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Risk factors for stunting among children in Banggai Regency, Indonesia[6]

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Abstract
Objectives: This study aimed to analyze the factors related to stunting in children aged 0--59 months.
Methods: This cross-sectional study involved a total sampling of 285 children <5 years. Data collected were age, sex, exclusive breastfeeding, Mid-Upper Arm Circumference (MUAC), water source and family latrine. Chi-square and multivariate logistic regression were performed.
Results: The results showed that age, exclusive breastfeeding, MUAC, the availability of family latrine were significantly related with the incidence of stunting ($P < 0.05$). Furthermore, the results of multivariate analysis showed that the risk factors that most affected stunting were non-exclusive breastfeeding (OR = 15.059; 95% CI 8.030--28.240), poor family latrine (OR = 2.695; 95% CI 1.364--5.324) and age (OR = 2.527; 95% CI 1.382--4.62).
Conclusions: The strongest risk factors for stunting are non-exclusive breastfeeding, poor family's latrines, and the sex of the children. It is recommended that to strengthen multisectoral interventions to reduce stunting.

Introduction

Stunting has been a global health problem, especially in low- and middle-income countries. The prevalence of stunting in children under 5 years old decreased from 253 million in 1990 to 178 million in 2005 and became 165 million in 2011. It can be concluded that the annual prevalence of stunting can only be reduced with an average of 2.1%.[1] Meanwhile, The

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World Health Assembly (WHA) aims to reduce 40% of stunting children in 2025, which means that it will be reduced by 3.9% in every year. In other words, the rate of the stunting children under 5 years old will decrease from 171 million in 2010 to around 100 million in 2025.[2]

Over the past decade in Indonesia, based on the data from Indonesia Basic Health Research survey, the prevalence of stunting has been decreased gradually from 36.8% in 2007 to 30.8% in 2018.[3]

Although the prevalence has shown a decrease, the target of reducing it to be <20% will be difficult to meet. The prevalence of stunting in Banggai Regency in 2018 was 30.8% composing of severely stunting 15.2% and stunting 16.7%.[4] Therefore, this study aimed to analyze factors related to stunting in children aged 0--59 months in the village of Jaya Bakti, Banggai Regency.

Methods

The design of the study was cross sectional, with a total sampling of 285 children aged 0--59 months and lived in Jaya Bakti Village, Pagimana sub-district, Banggai Regency, Central Sulawesi Province. The samples were recruited used exhausted sampling method. Data on age of the child, sex, exclusive breastfeeding, water, sanitation and hygiene were collected through interviews using a structured questionnaire. The anthropometric measurement on height, weight and Mid-Upper Arm Circumference (MUAC) of children was also conducted. The measurement equipment used were Camry brand digital scale, microtoise, length board and tape measure. The obtained data, then were analyzed used Chi-square and the multivariate logistic regression test.

Results

Data reveal that more children were male (54.7%), with >2 years old (51.6%) and 46.3% received non-exclusive breastfeed. Most of households had clean water source (94.4%). In contrast, only few households had sanitary latrine (28.4%). Mothers with MUAC <23.5 cm were 33% (Table 1)

Table 2 shows the variables tested for association with stunting. The variables related to stunting were age of children (P = 0.006), exclusive breastfeeding (P = 0.000), chronic energy malnutrition (P = and availability of latrine, P = 0.043). Other variables, sex and availability of clean water did not relate.

Table 3 confirms the significant influence of exclusive breastfeeding, latrine family and sex in which accounted for OR = 15.059; 95% CI 8.030--28.240, OR = 2.695; 95% CI 1364--5.324, and OR = 2.695; 95% CI 1364--5.324, respectively. Exclusive breastfeeding has the greatest risk factor for stunting.

Table 1 Characteristics of samples.

	n	%
Sex		
Male	156	54.7
Female	129	45.3
Age		
≥2 years old	147	51.6
<2 years old	138	48.4
Exclusive breastfeeding		
No	132	46.3
Yes	153	53.7
The availability of clean water		
No	16	5.6
Yes	269	94.4
The availability of family latrine		
No	204	71.6
Yes	81	28.4
Mid-Upper Arm Circumference (MUAC)		
Chronic energy malnutrition (<23.5 cm)	94	33.0
Normal	191	67.0

Discussion

The results of the study showed that although there was no significant correlation between the sex of children under five and the incidence of stunting, male toddlers were slightly more stunting. This was in line with the result conducted by Setyawati that the more stunted children were boys than girls. Some of the reasons were that gross motor development in boys is faster and more diverse so it requires more energy.[5] It is also in line with the research of Ghaida et al. that reveals boys are 1.2 times more at risk of stunting.[6] This is related to the pattern of childcare in the household. Girls are not only physically different, but also different in terms of motor and cognitive development. Girls are often seen as weak children, so they need to be given more attention, while boys are considered stronger and more active, therefore if they are not balanced with adequate nutrition, they can potentially become stunting. More research on sex-related difference in diet are required.

In terms of age in relation to stunting, in which the study found that children who are more than 2 years are more likely to be stunted than children are less than 2 years old. The study showed that as age increased the risk of stunting also increased.[7,8]

The result of this study revealed that exclusive breastfeeding in children under 5 years old was significantly related with the incidence of stunting. Some treatments that focused on prevention, such as ensuring pregnant and lactating mothers have adequate nutrition, getting exclusive breastfeeding for the first 6 months of infant's life, and continuing for 24 months, can help overcome stunting and wasting. Infants who are exclusively breastfed have a higher average than infants who are not breastfed.[7]

Water source was not significantly related to stunting in this area as the availability of clean water is abundant. A study conducted in Rondonuwu found that there was no significant correlation between the availability of clean water and nutritional status in children aged 6--24 months on Nain Island, Wori sub-district, North Minahasa Regency. Research done in Uganda (2016) found that one of the factors contributing to stunting was lack of access to high-quality drinking water, sanitation, hygiene and poverty.[9] Therefore,

Variables	Nutritional status				Total	*P*-value	95% CI	OR
	Stunting		Normal					
	n	%	*n*	%				
Sex								
Male	55	35.3	101	64.7	156	0.308	0.468--1222	0.756
Female	54	41.9	75	58.1	129			
Age								
>2 years old	68	46.3	79	53.7	147	0.006	1.250--3.318	2.036
≤2 years old	41	29.7	97	70.3	138			
Exclusive breastfeeding								
No	7	43.8	9	56.3	16	0.000	6.999--22.580	12.571
Yes	102	37.9	167	62.1	269			
The availability of family's latrine								
No	86	42.2	118	57.8	204	0.043	1.053--3.209	1.838
Yes	23	28.4	58	71.6	81			
Chronic energy malnutrition (MUAC <23.5 cm)								
Yes	45	47.9	49	52.1	94	0.027	1.101--3.017	1.822
No	64	33.5	127	66.5	191			
The availability of clean water								
No	7	43.8	9	56.3	16	0.840	0.460--3.524	1.273
Yes	102	37.9	167	62.1	269			

Table 3 Factors associate with stunting, multivariate analysis.

Variable	*B*	OR	95% CI OR	*P*-value
Age	.927	2.527	1382--4.621	0.003
Exclusive breastfeeding	2.712	15.059	8.030--28.240	0.000
Availability of family's latrine	.991	2.695	1364--5.324	0.004
Constant	−3.154	.043		0.000

increasing nutrition-specific and nutrition-sensitive interventions is very important to overcome these risk factors.

Lack of latrine facility significantly associated with stunting as majority of households in this area did have family's latrine. This research is in line with the study from Torlesse et al. revealing that the risk of stunting in children will be more than tripled (OR 3.47, 95% CI 1.73--7.28) if households did not use sanitary latrines.[10] The research conducted by Semba et al. showed that families that did not have sanitary latrine have a higher chance of the incidence of diarrhoea and deaths of children under 5 years old in the family.[11] Population-based studies show an independent correlation between lack of sanitary latrine and infant mortality. This finding is in accordance with the observational studies that show a correlation between the lack of sanitary latrine and infant mortality in rural Mozambique, the higher burden of cumulative diarrhoea consistently increases the risk of stunting.[12]

The study showed that there was a significant correlation between the size of the Mid-Upper Arm Circumference and the incidence of stunting. Women with chronic energy malnutrition during pregnancy are likely to deliver malnourished babies.[13]

Conclusions

Lack of exclusive breastfeeding, shortage latrine and age of children were dominant risk factors of stunting. In order to reduce stunting, the researchers recommend the convergence work that involves all organizations including the local government, the private, and society towards the household approach.

Conflict of interest

The authors declare no conflict of interest.

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