

The Social Determinants Of Stunting Among Children Under Five Years In Kotamobagu City

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Abstract

Stunting remains the priority of health programs in developing countries, especially Indonesia since the data from RISKESDAS (Basic Health Survey) 2018 found 30.8% of children were stunted. Stunting occurred due to multilevel factors including mother, child, household, and community. This study aimed to investigate the factors contributing to stunting among children aged 24 to 59 months. The mother of children aged 24 to 59 months joined this study and were chosen using a simple random sampling method. This study has been done in several community health centers in Kotamobagu City from May to July 2022. The outcome of this study was stunting, and the explanatory variables consist of 16 variables from child, mother, and household aspects. The final model found 5 variables had moderate significance to the stunting, such as a history of ANC (Antenatal Care) during pregnancy, birth weight, and family income. Family income was the most influencing factor related to stunting in this study. Income might be related to the power to purchase nutritious food such as meat, milk, fruits, and vegetables.

Keywords: Stunting, Social Determinants, Kotamobagu

INTRODUCTION

The first 2 years of a child's life are often called as "golden period" which means during this time the important growth and development of the children will affect their further life. In order to support the best growth and development of the children, the good quality and quantity of the food need to be served otherwise failure could be occurred (UNICEF, 2019). One of the failures is stunting. Stunting is defined as poor linear growth which showed by under minus 2 of standard deviation and occurred during the critical period. Besides stunting, there are other health problems among children nowadays including wasting and being overweight (UNICEF, 2019).

Compared to the countries in South Asia Region, the prevalence of stunting in Indonesia was lower than Myanmar (35%), but it is still higher than Vietnam (23%), Malaysia (17%), Thailand (16%), and Singapore (4%) (World Health Organization, 2014). According to UNICEF data, Indonesia contributed to the high proportion of stunting in the world, especially in developing countries (World Health Organization, 2018). In Indonesia, about 30.8% children were stunted in 2018 (Ministry of Health Indonesia, 2018). That high number of children with stunting led the government to do some improvements in the health sector and

was supported by other related stakeholders. Nowadays, stunting is a government priority program. The urgency of lowering number of stunting children is because stunting can affect the negative health across the lifespan, such as morbidity and mortality, and reducing the quality of people (UNICEF Indonesia, 2014).

In the global context, there are several factors which lead children to be stunted. Most of the study found the effect of household and family factors to the stunting, including the poor nutrition during and before pregnancy, ANC (Antenatal) and breastfeeding factor, infection, intrauterine growth rate (IUGR) and preterm birth, low birth weight, water and sanitation, socioeconomic, and cultural factors (Ministry of Health Indonesia, 2021). The WHO established the framework of stunted growth and development. In that framework, the causes of stunting consist of household and family factors, inadequate complementary feedings, breastfeeding, and infection (Solar & A.A, 2010). In terms of the context, the community and societal factors also influenced the stunted indirectly, they are such as political economy, health and healthcare, education, society and culture, agriculture and food systems, water, sanitation, and environment.

The latest data from SSGI (Survey Status Gizi Indonesia or Indonesian Nutrition Status Survey) showed a lowering prevalence of stunting from 27.7% in 2019 to 24.4% in 2021 (UNICEF Indonesia, 2014). These significant changes are due to the successfulness of government program to reduce the stunting in the national level (Ministry of Health Indonesia, 2021). However, the prevalence of stunting needs to be lowered a minimum. This study aimed to examine the factors related to the stunting among children aged 24 to 59 months in Kotamobagu City.

RESEARCH METHODS

This study was cross-sectional research which has been conducted in Kotamobagu City, North Sulawesi Province. The data collection was done from May to July 2022. The respondents of this study were a mother of children under five years. The sample has been selected using a simple random sampling method. Totally 147 mothers were recruited and successfully joined the interview. The mother is proxy to inform the information about the children including the data of birth height and weight, history of exclusive breastfeeding and immunization.

The outcome variable is stunting. It was defined based on the WHO cut-off. The explanatory variables include socioeconomic and health factors among mothers and children. The data analysis was performed using STATA version 15. The univariate analysis described the general characteristics of the respondent using frequency and percentage. The bivariate analysis was a Chi-Square test which is the method to analyze the correlation between one categorical independent variable and one categorical dependent variable. The multivariate analysis has been done using binary logistic regression which is used to analyze the explanatory variables (more than one) and the outcome variable. The Odd Ratio as the result of the multivariate analysis was shown as adjusted. The data analysis in this study used 95% standard error which means the significant level

is defined with a $p\text{-value} < 0.05$. All the steps of this study have been reviewed and got permission from the national and political unitary body (Badan Kesatuan Bangsa dan Politik / Kesbangpol) Kotamobagu City with the official number 11/BKBP-KK/RKM-P/V/2022.

RESULTS AND DISCUSSION

Totally 147 mothers of children aged 24 to 59 months joined this study. According to the mother's age, the average age the mother was 27 years old with minimum age was 17 and the maximum age was 36 years. Table 1 below described the general characteristics of the respondents. The prevalence of stunting in this study is 33.33% which was high. In terms of education level, most of the mothers graduated from high school (56.46%). It was found that majority of the mothers had the normal height compared to the short one (58.50%). The interval between one birth and others which was normal, or more than 2 years was found (58.50%). The parity of mothers shown that more than a half of them did not have a risky parity (62.59%). About the anemia during the pregnancy, most of the mothers reported there was no history of anemia (61.90%). ANC (antenatal care) during the pregnancy was found the majority of mothers completely did the ANC (68.03%). In terms of the washing hand behavior of the mother, most of them did well practices of washing hand (61.90%).

The factors related to stunting that occurred because of the children's health condition including the birth height, birth weight, history of exclusive breastfeeding, and immunization. More than a half of the children in this study had the normal height and weight (57.82% and 65.99%, respectively). This univariate data found that more than a half of the children did not have the exclusive breastfeeding (58.50%). About the immunization, almost three fourth of the children had the complete basic immunization (72.11%). In the household level, the family income seems the high gap between rich and poor which showed that the poor family was 68.71% from total 147 children.

Table 1. The general characteristic of the respondents

<i>Variables</i>	<i>Frequency (n = 147)</i>	<i>Percentage (%)</i>
Stunting		
No	98	66.67
Yes	49	33.33
Mother's age		
19-27 years	71	48.30
28-36 years	76	51.70
Education level		
High	83	56.46
Low	64	43.54
Mother's height		
Normal	86	58.50
Short	61	41.50
Births space		
Normal	86	58.50



Less than 2 years	61	41.50
Parity		
Not risky	92	62.59
Risky	55	37.41
History of anemia during pregnancy		
No	91	61.90
Yes	56	38.10
Attended the ANC		
Yes	100	68.03
No	47	31.97
Washing hand behavior		
Good	91	61.90
Poor	56	38.10
Birth height		
Normal	85	57.82
Short	62	42.18
Birth weight		
Normal	97	65.99
Underweight	50	34.01
History of exclusive breastfeeding		
Yes	61	41.50
No	86	58.50
Immunization		
Complete	106	72.11
Not complete	41	27.89
Family income level		
Middle to high	46	31.29
Poor	101	68.71

Table 2 below describes the bivariate results which performed using Chi-Square test. The results of this test presented by table 2 x 2 for each variable, Chi-Square value, and *p-value*. Among 13 explanatory variables, it was found that 9 independent variables had the correlation to the stunting among children. In detail, the weak correlation ($p\text{-value} < 0.05$) found in variable: education level, birth space, parity, and history of anemia. The moderate correlation ($p\text{-value} < 0.01$) was found in variable of: attended ANC, birth height, birth weight, history of exclusive breastfeeding, and family income. The other independent variables which were mother age, mother height, washing hand behavior, and immunization had no correlation to the stunting among children aged 24 to 59 months.

Table 2. The correlation between each variable to stunting

Variables	Stunting		Chi-square value	p-value
	No	Yes		
Mother's age			0.01	0.907
19 to 27 years	47 (47.96%)	24 (48.98%)		
28 to 35 years	51 (52.04%)	25 (51.02%)		
Education level			5.53	0.019*
High	62 (63.27%)	21 (42.86%)		
Low	36 (36.73%)	28 (57.14%)		
Mother's height			2.75	0.097
Normal	62 (63.27%)	24 (48.98%)		
Short	36 (36.73%)	25 (51.02%)		
Births space			5.60	0.018*
Normal	64 (65.31%)	22 (44.90%)		
Less than 2 years	34 (34.69%)	27 (55.10%)		
Parity			5.81	0.016*
Not risky	68 (69.39%)	24 (48.98%)		
Risky	30 (30.61%)	25 (51.02%)		
History of anemia during pregnancy			5.21	0.022*
No	67 (68.37%)	24 (48.98%)		
Yes	31 (31.63%)	25 (51.02%)		
Attended the ANC			9.77	0.002**
Yes	75 (76.53%)	25 (51.02%)		
No	23 (23.47%)	24 (48.98%)		
Washing hand behavior			0.36	0.548
Good	59 (60.20%)	32 (65.31%)		
Poor	39 (39.80%)	17 (34.69%)		
Birth height			8.72	0.003**
Normal	65 (66.33%)	20 (40.82%)		
Short	33 (33.67%)	29 (59.18%)		
Birth weight			7.33	0.007**
Normal	72 (73.47%)	25 (51.02%)		
Underweight	26 (26.53%)	24 (48.98%)		
History of exclusive breastfeeding			10.98	0.001**
Yes	50 (51.02%)	11 (22.45%)		
No	48 (48.98%)	38 (77.55%)		
Immunization			2.05	0.153
Complete	67 (68.37%)	39 (79.59%)		
Not complete	31 (31.63%)	10 (20.41%)		
Family income level			7.66	0.006**
Middle to high	38 (38.78%)	8 (16.33%)		
Poor	60 (61.22%)	41 (83.67%)		

*p-value < 0.05, **p-value < 0.01, ***p-value < 0.001

Table 3 below describes the results of binary logistic regression which is presented by AOR (adjusted Odd Ratio) and *p-value*. All the variables in the bivariate analysis were included in the multivariate analysis in order to get comprehensive data from household, mother, and child perspectives. The variables that had the correlation to the stunting were education level of the



mother, history of anemia during pregnancy, attended ANC, birth weight, history of exclusive breastfeeding, and family income. In detail, education level of the mother had the weak correlation (*p-value* 0.039) to stunting among the children aged 24 to 59 months. Compared to mother with high education, mother with low education were 3.8 times more likely to have stunting child after adjusted to other independent variables. History of anemia during pregnancy of the mother had a weak correlation (*p-value* 0.021) to stunting among the children aged 24 to 59 months. Compared to mother with no history of anemia, mother with anemia were 3.2 times more likely to have stunting child after adjusted to other independent variables. History of exclusive breastfeeding had a weak correlation (*p-value* 0.027) to stunting among children aged 24 to 59 months. Compared to mother who gave the exclusive breastfeeding, a mother who did not give the exclusive breastfeeding were 3.2 times more likely to have stunting child after adjusted to other independent variables.

History of attended ANC of the mother had a moderate correlation (*p-value* 0.003) to stunting among the children aged 24 to 59 months. Compared to mother complete ANC, mother with incomplete ANC were 4.4 times more likely to have stunting child after adjusted to other independent variables. Birth weight had a moderate correlation (*p-value* 0.006) to stunting among the children aged 24 to 59 months. Compared to normal birth, children who born with underweight were 3.9 times more likely to be stunting child after adjusting to other independent variables. Family income had a moderate correlation (*p-value* 0.007) to stunting among the children aged 24 to 59 months. Compared to the middle to high income family, poor family were 4.5 times more likely to have stunting child after adjusting to other independent variables.

Table 3. The Multivariate Results

<i>Variables</i>	<i>Adjusted Odd Ratio</i>	<i>Confidence Interval</i>	<i>p-value</i>
Mother's age		0.44 -5.44	0.491
19 to 27 years	1		
28 to 35 years	1.55		
Education level		1.07-14.05	0.039*
High	1		
Low	3.88		
Mother's height		0.97-6.27	0.058
Normal	1		
Short	2.47		
Births space		0.77-5.07	0.155
Normal	1		
Less than 2 years	1.98		
Parity		0.75-5.07	0.169

Not risky	1		
Risky	1.95		
History of anemia during pregnancy		1.20-8.69	0.021*
No	1		
Yes	3.22		
Attended the ANC		1.68 - 11.64	0.003**
Yes	1		
No	4.42		
Washing hand behavior		0.31-2.19	0.698
Good	1		
Poor	0.82		
Birth height		0.81-5.63	0.124
Normal	1		
Short	2.14		
Birth weight		1.48-10.47	0.006**
Normal	1		
Underweight	3.93		
History of exclusive breastfeeding		1.14 - 9.03	0.027*
Yes	1		
No	3.21		
Immunization		0.20 - 1.71	0.331
Complete	1		
Not complete	0.59		
Family income level		1.51 - 13.46	0.007**
Middle to high	1		
Poor	4.50		

p-value* < 0.05, *p-value* < 0.01, ****p-value* < 0.001

LR chi2 (13) = 66.45

Pseudo R2 = 0.3551

Log likelihood = - 60.342881

This study found several factors related to stunting among children aged 24 to 59 months in Kotamobagu City. In detail the household with low income 4.5 times tend to have stunting children. Mother who did not completely attend ANC 4.4 times more likely to have stunting children. Children who were born with underweight was 3.9 times more like to be stunting in the later life.

The prevalence of stunting in this study was 33.33%. This remains under the national level. This result similar to the findings from the study in Indonesia using 2013 IDHS which found 33.7% children was stunted (Titaley et al., 2019). Although this prevalence lower than the prevalence of stunting in Rwanda which was 38% (Nshimiyiryo et al., 2019). The prevalence of stunting in Tanzania in 2015 and 2010 was high which almost half of children were stunting (49.7% and 35.5%, respectively) (Chirande et al., 2015; Semali et al., 2015). In Peru, there was higher reduction of the stunting during 2008 onwards (Huicho et al., 2017). The prevalence of stunting in Ethiopia was 38.4% which higher than Kotamobagu City (Fantay Gebru et al., 2019). In Nigeria, the prevalence of stunting was quite low which was 29% (Akombi et al., 2017). A study in Madagascar reported the similar prevalence of stunting with Tanzania, which was 53.9% of children aged 24 to 59



months were stunted (Rakotomanana et al., 2017). The prevalence of stunting in Nepal was 26.3% which lower than Indonesia (Tiwari et al., 2014).

The factor which related to stunting in this study were found similar to the scoping review in Indonesia. That study found the child factor (low birth weight, premature birth), maternal factors (parental short stature, parental education), infection, and breastfeeding (Mediani, 2020). Supporting to the result of this study, the review study in Africa found the inadequate feeding practice, maternal under nutrition, food insecurity in the family, economic factor, and education level of the mother were related to the stunting (Wondimagegn, 2014). The study in Rwanda also found the mother's education level, low birth weight, and poorest household were associated to the stunting (Nshimiyiryo et al., 2019). Similar to the findings of this study, the study in Tanzania found that the economic status plays the major role among children (Semali et al., 2015). The successfulness reduction of stunting in Peru was because the government applied the anti-poverty policies and concentrating the program in the rural area (Huicho et al., 2017). Similar to this study, in Ethiopia and Nigeria there was birth weight, poor family, and maternal education which associated to the stunting (Akombi et al., 2017; Fantay Gebru et al., 2019). In Indonesian context using IDHS, it was found that mother attended ANC less than four times, and low birth weight were increasing the possibility to have stunting children (Gordon & Halileh, 2013; Titaley et al., 2019). The study among Palestinian and Madagascar children found the impact of demographic and social factors which contribute to the stunting (Gordon & Halileh, 2013; Rakotomanana et al., 2017). In line with the result of this study, the study in Iran found the mother's education had the correlation with stunting (Emamian et al., 2014). In Nepal, one study found that wealth index, baby size, and breastfeeding influenced the stunting (Tiwari et al., 2014).

The similar studies found the different factors related to stunting. For instance, the study in Somalia found the region characteristics were the most significant factor to stunting (Kinyoki et al., 2016). In detail, those who live in the rainfall and vegetation cover were significant in forecasting stunting. Mother's education found no correlation to the stunting based on the result of the scoping review (Mediani, 2020). The factors including the child's age, child's sex, and history of taking medicine during pregnancy were influenced the stunting in Rwanda (Darteh et al., 2014; Hagos et al., 2017; Nshimiyiryo et al., 2019; Rakotomanana et al., 2017). Different from this study, the research in Ethiopia examined other variables including community's name and religion related to stunting (Fantay Gebru et al., 2019). The community factors which were sources of drinking water was significantly associated with stunting in Tanzania, but that variables did not include to this current study (Chirande et al., 2015). Different from this study, the study in Indonesia found the significancy of household with three or more children under five years related to have stunting in the household (Titaley et al., 2019). One study in Senegal found the children's age and sex were associated with stunting (Garenne et al., 2019). The study in Madagascar found the

household using the iodized salt tend to have lower odd to have stunting children (Rakotomanana et al., 2017). The role of family characteristics and nutritional parenting was found by the study in South Jakarta which describes the factors in the household level (Utami et al., 2019).

In general, looking the results from this study and reviewing the previous studies related to the stunting among children, it was found the core points. Those points include the factors affecting the stunting such as children factor, maternal factor, and household factor. The factors in the children aspect such as birth weight and exclusive breast feeding. The factors in the mother aspect such as education of the mother, history of anemia, and attended ANC. The factor in the household level was a family income. In terms of the children factors, birth weight is reflected the nutrition of the mother during pregnancy so if baby was born with weight less than 2500 gram it might risky to be stunted. Exclusive breastfeeding is also reflected the source of nutrition of the baby until aged 6 months. This might be related to how the baby growth up with the very nutritious breastmilk. The factors of mother education level is related to knowledge of mother. Higher level of education higher knowledge to have a healthy children starting from the conception, pregnancy, and childbearing. The history of anemia is related to the risk of bleeding during childbearing that might risky to the new born baby. The frequency of ANC is related to the frequency of monitoring the physical check up during pregnancy. The family income is related to food insecurity that might lead the innutrition food because there is weak ability and power to purchase the high nutritious food.

CONCLUSION

Family income plays the most significant role to stunting in Kotamobagu City. Income level is related to the accessibility and ability of family to purchase the food. As an impact of low family income, the lack of nutrient for children might be occurred. The accessibility of food is also related to the diverse of the food including vegetables and fruit. The government need to pay more attention to the children living in rural area with middle to low-income household. The further study could include other variables in household and community level.

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