

FACTORS RELATED TO STUNTED TODDLERS IN EASTERN INDONESIA

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Abstrak

Latar Belakang: Wilayah timur memiliki tingkat prevalensi anak stunting yang lebih tinggi dibandingkan wilayah lain di Indonesia. **Tujuan:** Studi ini menganalisis faktor-faktor yang berhubungan dengan stunting balita di Indonesia Timur. **Metode:** Penelitian ini menggunakan data sekunder dari Pemantauan Status Gizi Indonesia Tahun 2017. Kami menganalisis 24.103 balita sebagai sampel. Penelitian ini menganalisis data dengan menggunakan uji regresi logistik multinomial. **Hasil:** Penelitian ini menemukan bahwa balita yang tinggal di perkotaan memiliki peluang 0,798 kali lebih kecil dibandingkan balita yang tinggal di pedesaan untuk mengalami stunting berat (AOR 0,798; 95% CI 0,719-0,885). Balita dengan ibu menikah memiliki kemungkinan 0,706 kali lebih kecil dibandingkan balita dengan ibu bercerai/duda untuk mengalami stunting berat (AOR 0,706; 95% CI 0,547-0,911). Hasil penelitian menunjukkan bahwa semakin baik tingkat pendidikan ibu, maka semakin kecil kemungkinan untuk memiliki balita stunting dan stunting berat. Studi ini juga menemukan bahwa usia balita berhubungan dengan balita stunting dan stunting berat. Studi tersebut menyimpulkan empat faktor yang berhubungan dengan stunting balita di Indonesia bagian timur. Keempat faktor tersebut adalah jenis tempat tinggal, status perkawinan dan pendidikan ibu, serta usia balita. **Kesimpulan:** Kesimpulan penelitian memberikan target kebijakan bagi pembuat kebijakan untuk mengurangi stunting balita di Indonesia bagian timur yaitu balita yang tinggal di pedesaan, balita dengan ibu bercerai/duda, dan balita dengan ibu berpendidikan rendah.

Kata Kunci: Gizi masyarakat; Kesehatan anak; Indonesia timur; Status gizi; Stunting

Abstract

Background: Eastern regions have a higher prevalence rate of stunted children than other regions in Indonesia. **Objective:** The study analyzes the factors related to stunted toddlers in Eastern Indonesia. **Methods:** The study employed secondary data from the 2017 Indonesia Nutritional Status Monitoring. We analyzed 24,103 toddlers as a sample. The study analyzed data using a multinomial logistic regression test. **Results:** The study found that toddlers living in urban areas had a 0.798 times less chance than toddlers residing in rural areas to experience severe stunted (AOR 0.798; 95% CI 0.719-0.885). A toddler with a married mother is 0.706 times less likely than a toddler with a divorced/widowed mother to experience severe stunted (AOR 0.706; 95% CI 0.547-0.911). The results indicate that the better a mother's education level, the less likely it is to have stunted and severely stunted toddlers. The study also found that toddler age is related to stunted and severe stunted toddlers. The study concluded four factors related to stunted toddlers in eastern Indonesia. The four factors were the type of residence, the mother's marital and education status, and the toddler's age. **Conclusion:** The study conclusion provides policy targets for policymakers to reduce stunted toddlers in eastern Indonesia, i.e., toddlers living in rural areas, toddlers with divorced/widowed mothers, and toddlers with poor education mothers.

Keywords: Child health; Community nutrition; Eastern Indonesia; Nutritional status

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INTRODUCTION

Stunting indicates the nutritional status of children under five, marked by height according to age below -2 standard deviation compared to the standards set by the World Health Organization. Stunting is an essential indicator of children's health under five because it indicates chronic malnutrition problems in children under five (Laksono et al., 2019; The Ministry of Health of The Republic of Indonesia, 2018). Stunting in childhood is the best indicator for measuring children's well-being and reflects existing social inequalities (de Onis and Branca, 2016). Multiple factors cause stunted toddlers, such as socioeconomic conditions, maternal nutrition during pregnancy, infant pain, and lack of nutritional intake in infants (The Ministry of Health of The Republic of Indonesia, 2018).

Stunting impacts growth and development quality and increases non-communicable diseases' morbidity. Meanwhile, the stunted toddler will also experience difficulties achieving optimal physical and cognitive development in the future (The Ministry of Health of The Republic of Indonesia, 2018). Previous research has shown the impact of stunting on children's cognitive development, resulting in intrauterine growth retardation (Engidaye et al., 2019). On the other hand, a stunted toddler has a greater chance of obesity. Permanent metabolic and endocrine adaptations begin in the womb. Excess nutritional intake in infants who were initially malnourished will experience failure of adaptation, increasing the risk of metabolic disorders in old age. This condition impacts glucose intolerance which obesity mediates initially (Rolfe et al., 2018).

Previous research has found that early-life stunting has adverse functional consequences, including poor cognition and low levels of education. Later as adults will have low wages and lost productivity, and if this situation is accompanied by weight gain in childhood, it will increase the risk of chronic diseases related to nutrition (Laksono and Megatsari, 2020).

In 2013, around 151 million children under five globally were estimated to be stunted. The report also estimated in 2017, half of the stunted children lived in Asia, and more than one-third lived in Africa (United Nations Children's Fund et al., 2018). On the other hand, Indonesia nationally also noted the prevalence of stunted toddlers, which is concerning. Reports on the Indonesia Basic Health Survey in 2007, 2013, and 2018 still show the stunting rate in children under 30%. This situation is equivalent to 3 in 10 toddlers born in Indonesia who are stunted (Laksono and Kusrini, 2020).

According to the WHO Conceptual Framework on Childhood Stunting, a complex interaction of familial, environmental, social, and cultural factors contributes to stunting. (de Onis and Branca, 2016) Stunting is a lengthy nutritional condition brought on by a variety of variables, including socioeconomic circumstances, mother nutrition during pregnancy, and baby discomfort (World Health Organization, 2020). Other factors include bad lifestyle choices and prolonged periods of not eating, which can make infants grow shorter starting in infancy (National Institute of Health Research and Development of The Indonesia Ministry of Health, 2019). Maternal education is one of the demographic factors that has drawn attention. One of the important aspects that does not directly affect nutritional status is education because it has an impact on how parents raise their children (Laksono et al., 2021).

In 2018, the prevalence in Eastern Indonesia was above the national prevalence rate, which the Indonesia Ministry of Health recorded at 30.8%. The Indonesia Ministry of Health reported five provinces in the eastern region to have a prevalence of stunted toddlers: East Nusa Tenggara 42.7%, Maluku 34.0%, North Maluku 31.4%, West Papua 27.8%, and Papua 33.1%. Only West Papua recorded figures below the national average (National Institute of Health Research and Development of The Indonesia Ministry of Health, 2019; Wulandari et al., 2022). This achievement informs that stunting is a public health problem in Indonesia, especially in Eastern Indonesia. Based on the background description, the study analyzes the factors related to stunted toddlers in eastern Indonesia.

METHODS

Data Source

This study uses secondary data from the 2017 Indonesia Nutrition Status Monitoring. The 2017 Indonesia Nutrition Status Monitoring is a national survey using a multi-stage cluster random sampling method conducted by the Directorate of Nutrition of the Ministry of Health of Indonesia. (Directorate of Community Nutrition of The Ministry of Health of The Republic of Indonesia, 2017) The population in this study were all toddlers in Eastern Indonesia, which cover Maluku, North Maluku, East Nusa Tenggara, West Papua, and Papua Province (Ipa et al., 2020b). The unit of analysis in this study was toddlers aged 0-59 months, with mothers as respondents. The sample size analyzed in this study was 24,103 toddlers.

Variables

Stunting is an indicator of nutritional status assessed based on height for age or the height of a child who is reached at a certain age. The height for age is determined based on the z-score, or the deviation of height from normal height according to WHO growth standards. The limit for the nutritional status category of children under five according to index height per age according to WHO is severe stunted ($< -3,0$ SD), stunted ($-3,0$ SD to $-2,0$ SD), and normal (≥ -2 SD) (Directorate of Community Nutrition of The Ministry of Health of The Republic of Indonesia, 2017).

The study employed six independent variables: the type of residence, mother's age (in years), mother's marital status, mother's education level, mother's employment status, and toddler's age (in months). The residence type follows the categorization of Indonesia Statistics, which consists of urban and rural. The mother's age is determined based on the last birthday that has passed. Mother's education level consists of four categories: no education, primary, secondary, and higher. Meanwhile, the mother's employment status consists of two types: unemployed and employed. In addition, the toddler's age is determined based on the last month that has passed.

Data Analysis

In the first step, the survey used the Chi-Square to test the dichotomous variable, while the study used the T-test for continuous variables. The study employed this statistical test to assess whether there was a statistically significant relationship between the nutritional status variables of children under five as the dependent variable and the independent variable. In the second step, the study carried out a co-linearity test. The test ensured that the final regression model did not have a strong correlation among the independent variables. Moreover, in the last step, the study used a multinomial logistic regression test to determine the factors related to stunted toddlers in eastern Indonesia. The study carried out all statistical analyses using IBM SPSS Statistics 26 software.

Ethical Approval

The 2017 Indonesia Nutrition Status Monitoring has an ethics license approved by the national ethics committee (ethical number: LB.02.01/2/KE.244/2017). The survey used informed consent during data collection, which accounted for aspects of the procedure for data collection, voluntary, and confidentiality.

RESULTS

Based on the study results, the proportion of stunted toddlers (stunted + severe stunted) in eastern Indonesia is 34.5%. Moreover, Table 1 is a statistical description of the characteristics of toddlers based on nutrition status, which are the objects of analysis in this study. Table 1 shows that toddlers in rural areas have mothers in the 20-29 age group in all nutritional status categories, and toddlers have married mothers.

Based on the mother's education level, mothers with primary education ruled all categories of toddler nutrition status. Meanwhile, based on the mother's employment status, it was dominated by unemployed mothers. Finally, based on toddler age, toddlers with severe stunted have an average age slightly older than those with stunted.

The next step was a collinearity test. The test indicates that the independent variables do not significantly correlate. The variance inflation factor (VIF) value for all factors is simultaneously less than 10.00, and the tolerance value for all variables is more significant than 0.10. The results display there were no indications of multicollinearity in the regression model.

Table 1. Descriptive Statistic of Nutrition Status of Toddlers in Eastern Indonesia (n=24,103)

Variables	Nutrition Status of Toddler						p-value
	Normal		Stunted		Severe Stunted		
	n	%	n	%	n	%	
Type of residence							*<0.001
• Urban	3234	20.5	891	18.8	539	15.0	
• Rural	12557	79.5	3839	81.2	3043	85.0	
Mother's Age							*0.008
• < 20	846	5.4	187	4.0	188	5.2	
• 20-29	7443	47.1	2241	47.4	1655	46.2	
• 30-39	5995	38.0	1812	38.3	1359	37.9	
• 40-49	1362	8.6	438	9.3	346	9.7	
• >49	145	0.9	52	1.1	34	0.9	
Mother's Marital status							*<0.001
• Never married	174	1.1	65	1.4	67	1.9	
• Married	15369	97.3	4587	97.0	3430	95.8	
• Divorce/widowed	248	1.6	78	1.6	85	2.4	
Mother's Education level							*<0.001
• No education	1896	12.0	507	10.7	607	16.9	
• Primary	7366	46.6	2438	51.5	1900	53.0	
• Secondary	4724	29.9	1376	29.1	838	23.4	
• Higher	1805	11.4	409	8.6	237	6.6	
Mother's Employment Status							*<0.001
• Unemployed	8769	55.5	2704	57.2	1860	51.9	
• Employed	7022	44.5	2026	42.8	1722	48.1	
Toddler's age (in months; mean)	15791	(24.10)	4730	(31.33)	3582	(31.41)	*<0.001

Note: The study used Chi-Square for dichotomous variables and a T-test for continuous variables. *Significant at the 95% level.

Table 2 shows the multinomial logistic regression test results to determine the characteristics of mothers under five as predictors of the incidence of stunting in Indonesia. The study used toddlers with "normal" nutritional status as the reference in this multinomial logistic regression test.

The study shows that toddlers who live in urban areas are less likely 0.798 than those who live in rural areas to experience severely stunted (AOR 0.798; 95% CI 0.719-0.885). This analysis indicates that toddlers who live in rural areas are at more risk of experiencing severe stunted.

A toddler with a married mother is 0.706 times less likely than a toddler with a divorced/widowed mother to experience severe stunted (AOR 0.706; 95% CI 0.547-0.911). This information shows that a divorced/widowed mother is a risk factor for toddlers to experience severe stunted.

The study indicates that toddlers with mothers with no education have a chance of 2.207 times more than toddlers with higher education to experience severe stunted (AOR 2.207; 95% CI 1.865-2.612). Toddlers with mothers with primary education were 1.389 times more likely than toddlers with mothers with higher education to experience stunted (AOR 1.389; 95% CI 1.229-1.570). Toddlers with primary

education mothers are 1.894 times more likely than toddlers with higher education to experience severe stunted (AOR 1.894; 95% CI 1.630-2.201). Toddlers with secondary education mothers have a chance of 1.252 times more than toddlers with higher education levels to be stunted (AOR 1.252; 95% CI 1.101-1.424). Toddlers with secondary education mothers have a probability of 1.391 times more than toddlers with mothers with higher education to experience severe stunted (AOR 1.391; 95% CI 1.186-1.631).

The multivariate analysis results show that the better a mother's education level is, the less likely it is to have stunted and severely stunted toddlers. Meanwhile, the analysis also found that toddler age determines stunted and severe stunted toddlers.

Table 2. Multinomial Logistic Regression of Nutrition Status of Toddlers in Eastern Indonesia (n=24,103)

Predictors	Stunted			Severe Stunted		
	AOR	95% CI		AOR	95% CI	
		Lower Bound	Upper Bound		Lower Bound	Upper Bound
Type of residence: Urban	0.926	0.849	1.009	*0.798	0.719	0.885
Type of residence: Rural	-	-	-	-	-	-
Mother's age: < 20	0.837	0.584	1.200	1.193	0.789	1.803
Mother's Age: 20-29	0.930	0.671	1.288	1.095	0.747	1.607
Mother's Age: 30-39	0.876	0.632	1.214	1.083	0.738	1.590
Mother's Age: 40-49	0.867	0.617	1.218	1.084	0.729	1.613
Mother's age: >49	-	-	-	-	-	-
Mother's Marital: Never married	1.324	0.897	1.953	1.355	0.924	1.987
Mother's Marital: Married	0.974	0.750	1.265	*0.706	0.547	0.911
Mother's Marital: Divorce/widowed	-	-	-	-	-	-
Mother's Education: No education	1.103	0.949	1.282	*2.207	1.865	2.612
Mother's Education: Primary	*1.389	1.229	1.570	*1.894	1.630	2.201
Mother's Education: Secondary	*1.252	1.101	1.424	*1.391	1.186	1.631
Mother's Education: Higher	-	-	-	-	-	-
Mother's Employment: Unemployed	1.044	0.973	1.120	*0.909	0.840	0.982
Mother's Employment: Employed	-	-	-	-	-	-
Toddler's age (in months; mean)	*1.027	1.025	1.029	*1.027	1.025	1.030

Note: Reference category was "normal"; confidence interval of 95% for AOR; adjusted odds ratio.

DISCUSSION

The eastern region is known to lag behind other areas in Indonesia in all aspects of development, including in the health sector (Ipa et al., 2020a; Paramita et al., 2022). Eastern Indonesia has many unique cultures that can challenge health workers to perform better in the health sector (Illahi and Muniro, 2016; Kurniawan et al., 2012; Kurniawan and Laksono, 2013).

The analysis indicates that living in rural areas is a risk factor for children under five to experience severe stunted. In the Indonesian context, urban areas have more progressive development progress in any field, and this condition encourages the availability of better information, including health information (Laksono et al., 2022a; Seran et al., 2020b, 2020a; Wulandari and Laksono, 2020a, 2020b). The study findings align with other India, Congo, and Tanzania (Pillai and Maleku, 2019; Sunguya et al., 2019). In Tanzania, toddlers who live in urban areas are 0.56 times more likely to be stunted (Sunguya et al., 2019). On the other hand, a study in Pakistan reported different findings; toddlers residing in rural areas are 0.67 times more likely than in urban areas (Khan et al., 2019).

The study also found divorced/widowed mothers a risk factor for toddlers to experience severe stunted. In Asia cultures, including Indonesia, women or mothers are often responsible for domestic affairs. At the same time, men or husbands are responsible for matters considered more extensive, including earning a living (Laksono et al., 2019). In a family with a divorced/widowed mother, the mother must take over both roles. This condition makes the child less attentive because the time provided by the mother to care for her child is getting less (Bue and Priebe, 2018).

In contrast to our research, another study indicated that in sub-Saharan Africa, maternal marital status was not related to results for infant development (Ngandu et al., 2020). However, a recent study in Sub-Saharan Africa shows that the nutritional condition of children in that region is influenced by the family cooking fuel and the maternal marital status (Amadu et al., 2021).

The analysis results inform that inadequate education is a risk factor for toddlers to experience stunted and severely stunted toddlers in eastern Indonesia. A better level of education provides a better understanding of any required health information. Generally, mothers with better education levels are also presumed to understand better choosing better or risky behaviors for their health and their children's health (Kahssay et al., 2020; Laksono et al., 2022b).

All decisions about appropriate eating habits, including nursing, belong to mothers in their capacity as a caregiver (Bain et al., 2013; Rachmi et al., 2016). Higher father education was also linked to preventive caregiving practices, such as taking vitamin A supplements, ensuring children received all recommended vaccinations, maintaining better hygiene, and using iodized salt (Semba et al., 2008). Consider the fact that, like many other developing nations, Indonesia places a high priority on education. Numerous studies found that higher education was a significant predictor of better health outcomes (Ipa et al., 2020b; Masruroh et al., 2021; Megatsari et al., 2020; Wulandari and Laksono, 2020c). Moreover, numerous studies claim that a barrier to improving health outcomes is a lack of education (Kusrini et al., 2021a; Rohmah et al., 2020).

This finding confirms the results of several previous studies in various countries, which inform that poor education mothers increase the risk of children under five experiencing stunted (Laksono et al., 2019; Pillai and Maleku, 2019). In line with these findings, a study in North East Ethiopia reported that toddlers with no education mothers are 4.92 times more likely to be stunted (Fantay Gebru et al., 2019; Kahssay et al., 2020).

The analysis also found that toddler age determines stunted and severe stunted toddlers. This finding aligns with previous studies in Ethiopia, including Indonesia (Fantay Gebru et al., 2019; Kusrini et al., 2021b; Kusrini and Laksono, 2020).

This study has limitations as a consequence of the secondary data received. Previous studies identified several variables as risk factors for stunted toddlers who were not included in the analysis. Among them is no access to a restroom, short maternal height, not feeding colostrum (Kahssay et al., 2020), low birth weight (Aguayo et al., 2016), poor wealth index (Budiarto et al., 2021), poor antenatal care visits (Talukder et al., 2018), and lack of postnatal vitamin-A supplementation (Tariku et al., 2017), including the value of children (Kusrini et al., 2019; Pratita and Laksono, 2020).

Furthermore, the study's quantitative methodology is unable to account for the cultural influences that continue to have a significant impact in Indonesia, particularly in rural areas. The results were influenced by a number of other studies, including those on the importance of children, dietary taboos, parenting, and eating habits (Laksono et al., 2020; Maghfiroh and Laksono, 2020; Pratita and Laksono, 2020). Based on the results, the study concluded four factors related to stunted toddlers in eastern Indonesia. The four factors were the type of residence, the mother's marital status, education, and the toddler's age.

The study conclusion provides specific and clear policy targets for policymakers implementing interventions in Eastern Indonesia for stunted toddlers. The particular policy targets are toddlers living in a rural areas, divorced/widowed mothers, and toddlers with poor education mothers. Policymakers need to make policies that expressly set specific targets based on the results of this study if they want to accelerate the reduction of stunting in eastern Indonesia.

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