

Factors Related to Stunting in Toddlers Aged 6-24 Months

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Abstract

Stunting is one of worrying nutritional problems in Indonesia as its prevalence grows every year. The general objective of this study is to determine factors related to stunting. This study used cross-sectional approach conducted in Kendari City and Semarang City from April to December 2019. The population was children under two years old in Kendari City and Semarang City. Data were analyzed quantitatively, consisting of univariate and bivariate analysis with the help of SPSS. Data analyzed were presented in the form of table and description to discuss the results. The results showed that variables that were significantly correlated with stunting in this study were birth weight ($p = 0.014$), feeding ($p = 0.014$), mother's height ($p = 0.004$), ANC ($p = 0.008$), mother's education ($p = 0.007$), drinking water use ($p = 0.0001$), toilet use (0.047). To prevent stunting, it is suggested based on this study to focus on variables like feeding suitability, mother's weight, ANC examination, drinking water use and toilet use.

Keywords: *Stunting, toddler, birth weight, feeding.*

Introduction

Stunting arises as one of prevalent nutritional problems in the world recently, especially in poor and developing countries. It becomes a problem because it elevates the risks of diseases and death¹⁻³ and leads to suboptimal brain development, causing delayed and impaired mental and motor development. Children whose parents have short stature, whether both or one of them, are more likely to have similarly short stature compared to those whose parents have normal height⁴. Parents with short stature, because of the genes in chromosomes that carry the short stature traits, will most likely pass those traits onto their children. However, in case the short stature is caused by nutritional or pathological problems, the traits will not be passed onto their offspring⁵.

The determinants of stunting are complex. Stunting may be influenced by a number of factors such as Low Birth Weight⁶, education and economic level⁷, mother's nutritional knowledge, and exclusive breastfeeding⁸. Stunting may also be attributable to sanitation, water, hygiene and environmental aspects⁹. According to Palutturi, Syam, and Asnawi (2020), stunting can even be linked to political contexts. Health problems, stunting is one of them, are closely related to political, cultural and leadership problems¹⁰⁻¹⁵.

Based on provincial and national data of 2013 Riskesdas, national prevalence of stunting is 37.2%, showing an increase compared to in 2010 (35.6%) and 2007 (36.8%). This rate consists of 18.0% very short stature and 19.2% short stature. In 2013, the very short stature rate saw a decrease from 18.8% in 2007 and 18.5% from 2010 while the short stature rate saw an increase from 18.0% in 2007¹⁶. In 2018 Riskesdas, a decrease of 6.4% was observed for 5-year period, bringing the number to 30.8% in 2018 from 37.2% in 2013. However, this decrease still fell short of 2019 RPJMN's target of 28% for toddlers under two years old. The prevalence of stunting in Southeast Sulawesi is 34.5%.

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Materials and Method

In design, this was a cross-sectional study. It was conducted in Kendari City and Semarang City from April to November 2019. The population was children under two years old in both cities, with a sample size of 245 children (125 in Kendari City and 125 in Semarang City). The samples were collected using purposive sampling technique. Bivariate analysis was performed to determine the relationship between dependent variables and independent variables with Chi-square statistical test.

Results

Based on the nutritional status determination according to TB/U index, 42.9% of the children were stunted, 53.5% of them were male and 46.5% were female. In age group, 51.0% of them were aged 6-12 months. Only 2% of them were <20 years old, while 84.9% of them were 20-35 years old and 13.1% of them were >35 years old. 66.2% of the fathers had medium education, 11.4% had low education and 22.4% had high education. The majority of the family head were father with 85.7%.

Table 1: Study sample characteristics

No.	Respondent Characteristics	n	%
1.	TB/U Nutritional Status		
	Stunting	105	57.1
	Normal	140	42.9
2.	Genders		
	Male	131	53.5
	Female	114	46.5
3.	Age Group		
	6-12 months old	125	51.0
	12-24 months old	120	49.0
4.	Maternal Age Category		
	< 20 years old	5	2,0
	20-35 years old	208	84.9
	> 35 years old	32	13.1
5.	Father's Education		
	Low	28	11.4
	Medium	162	66.2
	High	55	22.4
6.	Family Head		
	Father	210	85.7
	Mother	7	2.9
	Other	28	11.4

Table 2: Factors related to stunting in toddlers

Variables	Stunting Status				Total		pv
	Normal		Stunting		n	%	
	n	%	n	%			
Birth Weight							0.014
BBLR (LBW)	9	34.6	17	65.4	26	100	
Normal	131	59.8	88	40.2	218	100	
Feeding							0.014
Solid foods	16	80.0	4	20.0	20	100	
Formula/ASI	124	55.1	101	44.9	218	100	

Variables	Stunting Status				Total		pv
	Normal		Stunting		n	%	
	n	%	n	%			
Mother's Height							0.004
Short	7	29.3	17	70.8	24	100	
Normal	133	60.2	88	39.8	221	100	
ANC							0.008
Adequate	59	68.6	27	31.4	86	100	
Inadequate	81	50.9	78	49.1	159	100	
Mother's Education							0.007
Low	15	50	15	50	30	100	
Medium	84	52.2	77	47.8	161	100	
High	41	75.9	13	24.1	54	100	
Drinking Water							0.003
Protected Water	94	64,8	51	35,2	145	100	
Unprotected Water	46	46	54	54	100	100	
Toilet Use							0.047
Gooseneckor similar	132	55,9	104	44,1	236	100	
Other	8	88,9	1	11,1	9	100	

In Table 2, out of 218 samples, 88 (40.2%) of them had normal birth weight but stunted and 131 (59.8%) of them had normal birth weight but not stunted. Out of 20 samples, 4 (20.0%) of them were given solid foods and stunted and 16 (80.0%) of them were given solid foods but not stunted.

Out of 221 mother's height samples, 88 (39.8%) of them had normal height with stunting status, and 133 (60.2%) of them had normal height without stunting status. Meanwhile, out of 24 short stature mother samples, 7 (29.3%) of them were normal while 17 (70.8%) of them were stunted. Out of 159 ANC samples, 78 (49.1%) of them received inadequate ANC and were stunted and 81 (50.9%) of them received inadequate ANC but not stunted. Out of 54 high mother's education samples, 13 (24.1%) of them were stunted and 41 (75.9%) of them were normal. Out of 145 protected water samples, 51 (35.2%) of them were stunted and 94 (64.8%) were normal. Out of 236 samples, 104 (44.1%) of them used gooseneck toilet or similar and suffer from stunting and 132 (55.9%) of them used gooseneck toilet or similar and were free from stunting.

Discussion

Relationship between Birth Weight and Stunting

Status: The statistic test using Chi square obtained a p-value of 0.014, smaller than the alpha ($p < 0.05$), indicating a relationship between birth weight and stunting status. This was in line the study by ¹⁷, expressing that toddlers with low birth were at increased risk for stunting.

The study by Nasution et al. on low birth weight (LBW) with stunting in children aged 6-24 months found that there was a significant relationship between LBW and stunting incidents in children aged 6-24 months (OR=5.60; 95% CI:2.27-15,70).

LBW infants also experienced digestive tract disorders because the digestive tract had not functioned properly, as in less able to absorb fat and digest protein and cause a lack of reserves of nutrients in the body. Consequently, it would impair the growth of LBW babies and if this continued unchecked, coupled with inadequate feeding, multiple infection episodes, and poor health care, it might lead to stunting.

Relationship between Feeding and Stunting Status: Table 2 shows that out of 20 samples, 4 (20.0%) of them received solid foods and suffered from stunting and 16 (80.0%) of them received solid foods and did not suffer from stunting. Furthermore, out of 218 exclusive formula/breastfeeding samples, 124 (55.1%) of them were normal and 101 (44.9%) of them were stunted.

Based on the chi-square test, there was no relationship between energy sufficiency level and stunting incidents in children under five both in rural or urban areas, while zinc and iron sufficiency levels were observed to have a significant relationship. In rural areas there was a significant relationship between protein and calcium sufficiency and stunting incidents in children under five, evidenced by a p -value of $<\alpha$ (0.05). However, for urban areas the p -value was $>\alpha$ (0.05), meaning that protein and calcium sufficiency levels were not correlated with stunting incidents in children under five.

This was in line with the study by Salsa (2016) stating consumption of foods containing vitamin C affected stunting incident. Vitamin C is important for forming collagen and protein structure. Collagen is needed for the formation of bones and teeth and scar tissue. Vitamin C is also instrumental in boosting immunity against infections. Vitamin C is needed in the growth process through its role in the synthesis of collagen, proline hydroxylation and lysine conversion to hydroxyproline.

Relationship between ANC and Stunting Status: Table 2 shows that out of 159 inadequate ANC samples, 78 (49.1%) of them suffered from stunting and 81 (50.9%) did not suffer from it. Furthermore, out of 86 adequate ANC samples, 59 (68.6%) of them were normal and 27 (31.4) of them were stunted. The statistic test using Chi-square obtained a p -value of 0.008, smaller than the alpha ($p < 0.05$) with a Coefficient Contingency value of 0.607, indicating there was a relationship between ANC and stunting status.

This was also in line with the other study on risk factors of child stunting, one of which was ANC visits. ANC visits made regularly can detect pregnancy risks early in 18 mothers, especially ones related to nutritional status (Ni'amah, 2014). In this study it was found that mothers who made only one ANC visit (fewer than the minimum standard of four times) had a risk of having a stunted toddler 2.4 times greater than mothers who made ANC visit according to the standard¹⁸.

Relationship between Mother's Height and Stunting Status: Parents' height is closely related to the child's physical growth. Mothers with short stature are one of factors correlated significantly with stunting incidents¹⁹. This finding was in line with the study by Rahayu (2011) revealing that a child born from a mother and father with short stature was at risk for stunting. One or both parents with short stature due to pathological condition (such as growth hormone deficiency) possess genes in chromosomes that carry short height traits, effectively increasing the probability of the child inheriting said genes and suffering from stunting.

Another study concluded that parents with short stature, low education levels and low income are risk factors associated with stunting incidents in children under five²⁰. Other study also stated that genetic factors in the mother, namely height, have a strong correlation with stunting incidents in children²¹.

Relationship between Mother's Education Level and Stunting Status: The education level is associated with the level of difficulty for mothers to access and receive information about nutrition and health from external sources. A mother with higher education level receives information from external sources with more ease, compared to a mother with lower education level. The level of education of the majority of families of stunted toddlers fell into the low category, which was mainly due to economic condition, holding them back from continuing to higher education levels. Infact, higher education levels were nearly out of question when they struggled to provide foods with complete nutrition²².

The statistic test using Chi-square obtained a p -value of 0.007, smaller than the alpha ($p < 0.05$), indicating there was a relationship between mother's height and stunting status. It showed that mother's education level was not a determinant factor in stunting incidents. This was in line with the study by Ni'mah and Muniroh (2015) stating that mother's education level was not correlated with stunting incidents in children under five.

This was also in line with the study by Astuti (2013)²³ revealing that there was no correlation between mother's education and stunting incidents. Similar results were also obtained by Ni'mah and Muniroh (2016)²⁴ in their study.

Relationship between Drinking Water Use and Stunting Status: Clean drinking water source is an important element for health and helps decrease the risk

of various diseases such as diarrhea, cholera, and typhus. Children are a vulnerable subject for infectious diseases since their immune system is naturally weak. Mortality and morbidity in children are generally associated with contaminated drinking water sources and poor sanitation. Several studies in many countries showed that drinking water quality is positively correlated with the reduction in diarrhea incidents and mortality in children (Adeware, et. al. 2011).

Protected drinking water sources which are the manifestation of healthy environmental sanitation indirectly influences toddler's health which ultimately affects their nutritional status or stunting incidents. Nutritional problems, in addition to being caused by a lack of nutrient intake, are also caused by poor environmental sanitation, in this case drinking water sources and personal hygiene, which facilitate the emergence of infectious diseases. This was in line with the study by Zairinayanti and Purnama Rio (2019), revealing that there was a relationship between hygiene and environmental sanitation and stunting incidents.

Relationship between Toilet Use and Stunting Status

Community-led total sanitation program (*STBM*) is a national policy based on the Decree of the Minister of Health No. 852/Menkes/SK/IX/2008, which was then extended with Permenkes No. 3 of 2014. The objective of this program is to realize hygienic and sanitary community behavior independently in order to improve public health to the highest level possible. The implementation of *STBM* relies on 5 principles; Stop Open Defecation; Use Soap to Wash Hands; Household Drinking Water and Food Management; Household Waste Management; and House Wastewater Management²⁵.

Conclusions

Based on the results and discussion, the conclusion drawn is that in this study, factors that are significantly related to stunting incidents are birth weight, feeding, mother's height, ANC, drinking water consumption and toilet use. The researchers suggest that in order to prevent stunting, factors such as feeding, mother's height, ANC, drinking water consumption and toilet use need closer attention.

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