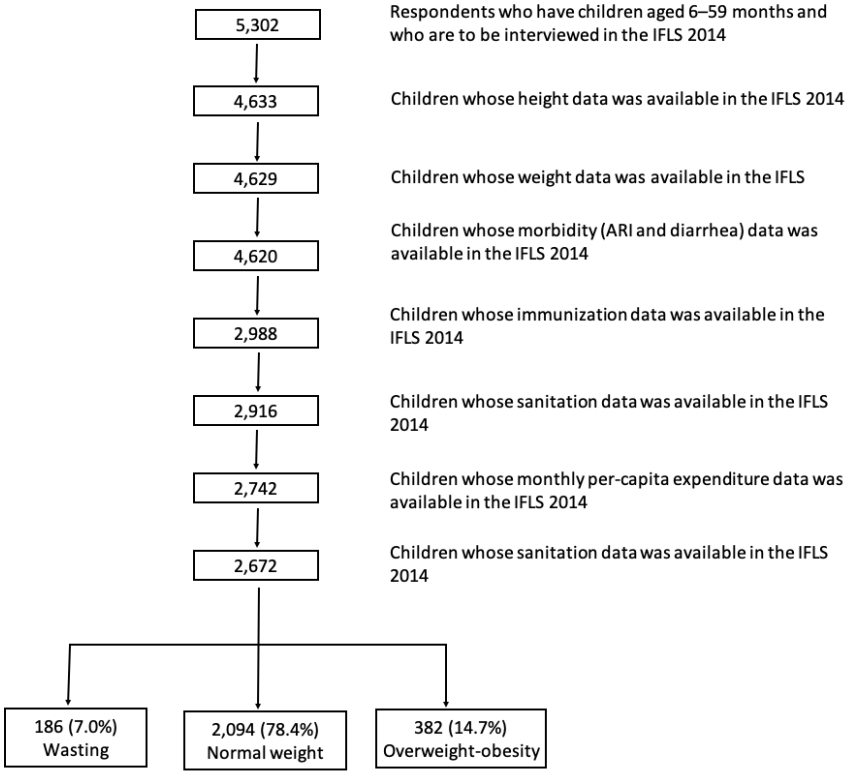

Figure 1. Flow chart respondents

Environmental health was measured by asking the main source of water used for drinking and the availability of latrines in the household, the respondents' answers were categorized as "not good" (the source of the water used comes from natural or untreated) or "good" (if the source of drinking water used comes from treated water) and have their own latrines with septic tanks. Monthly per capita expenditure (PCE) is the expenditure of a family under five in a month for food, clothing, education etc., and the location of the child's residence based on questions on the questionnaire regarding the location of residence in urban or rural areas.

The dependent variable is wasting, which is measured by weight and height then the Z-Score is calculated. Then grouped into "wasting" if the z-score is <-2 SD, "normal" if the z-score is -2 SD to +1 SD, or "overweight-obese" if the z-score is >+1 SD to +3 SD or z -score >+3SD. The statistical analysis used consisted of univariate and bivariate analyzes using the chi-square test aimed at determining the relationship between exposure and outcome as seen from a p-value ≤0.05 which was considered statistically significant using SPSS software to analyze the statistics.

RESULTS AND DISCUSSION

Table 1 explains that from 2,672 research samples, it was found that the majority of children had normal nutritional status, namely 2,094 (78.4%), and children with overweight-obese nutritional status had a rate twice as high, namely 392 (14.7%) compared to the wasting rate, namely 186 (7.0%). 1,377 boys (51.5%) had a history of ARI, 2,090 (78.2%) children and 2,210 (82.7%) children had no history of diarrhea. In this study also measured the frequency of children's meals, immunization status, environmental health, monthly per capita and location of residence. The results of the study regarding the frequency of meals showed that 2,496 (93.4%) children were fed 2-3 times a day. Immunization status of children with complete immunization status was 1,958 (73.3%), and 1,716 (64.2%) children had good environmental health. The results of the analysis of monthly per capita expenditure show that the monthly per capita family of toddlers in the IDR 500,000 - IDR 999,999 category is 1,186 (44.4%) with an average (mean) expenditure of a child's family of IDR 964,033 per month. There were 1,544 (57.8%) children living in urban areas and 346 (12.9%) living in West Java Province.

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Table 1. Univariate analysis of characteristics of children aged 6-59 months in indonesia based on 2014 IFLS Data (n=2,672)

Variable	n	Mean ± SD or %
Nutritional status (weight-for-height)		
Wasting	186	7.0
Normal	2,094	7.4
Overweight	275	1.3
Obesity	117	4.4
Nutritional status (weight-for-height)		
Wasting	186	7.0
Normal	2,094	78.4
Overweight-obesity	392	14.7
Gender		
Man	1,377	51.5
Woman	1,295	48.5
ISPA history		
There is a history of ARI	2,090	78.2
No history of ARI	582	21.8
Diarrhea history		
There is a history of diarrhea	462	17.3
No history of diarrhea	2,210	82.7
Meal frequency		
Child eats <2 times a day	176	6.6
Children eat 2-3 times a day	2,496	93.4
Immunization		
Incomplete	714	26.7
Complete	1,958	73.3
Environmental Health		
Not good	956	35.8
Good	1,716	64.2
Monthly per capita expenditures		
IDR 500,000	612	22.9
IDR 500,000-IDR 999,999	1,186	44.4
>IDR 1,000,000	874	32.7
Average monthly per capita expenditures (IDR)	2,672	964,033±794,360
Residential location		
Urban	1,544	57.8
Countryside	1,128	42.2

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ISPA (Acute Respiratory Infection), IDR (Indonesian Rupiah)

Table 2 presents a bivariate analysis of the relationship between history of ARI, history of diarrhea, frequency of eating, immunization, environmental health, monthly per capita expenditure (PCE), and the location of the child's residence with wasting nutritional status. It was found that there was no statistically significant relationship. between history of ARI, history of diarrhea, frequency of meals and immunization. As for environmental health, monthly per capita expenditure and location of residence found a statistically significant relationship.

Table 2. Bivariate analysis of determinants of wasting nutritional status in children aged 6-59 months in indonesia based on 2014 IFLS data (n=2,672)

Variable	Nutritional Status						Total		p-value
	Wasting		Normal		Overweight-Obesity				
	n	%	n	%	n	%	n	%	
ISPA history									
There is a history of ARI	142	6.8	1,652	79	296	14.2	2,090	100	0.269
No history of ARI	44	7.6	442	75.9	96	16.5	582	100	
Diarrhea history									
There is a history of diarrhea	40	8.7	361	78.1	61	13.2	462	100	0.209
No history of diarrhea	146	6.6	1,733	78.4	331	15	2,210	100	
Meal Frequency									
Child eats <2 times a day	16	9.1	138	78.4	22	12.5	176	100	0.400
Children eat 2-3 times a day	170	6.8	1,956	78.4	370	14.8	2,496	100	
Immunization									
Incomplete	57	8	560	78.4	97	13.6	714	100	0.325
Complete	129	6.6	1,534	78.3	295	15.1	1,958	100	
Environmental Health									
Not good	73	7.6	770	80.5	113	11.8	956	100	0.006
Good	113	6.6	1,324	77.2	279	16.3	1,716	100	
Monthly Per Capita Expenditures									
IDR 500,000	36	5.9	505	82.5	71	11.6	612	100	<0.001
IDR 500,000-IDR 999.999	88	7.4	942	79.4	156	13.2	1,186	100	
IDR 1,000,000	62	7.1	647	74	165	18.9	874	100	
Residential Location									
Urban	103	6.7	1,185	76.7	256	16.6	1,544	100	0.005
countryside	83	7.4	909	80.6	136	12.1	1,128	100	

ISPA (Acute Respiratory Infection), IDR (Indonesian Rupiah)

This study describes as many as 186 (7.0%) of Indonesian children experiencing wasting. The results of this study showed that there was no statistically significant relationship between history of ARI and wasting. The results of this study are not in line with previous studies which state that ISPA is significantly related to wasting. Children who had an acute respiratory infection (ARI) in the previous two weeks were more likely to be malnourished than children who did not have ARI[17]. The results of this study are also different from the mechanism which states that ISPA is a direct factor in the occurrence of malnutrition in children. ISPA can interfere

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with the absorption of nutritional intake resulting in undernutrition and malnutrition[18]. The difference in this study occurred because there was no data indicating how long the child had suffered from ARI and the questions on the questionnaire asked in this study were whether or not the child had experienced any of the symptoms of ARI in the last 4 weeks, so it is not known how long toddlers have ARI. This is supported by the mechanism which states that generally ISPA which lasts for 14 days indicates that the occurrence of acute infection, infection can interfere with appetite so as to encourage the occurrence of undernourished status in children[19].

Based on the theoretical framework of the determinants of wasting, diarrheal disease is a direct factor in the occurrence of wasting in children[5]. In this study, children with a history of diarrhea were more likely to have wasting nutritional status (8.7%) compared to children without a history of diarrhea (6.6%). statistically showed no significant relationship between the incidence of diarrhea in the last month with wasting nutritional status. The findings at this time are different from previous studies which showed that there was a significant relationship between diarrhea and acute malnutrition (wasting), children with a history of diarrhea were 2.4 times more likely to experience acute malnutrition (wasting)[20,21]. The difference in this study may have occurred because diarrheal infections in children lasted <14 days and were not accompanied by other symptoms so that they were classified as acute or mild diarrhea that could heal on its own, therefore it is possible for acute or mild diarrheal infections to occur, this does not bother absorption of nutrients in the body so that it does not affect the nutritional status of children[19,22].

The results of the analysis on the frequency of eating in children, the type of food consumed or given to children can be adequate and the nutrient content can meet the requirements of balanced nutrition in children. Aspects of food consumption can be carried out by providing additional food to food insecure groups, namely children aged 6 months to 2 years and providing cash assistance to increase the ability to access food[23]. When the food intake given/consumed is adequate, the child is in normal nutritional status and vice versa if the child eats a little more it is highly recommended to increase the frequency of meals so that their nutritional intake is met. If food intake is not met, signs of wasting will be seen from the child's weight does not match the child's height[24]. The results showed that there was no significant relationship between eating frequency and wasting. These results differ from previous studies which state that there is a significant relationship between eating frequency and wasting. Although statistically the results of this study did not show a significant relationship, in this study children who ate <2 times a day were more (9.1%), compared to children who ate 2-3 times a day (6.8%). The low frequency of eating is influenced by the mother/caregiver and the availability of pagans in the household. If at every feeding, the quality of the child's food menu (nutritional intake) does not comply with the guidelines for balanced nutrition (the nutrients contained are incomplete) and will have an impact on wasting and can cause children to experience it, and is what must be considered in food consumption is not just the frequency of meals only but also the quality or content of the food[25,26].

An analysis of immunization in children shows that the wasting rate is higher for children who do not carry out complete immunizations compared to those who are fully immunized. However, the results of the study showed that there was no significant relationship between immunization and wasting. These findings differ from previous studies which state that immunization has a significant relationship with wasting, children who are not immunized are more likely to experience it than those who were immunized during childhood. Children who are not immunized means that children will be easily exposed to and infected by various infectious agents which can develop into diseases and eventually lead to malnutrition[26]. The difference in this study may have occurred because based on the theoretical framework for the causes of nutritional problems set by the United Nations Children's Fund (UNICEF), immunization is not the main factor causing children's nutritional status, but there are other things that affect nutritional status[27]. Wasting is a nutritional problem as measured by the weight/Height index. While immunization is thought to protect children from disease by building an immune system that can prevent malnutrition, this process takes time. Thus, it makes sense that immunization is not related to wasting, short-term malnutrition[27].

In theory, H.L Blum states that there are four main factors that can affect public or individual health, namely life style, environment, genetics and health services. The four factors are interrelated (simultaneously) in influencing the health of an individual and the environment is the main factor and has the greatest influence on individual health[28]. The results of this study indicate that children with wasting nutritional status mostly live in poor health environments (source of water used comes from bucket wells, springs, rainwater, river water, use their own latrines without septic tanks, public latrines, rivers/ponds/sea/lake) compared to children who live in a good environment. The results of this study are in line with previous research which said the source of drinking water and the availability of latrines (sanitation) had a significant relationship with acute malnutrition (wasting)[29]. Poor drinking water, inadequate hygiene and sanitation conditions will increase the risk of infection[11,20]. If the cleanliness of the environment is in accordance with the indicators of a clean house and a clean environment, the smaller the risk of children becoming malnourished[12].

Monthly per capita expenditure (PCE) is calculated as the total monthly household expenditure. Household expenditure is categorized as follows: 1) food expenditure; 2) non-food consumption: frequently purchased goods and services (i.e., electricity/ telephone/water, transportation, entertainment, and others); 3) non-food expenditures: less frequently goods and services are purchased (i.e., clothing, furniture, medicines, taxes, etc.); 4) education or 5) housing (i.e., renting)[30]. Household expenditure in IFLS has been described in detail in previous studies. Based on this research, it was found that there was a relationship between monthly per capita spending (PCE) and wasting.

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This result is in line with previous research which stated that there is a relationship between family expenditure and children's nutritional status, low family expenditure increases the risk of wasting by 2.5 times greater than high family expenditure. High family expenditure reflects a good socio-economic condition of the family. The good economic condition of the family can be interpreted that the basic needs in the form of family nutrition have been fulfilled[31].

The proportion of malnourished children is higher in rural areas (7.4%) than in urban areas (6.7%). In this study, statistically, there is a relationship between the location where children live and the incidence of wasting. The Global Nutrition Report 2020 and previous studies state that the majority of children who experience wasting live in rural areas compared to children who live in urban areas[32]. This is due to inadequate access to health and sanitation services in rural areas where this will have an impact on the nutritional status of children. In addition, the availability of adequate health and sanitation facilities and good education for people living in urban areas about child care may contribute to the lower prevalence of wasting in urban areas than in rural areas[33].

This study has a weakness, namely several variables, namely history of ARI, history of diarrhea, frequency of meals, immunization status and monthly per capita expenditure are information obtained through self-reporting thus making it possible for information bias. However, this study also has advantages including the first, IFLS uses calibrated tools to measure body weight and height in children. Second, this study utilized IFLS 2014 data, covering a nationally representative sample. Third, all IFLS interviewers were trained to understand the content of the questionnaire as well as the research methodology.

CONCLUSIONS

Wasting at the age of 6-59 months is influenced by environmental health, monthly per capita expenditure (PCE), and the location where the child lives. Efforts that can be made are setting priorities in health policy to reduce wasting which may be different for each region, so that children can grow and develop optimally according to their age, weight and height to create smart and healthy future generations.

ACKNOWLEDGEMENT

The authors would like to thank the RAND Corporation for providing access to IFLS data.

Conflict of Interest and Funding Disclosure

The authors have no conflicts of interest associated with the material presented in this paper. This study was funded by Sekolah Tinggi Ilmu Kesehatan Banten.

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How to cite: *Purwadi, H. N., Nurrika, D., Wulandari, M., Novrinda, H., & Febriyanti, H. Determinants of Wasted Among Age 6-59 Months: The Indonesia Family Life Survey 2014: Determinan Wasting pada Usia 6-59 Bulan: Indonesia Family Life Survey 2014. Amerta Nutrition, 7(1SP), 17–24.*

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How to cite: *Purwadi, H. N., Nurrika, D., Wulandari, M., Novrinda, H., & Febriyanti, H. Determinants of Wasted Among Age 6-59 Months: The Indonesia Family Life Survey 2014: Determinan Wasting pada Usia 6-59 Bulan: Indonesia Family Life Survey 2014. Amerta Nutrition, 7(1SP), 17–24.*