

Factors Associated with Stunting in Children Under Five: A Cross-Sectional Study from Ritaebang Health Center, West Solor, East Flores, Indonesia

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ABSTRACT

Background: Stunting in children under five years of age is one of the global nutritional problems. World Health Organization (WHO) puts Indonesia as the third country with the highest cases in Asia. Prevalence of stunting in children under five years of age in East Nusa Tenggara touches 40.3%, the highest compared to other provinces in Indonesia. The study aims to discover factors associated with stunting incidences in children under five years of age in the working area of Ritaebang Community Health Center, West Solor, East Flores.

Subjects and Method: This cross-sectional study was conducted in the working area of Ritaebang Community Health Center, West Solor, East Flores during the month of June – July 2022. A total of 70 children under five years of age were selected by using random sampling. The dependent variables were birth weight, consumption pattern, clean water availability, maternal education, number of family members, and family income. The independent variable was stunting children under five years of age. The data were collected by using questionnaires, and analyzed by using SPSS.

Results: The stunting incidences in children under five years of age were significantly associated with exclusive breastfeeding (OR= 3.91; p= 0.046), consumption pattern (OR= 19.63; p<0.001), the availability of clean water (OR= 6.37; p= 0.001), maternal education, (OR= 3.14; p= 0.033), number of family members (OR= 6.71; p= 0.007), and family income (OR= 12.25; p= 0.008), and were also associated with birth weight (OR= 3.61; p= 0.214), however it was not statistically significant.

Conclusion: Stunting incidences is associated with birth weight, breastfeeding, consumption pattern, clean water availability, maternal education, number of family members, and family income.

Keywords: stunting, birth weight, clean water, environment.

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BACKGROUND

Stunting incidences in children under 5 years of age is one of global health problems. Stunting incidences in children is a

cumulative process occurs since gestation, during childhood, and throughout live cycle. Maternal nutrition factor prior and during pregnancy is an indirect cause that

contributes in fetal growth (Dinkes 2020). World Health Organization (WHO) puts Indonesia as the third country with highest cases in Asia. In Indonesia, people often consider short stature as a genetic factor. Public's wrong perception makes the problem difficult to reduce and it requires great efforts from the government and various related sectors.

The result of Pantauan Status Gizi (PSG) or Nutritional Status Monitoring year 2017, the prevalence of stunting in children under 5 years of age in East Nusa Tenggara touches 40.3%, the highest of all other provinces in Indonesia. Based on East Flores Health Office data around 26% infants and children under five years of age suffer from stunting. In the working area of Ritaebang Community Health Office of West Solor sub-district of East Flores Regency, the number of stunting cases is increasing every year. Based on the data of Ritaebang Community Health Center working area that consists of 1 urban-village and 14 villages, the stunting cases rates in 2020 and 2021 reach 109 cases and 130 cases, respectively. Per February 2022 the case data hits 134 cases (Puskesmas Ritaebang, 2022).

Based on the Health Ministry of the Republic of Indonesia (2018) there are three matters to be concerned related to stunting prevention, namely dietary pattern, parenting, and sanitation improvement. Stunting issue is influenced by the low access to food in terms of quantity and nutritional quality, and they are often unvaried.

The study aims to discover factors associated with stunting incidences in children under five years of age in the working area of Ritaebang Community Health Center, West Solor, East Flores.

SUBJECTS AND METHOD

1. Study Design

It was a quantitative study with analytical observational method by using cross-sectional study design. It was conducted in the working area of Ritaebang Community Health Center, West Solor, East Flores during the period of June – July 2022.

2. Population and Sample

The population was 250 children under five years of age. The sampling technique used was random sampling technique. A total of 70 children under five years of age were selected in the study.

3. Study Variables

The dependent variables were birth weight, consumption pattern, clean water availability, maternal education, number of family members, and family income. The independent variable was stunting in children under five years of age.

4. Operational Definition of Variables

Birth weight was the size of infant's weight or mass, measured in gram during the first hour after birth. The data were obtained from interviews by using questionnaires.

Breastfeeding was feeding breastmilk exclusively to infants in the first 6 months after birth. The data were obtained from interviews by using questionnaires.

Consumption pattern was eating habit of children under five years of age since they start receiving complimentary foods. The data were obtained from interviews by using questionnaires.

Clean water availability was the distance to clean water or clean water source used in daily life. The data were obtained from interviews by using questionnaires.

Maternal education was the last educational level taken by a mother. The data were obtained from interviews by using questionnaires.

Number of family members was the number of family members in a house including the head of family as well as other family members who become dependents. The data were obtained from interviews by using questionnaires.

Family income was the amount of family income whether from father, mother as well as any other family members who live in the house. The data were obtained from interviews by using questionnaires.

5. Instruments

The study data were obtained from primary and secondary data. The primary data were obtained from direct interviews with the study subjects by using questionnaires. The secondary data were obtained from Ritaebang Community Health Center of

West Solor Sub-district, East Flores Regency, they were the data of children under five years of age during the month of June-July 2022.

6. Data Analysis

Univariate analysis was conducted to see the frequency distribution and characteristics of study subjects, while bivariate analysis was conducted by using chi square test to test the association between independent variable and independent variable.

RESULTS

1. Sample Characteristic

Table 1 showed the categories of variables, total sample, and also the percentage of each variable.

Table 1. Respondents distribution based on variables of stunting incidences in Ritaebang Community Health Center working area year 2022.

Variables	Categoris	Frequency (n)	Percentage (%)
Stunting Incidences	Stunting	50	71.41
	Non-Stunting	20	28.57
Age	12-23 months	29	41.43
	24-35 months	14	20
	36-47 months	11	15.71
	48-59 months	16	22.86
Gender	Male	44	62.86
	Female	26	37.14
Birth Weight	LBW	9	12.86
	Non-LBW	61	87.14
Breastfeeding	Non-Exclusive	41	58.57
	Exclusive	29	41.43
Consumption	Poor	59	85.29
	Excellent	11	15.71
Clean Water Availability	Insufficient	39	55.71
	Sufficient	31	44.29
Maternal Education	Low	45	64.29
	High	25	35.71
Number of Family Members	>4 people	61	87.14
	≤4 people	9	12.86
Family Income	Low	65	92.86
	High	5	7.14

Table 2. Factor associated with Stunting Incidences in Children under Five Years of Age in the Working Area of Ritaebang Community Health Center, West Solor Sub-district, East Flores Regency year 2022.

Variables	Stunting		Non-Stunting		Total	OR	p-value
	n	%	N	%	N		
Birth Weight							
Low Birth Weight	8	11.43	1	1.43	9	3.61	0.214
Non-Low Birth Weight	64	60	19	27.14	61		
Breastfeeding							
Non-Exclusive	33	47.14	8	11.43	44	2.91	0.046
Exclusive	17	24.29	12	17.14	26		
Consumption Pattern							
Poor	48	68.572	11	15.71	59	19.63	<0.001
Excellent	2	.86	9	12.84	11		
Clean Water Availability							
Insufficient	34	48.57	5	7.14	39	6.37	0.001
Cukup	16	22.86	15	21.43	31		
Maternal Education							
Low	34	68.57	11	15.71	45	3.14	0.033
High	16	2.86	9	12.86	25		
Number of Family Members							
>4 people	47	67.14	14	20	61	6.71	0.007
≤4 people	3	4.29	6	8.57	9		
Family income							
Low	49	70	16	22.86	65	12.25	0.008
High	1	1.43	4	5.71	5		

Table 1 above indicated the majority of respondents were stunted with a total of 50 children under 5 years of age (71.41%), aged 12-23 months (41.43%), male (62.86%), non-low birth weight (87.14%), non-exclusively breastfed (58.57%), poor consumption pattern (85.29%), clean water unavailable (55.71%), low maternal education (64.29%), and number of family members >4 (87.14%), also low family income (92.86%).

Table 2 showed Factor associated with Stunting Incidences in Children under Five Years of Age in the Working Area of Ritaebang Community Health Center, West So-

lor Sub-district, East Flores Regency year 2022.

a. The association of birth weight with stunting incidences in children under five years of age.

Children under five years of age with low birth weight were 3.61 times more likely to increase stunting incidences compared to non-low birth weight (OR= 3.61; p= 0.214), however it was not significant.

b. The association of exclusive breastfeeding with stunting incidences in children under five years of age

Children under five years of age who were not exclusively breastfed were 3.91 times

more likely to increase stunting incidences compared to those who were exclusively breastfed (OR= 3.91; $p= 0.046$), and statistically significant.

c. The association of consumption pattern with stunting incidences in children under five years of age

Children under five years of age with poor consumption pattern were 19.63 times more likely to increase stunting incidences compared to those with excellent consumption pattern (OR= 19.63; $p<0.001$), and statistically significant.

d. The association of clean water availability with stunting incidences in children under five years of age

Insufficient clean water availability was 6.37 times more likely to increase stunting incidences in children under five years of age compared to sufficient clean water availability (OR= 6.37; $p= 0.001$), and statistically significant.

e. The association of maternal education with stunting incidences in children under five years of age

Low maternal education was 3.14 times more likely to increase stunting incidences in children under five years of age compared to high maternal education (OR= 3.14; $p= 0.033$), and statistically significant.

f. The association of number of family members with stunting incidences in children under five years of age

Number of family members >4 was 6.71 times more likely to increase stunting incidences in children under five years of age compared to children with family members <4 people (OR= 6.71; $p= 0.007$), and statistically significant.

g. The association of family income with stunting incidences in children under five years of age

Low family income was 12.25 times more likely to increase stunting incidences in children under five years of age compared to high family income (OR= 12.25; $p= 0.008$), and statistically significant.

DISCUSSION

1. The Association of Birth Weight with Stunting Incidences in Children under Five Years of Age.

Based on the study it was discovered that there was no association of birth weight with stunting incidences in children under five years of age in Ritaebang Community Health Center. It was because the majority of mothers with children under five have children with birth weight above 2500 grams. However, out of 8 children under five who suffered from low birth weight all of them suffered from stunting.

It is not in accordance with line with a study conducted by Rahmaniar (2021) that states there was an association of birth weight with stunting incidences in children under five in Lahat Regency Health Office. However, it is in line with a study conducted by Kurniawan et al (2020), that claims there is no association between birth weight and stunting incidences in children under five of age. Likewise, a study by Rahmadi (2016) toward children aged 12-59 months in Lampung Province reveals that there is no association between low birth weight and stunting incidences.

2. The association of exclusive breastfeeding with stunting incidences in children under five years

The study revealed that the history of exclusive breastfeeding was associated with stunting incidences in children under five years of age in the working area of Ritaebang Community Health Center. Based on the result of interviews the majority of mothers combined breastfeeding and formula feeding.

It was because the milk was not coming or too little. Mothers also gave infants under 6 months water and other drinks such as coffee and tea since their children were fond of the drinks. It may generate negative impact since infants under 6 months have immature body system therefore their body immune is not able to receive too much intake including plain water.

The study is in line with a study by Mulyaningrum & Nuur (2021) that states that infants who are not breastfed insufficiently have deficient nutrient intake and may lead to malnutrition that may generate stunting. It is in accordance with Indrawati (2016) that claims one of the benefits of exclusive breastfeeding is supporting infants' growth particularly body stature since calcium of breast milk is absorbed more efficiently compared to breast milk substitute.

The result of the study is in line with a study by Rahmat and Miko (2016) that discovers children under five who are not exclusively breastfed will lead to stunting in Banda Aceh. A study by Ika & Ariyati (2019) states that exclusive breastfeeding factor has a significant association with stunting incidences in Pandunan Village with the value of $p=0.000$ ($p=0.05$).

3. The association of consumption pattern with stunting incidences in children under five years

The study result indicated the occurrence of association between consumption pattern and stunting incidences in children under five years of age in Ritaebang Community Health Center.

Based on the study result the majority of parents only perfunctorily gave what was available or only to fill their stomach to feel full without considering the nutrients. It was due to the relatively long distance to

market and extremely minimal family income.

Some mothers gave their children food only during its season as they could get the fruits from their yard or their own farm. The study is in line with a study conducted by Simarmata (2020) that states that at the bottom line the nutritional problem is generated by food unavailability.

Children dietary pattern greatly contributes in children's growth process since food contains a lot of nutrition. A study by Sari & Madhyna (2018) in Agam Regency reveals that respondents with poor dietary pattern are 6 times more likely to have stunted children under five compared to respondents with excellent dietary pattern.

Nurjanah's research (2018) in Madiun Regency shows that there is a relationship between diet and the incidence of stunting or 1.52 times greater for stunting. Diet will also be related to family income so this cannot be separated. This is what makes the researchers include these two factors for a different analysis, because both are determining factors.

4. The association of clean water availability with stunting incidences in children under five

In the study, clean water availability was measured based on household water needs, access to water source, and distance of water source from the house. The result indicated that clean water availability was associated with stunting incidences in children under five years of age.

Based on the interviews, there were a lot of people who lacked of clean water, even there was a village that used saline water to cook since it was near a seashore. There was also a village with water source located far from the village and it took >50 meter to get clean water.

The majority of the people obtained water from a spring often called as custo-

mary water, some others obtained water from a well. Villages that obtained water from the spring, channeled it, and collect it in a big tank to be channeled to houses. Based on the interviews the water tank was seldom to clean.

The study result is in line with a study by Rizki (2022) that states that unprotected water spring such as well, river, and rain water reservoir, may affect health, such as diarrhea. Children under five that suffer from diarrhea in the last two months are at risk for stunting compared to those without diarrhea history in the last two months. It is because diarrhea that occurs to children under five may obstruct adequate nutrition intake required during their growth.

In accordance with Simanjuntak's research (2018) in Cimarga Village, the availability of clean water is associated with stunting, which is indicated by the value of $p= 0.007$ ($p < 0.05$). This can be a consideration for the local government as well as to pay attention to the factors that cause stunting.

5. The association of maternal education with stunting incidences in children under five years

In the study, variable of maternal education was associated with stunting incidences. Based on the result of interviews the majority maternal educational level was low educational level. A lot of mothers did not finish high school, and even only elementary school graduates. It made a lot of mothers did not understand health especially nutrition for children under five to grow, therefore mothers could not give good food required for children's growth and it led to stunting.

It is in line with a study by Nadia (2017) in the area of Wonosari II Community Health Center, Yogyakarta that indicates stunting is 2,778 times more likely to occur to children under five who were born

to mothers with low education compared to those born to mothers with high educational level. It is in accordance with a study by Ika & Ariyati (2019) that states maternal education factor has a significant association with stunting incidences in Pandunan Village with $p= 0,048$ ($p= 0.05$). Based on a literature review conducted by Pariadi (2020) several articles reveal that stunting is also affected by low maternal education. Maternal education will indirectly affect maternal ability and knowledge concerning health care particularly in understanding nutritional knowledge.

6. The association of number of family members with stunting incidences in children under five

The study result indicated that the number of family members was associated with stunting incidences in children under five years of age. Based on the interviews results conducted in Ritaebang Community Health Center working area concerning the number of family members, it was discovered that the majority had more than 4 family members. Family with fewer family members will be easier to improve their welfare, meet the needs for food and clothing. Family with more family members will find it harder to meet the needs for food compared to family with fewer members.

It is in line with a study conducted by Simarmata (2020) in Lubuk Payam Integrated Service Post (Posyandu) that states number of family members is associated with stunting incidences. A big family combined with low social economic level will lead to unmet needs for affection and other needs such as food and clothing.

The results of Susanti et al's research (2020) in Belu Regency assessed that the incidence of stunting in toddlers was caused by many factors, including the large number of family members with low total income which greatly affected the family's

diet, especially toddlers. Many toddlers with a good diet do not meet the amount of nutritional composition needed in balanced nutrition due to limited knowledge for families about the nutrition that children need to consume to avoid the increasing incidence of stunting, as well as the importance of health promotion efforts by local health workers.

7. The association of family income with stunting incidences in children under five years

The study result indicated that family income was associated with stunting incidences in children under five years of age. Based on the interviews result concerning family income it was discovered that families in the working area of Ritaebang Community Health Center, West Solor Sub-district, East Flores Regency, had low income under the Minimum Wage Standard of East Flores of 2021 that was Rp 1.950.000, it was because most people worked as farmers. Low economic status will affect the quality and quantity of the food consumed by the family. The food obtained is usually less varied and in small quantity, especially for food that is important for child growth such as source of protein, vitamin, and mineral, therefore it may lead to the risk for malnutrition (Borithnaban,2016).

It is in line with a study by Fadilah (2021) that social economic status impacts on the inability to obtain sufficient and quality food due to the low buying power. A study by Ika & Ariyati (2019) states that good social economic condition in a family will affect energy and protein adequacy in children, it is related to the buying power.

Based on the study its ca be concluded that birth weight factor is not associated with stunting incidences in children under five years of age in the working area of Ritaebang Community Health Center, West

Solor Sub-district, East Flores Regency. Whereas the factor of breastfeeding, consumption pattern, clean water availability, maternal education, number of family members, and family income are associated with stunting incidence in children under five years of age in the working area of Ritaebang Community Health Center, West Solor Sub-district, East Flores Regency.

Community, in particular mothers, are expected to be more attentive in children food intake especially in feeding pattern and exclusive breast feeding to reduce the stunting incidences in children under five years of age. Community Health Centers are expected to improve the stunting prevention program and health promotion concerning nutrition for children under five years of age.

AUTHOR CONTRIBUTION

Marina A.B Ndetu as the main researcher, Pius Weraman, Petrus Romeo the counselors in the article writing.

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This study is self-funded.

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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