

# Poor and Uneducated Parents Increased the Risk of Stunting among Children Living in Non-Remote Areas of Indonesia

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## Research Article

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## Abstract

**Introduction:** The prevalence of stunting among under five years old children in Indonesia is still high, including those living in urban and non-remote areas that was thought to have better access of food and nutrition. The study aimed to determine the correlation between predisposing factors of stunting among toddlers in non-remote areas which thought to have good access to food and healthcare.

**Methods:** This was a secondary data analysis using Indonesia's Nationally Representative Survey known as the Basic Health Research 2018. The sample were children aged 0-59 months who were measured in selected households. Stunted children was determined based on the measuring height for age (HAZ) with a z-score less than -2 standard deviation. Multivariate analysis with a logistic regression test was performed to test predisposing factors associated with stunting.

**Results:** The results showed that the prevalence of stunting among under-five years old children in non-remote areas of Indonesia was 29.7%. Adjusting for the multivariate analysis, the predisposing factors that significantly correlated with the incidence of stunting in a non-remote areas were families with a poor economic (AOR=1.49; 95%CI=1.39-1.59), household heads with low education levels (AOR= 1.50 (1.33-1.69) and health insurance ownership (AOR=1.16; 95%CI=1.09-1.24).

**Conclusions:** In conclusion, families living in non-remote areas of Indonesia did not necessarily benefit from food availability or healthcare facilities, but it needs to be educated and wealthy enough to purchase food and also insurance.

**Trial Registration:** Ethical approval research was issued by the Health Research Ethics Commission, Health Research and Development Agency of the Ministry of Health Number LB.02.01/2/KE.267/2017.

## Background

Globally, 149.2 million children are stunted, and 45.4 million children are wasting in 2020 [1]. The prevalence of stunting in Indonesia is higher than in other countries ASEAN, especially in remote areas. Based on the Indonesian nutritional status study in 2021, the prevalence of stunting by 24,4% decreased from 2019 by 27,7% [2]. However, it exceeds of WHO standard of 20%. The prevalence of stunting in Indonesia is still higher than in Vietnam (22,3%), Malaysia (20,9%), Thailand (12,3%), and Singapore (2,8%) [3]. More efforts are still needed from various ministries and institutions through specific and sensitive nutrition interventions to achieve targets of reducing stunting by 3.0% per year or 14% in 2024 [4].

The quality of human resources country can be reflected in the magnitude of the stunting problem because stunting has a very detrimental impact in the short and long term. Recent studies revealed stunting correlates with increased morbidity, mortality, and decreased quality of life [5–9]. Stunting increases the risk of low cognitive ability, suboptimal height, lost productivity, poor educational performance, several infectious diseases, and a greater risk of degenerative diseases in adulthood [10–14]. In addition, stunting can affect economic growth [15]. One of the key indicators of a well-functioning health system is equitable access to health services. Indonesia has a large geographic and socio-economic disparity in child undernutrition. For example, Papua Region (Eastern Indonesia region) has a higher prevalence of malnutrition than the Java-Bali Region [16].

The factors causing stunting include household social-economic status, inadequate complementary feeding, not breastfeeding practice, and a sick history. The present study shows that stunting in Indonesia is influenced by many factors, both individuals, families, and the environment [17, 18]. Another study also found that the factors related to stunting were a history of premature birth, health facilities of delivery, parents' education level, food security status, urban or rural residence, having a toilet at home, inadequate utilization of prenatal care, poor nutritional status during pregnancy and infectious dis-ease history [19–26]. In addition, poor sanitation, lack of access to health services, and use of contraception influence the incidence of stunting in toddlers [27].

Several studies have shown that the prevalence of stunting in remote and rural areas is higher than in non-remote areas or urban [28, 29]. Although the prevalence of stunting in remote areas is higher, a study in Bangladesh which is also a developing country like Indonesia shows that the prevalence of stunting in remote and non-remote areas is not too different, namely 38.1% and

31.2% respectively [30]. In remote or urban areas, health facilities are widely available and evenly distributed, but people who live in non-remote areas also have poor people who have low levels of education and socioeconomic status.

Based on data from the Indonesian Central Bureau of Statistics, the number of poor people in Indonesia in 2022 is 26.16 million, of which 11.82 million people live in urban areas or non-remote areas [31]. Most of the people who are classified as poor in Indonesia have a low level of education or have never received an education, do not have a steady job, so they have a low level of economic and welfare, and do not have a decent place to live [32]. The low level of education of parents will affect their ability to obtain more health information and can also affect the type and amount of food that will be given to their children [33]. In fact, a higher level of education will also increase the socio-economic level of the community so that their welfare also increases [33]. This can cause them to not have awareness of and access to good health care facilities, which can cause their children to also be at risk of experiencing stunting, even though they live in urban or non-remote areas.

Unfortunately, there is still limited information regarding predisposing factors related to stunting based on the characteristics of regions in Indonesia. The study aims is to determine whether the existence of adequate health facilities followed by low levels of education and economy in non-remote areas will affect to prevent the incidence of stunting on children in Indonesia.

## Methods

The design study was cross-sectional with a quantitative approach. This was a secondary data analysis of the Indonesia Basic Health Research 2018 data (Riskesdas). Riskesdas was a nationally representative health survey conducted by the Ministry of Health every five years [36].

Collected data from respondents were carried out by two-stage technique sampling. At the first level, sampling blocks were selected with a total of 30,000 and then continued with the selection of 10 households in each block. Individuals sampled for basic health research were all household members in the selected households, with 300,000 house-holds visiting [36]. Data collection was conducted with interviews, measurements, and examinations. There are two instruments for interviews: Household Instruments and Individual Instruments. Measurements of anthropometrics using a digital weight scale (accuracy 0.1 kg), measuring height/body length (accuracy 1 mm). The study's population was children under five years from all over Indonesia. The sample was toddlers aged 0–59 months who were measured in selected households in Basic Health Research 2018.

The dependent variables in this study was stunting in children based on the measuring height for age (HAZ.) with z-score < -2 SD (standard deviation) according to WHO standards. Children with a z-score of more than - 2 SD were categorized as not stunting. Meanwhile, the independent variables in this study were age group, family economic status, head of household education level, employment status, access to health centres, exclusive breastfeeding, supplementary feeding, having of toilets, parity, ownership of health insurance status, and history of infection in children.

The age group was categorized into 0–1 month, 2–24 months, and 24–59 months. The family's economic status is categorized into two groups: poor if the economic level is at quintile 1, quintile 2, and quintile 3. Not poor economic status if the family's economic level is at quintile 4 and 5. The education level is based on the highest level of education completed head of the household. It has categorized into low education level if no school or graduated from elementary school. When the head of household completed junior or senior high school level was categorized as secondary education level. Then higher education for respondents who have graduated college.

Accessibility of health care was grouped into easy, difficult, and very difficult based on the measurement of several questions at the household level. Indicators were analyzed using the Principal Component Analysis method, which was built with three dimensions, namely: (1) The type of transportation used to health facilities; (2) The round-trip time from home to the health facility, and (3) the costs of transportation incurred for a round-trip to the health facility. Employment status consists of working and not working. Exclusive breastfeeding behavior was categorized based on breastfeeding for six months without other food additives.

Provision of complementary feeding based on the behavior of providing additional food, namely nutritional supplementation in the form of food in the form of biscuits, milk, and other food ingredients with special formulations and fortified with vitamins and minerals given to infants and toddlers in the last 12 months. Having a toilet at home is categorized as yes or no. Parity was grouped into primipara if the mother has one child and if the mother has two or more children called multipara. The ownership of health insurance from the government or the private sector is categorized as yes or no. Infections in children are categorized based on a history of infectious disease at least one infectious disease in the past month, such as Acute Respiratory Infection, pneumonia, pulmonary TB, hepatitis, diarrhea, and malaria.

Data analysis on each variable was carried out by considering the weighting. Bivariate analysis using the chi-square test to see the correlation of each predisposing factor with the incidence of stunting in children in the Non- remote areas. Then, multivariate analysis with a logistic regression test was conducted to examine the most dominant factor. Calculation of risk using Odds Ratio (OR) with 95% CI (Confident Interval) and p-value < 0.05. Ethical approval research was issued by the Health Research Ethics Commission, Health Research and Development Agency of the Ministry of Health Number LB.02.01/2/KE.267/2017.

## Results

In this study, the total number of respondents who were in remote areas was 28,709.

Table 1. Characteristics of Respondent in Non-Remote Area of Indonesia

Variable		Non- Remote Area		
		n	%	95% CI
Children Stunted	Yes	8539	29.7	29.2-30.3
	No	20170	70.3	69.7-70.9
Age groups	0-1 Months	456	1.6	1.4-1.7
	1-23 Months	11104	38.7	38.1-39.2
	24-59 Months	17149	59.7	59.2-60.3
Family Economic Status	Poor	16349	61.3	60.5-62.0
	Not Poor	10340	38.7	38.0-39.5
Head of Household Education Level	Low	16765	58.4	57.7-59.0
	Secondary	9107	31.7	31.1-32.3
	High	9,9	9.9	9.5-10.3
Employment Status	No	1963	6.8	6.5-7.2
	Yes	26746	93.2	92.8-93.5
Access to Health Centers	Very Difficult	7343	26.1	25.4-26.7
	Difficult	8855	31.4	30.8-32.1
	Easy	11987	42.5	41.8-43.2
Exclusive Breastfeeding	No	4685	54.5	53.4-55.6
	Yes	3910	45.5	44.4-46.6
Complementary Feeding	No	14649	56.6	55.9-57.4
	Yes	11225	43.4	42.6-44.1
Having toilet at home	No	2150	7.6	7.3-7.9
	Yes	26231	92.4	92.1-92.7
Parity	Multipara	19148	66.8	66.2-67.4
	Primipara	9524	33.2	32.6-33.8
Health Insurance Ownership	No	12550	54.1	53.4-54.8
	Yes	10660	45.9	45.2-46.6
History of Childhood Infectious	Yes	5424	18.9	18.4-19.4
	No	23285	81.1	80.6-81.6

Based on Table 1, the prevalence of child stunting in non-remote areas of Indonesia was 29.7% and 61.3% of the total families were poor. The majority of the the head of households were low educated (58.4%). Access to health services was deemed relatively easy (42.5%) but 54.1% of the families did not have health insurance. Exclusive breast-feeding coverage among families in non-remote areas was 45.5% and 43.4% of families given their children complementary feeding.

Table 2. Proportion of Children Under 5 Years Old with Stunting Based on Predisposing Factors in Non-Remote Areas of Indonesia

Variables		Stunted Children Non-Remote Area	
		n	%
Age groups	0-1 Months	101	22.3
	1-23 Months	3291	29.6
	24-59 Months	17149	30.0
Family Economic Status	Poor	5532	33.8
	Not Poor	2421	23.4
Head of Household Education Level	Low	5641	33.7
	Secondary	2289	25.1
	High	608	21.5
Employment Status	No	530	27.0
	Yes	8008	29.9
Access to Health Centers	Very Difficult	2418	32.9
	Difficult	2637	29.8
	Easy	3324	27.7
Exclusive Breastfeeding	No	1466	31.3
	Yes	1092	27.9
Complementary Feeding	No	4235	28.9
	Yes	3637	32.4
Having toilet at home	No	844	39.3
	Yes	7615	29.0
Parity	Multipara	5806	30.3
	Primipara	2715	28.5
Health Insurance Ownership	No	4104	32.7
	Yes	2834	26.6
History of Childhood Infectious	Yes	1713	31.6
	No	6825	29.3

Based on table 2 the proportion of stunting among under-five children in non-remote areas were 33.8% of poor families have stunted children. The proportion of stunting among under-fives in non-remote areas of Indonesia were 33.7%.

Table 3. Logistic regression test for predisposing factors that correlated to stunting in children under five years old in non-remote areas

Variables	Non-Remote Area	
	P value	AOR
<b>Family Economic Status</b>		
Poor	0.00*	1.49 (1.39-1.59)
Not Poor		<b>Ref</b>
<b>Head of Household Education Level</b>		
Low	0.00*	1.50 (1.33-1.69)
Secondary		1.11 (0.98-1.25)
High		<b>Ref</b>
<b>Health Insurance Ownership</b>		
No	0.00*	1.16(1.09-1.24)
Yes		<b>Ref</b>

\*) Significant at P value<0.05

Table 3 shows that after adjusting for the multivariate analysis, the variables of predisposing that significantly correlated with the incidence of stunting in non-remote areas were families with a poor economic level (AOR=1.49; 95%CI=1.39-1.59), household heads with low education levels (AOR= 1.50 (1.33-1.69) and insurance ownership health status (AOR=1.16; 95%CI=1.09-1.24).

## Discussions

The stunting proportion in non-remote areas was 29.7%. This number align with the previous study, stunting and very stunted in rural areas are higher than in urban areas [30, 34]. Even so, the prevalence of stunting in urban areas or urban areas is lower, but behind that, there are several problems that must be faced by people in urban areas such as unhealthy food quality, unhealthy living and transportation environments, stress, and differences from smoking, and more vulnerable to illegal drugs [35]. Despite advances in technology and infrastructure that can be said to be very adequate, there are still Indonesians in urban areas who are far from decent or belong to the poor category. Based on data from the Central Statistics Agency, it shows that the number of urban res-idents who are classified as categories is 11.82 million out of the total urban population of 26.72 million as of March 2022 [31]. The handling of a population classified as poverty is based on several things such as the average per capita expenditure per month which is below the national poverty line, not having a permanent job, not having proper housing, and a low level of education [36].

The results of this study are also in line with BPS data for 2022 which showed that most people living in urban areas have a low level of education, a poor economic level, and do not have health insurance. In addition, these three factors are the most significant factors or have a strong relationship with the incidence of stunting in urban or non-remote areas. The causes of stunting are not only nutritional problems but environmental factors and the role of parents in parenting are closely related [37]. Parental education has an important role in the parenting process. Parental education is significantly related to stunting [38]. A systematic review revealed that six studies reported a significant relationship between low father education and stunting [39]. Good parental education has a piece of good knowledge about nutrition for the growth of their children and can provide good care for their children [40]. In addition, parents with higher education generally have a better income so they can buy enough food for their nutritional needs.

Increasing parents' formal education will lead to a 3–5% reduction in the risk of children becoming stunted [30]. Parents who have higher education are usually more aware of their children's nutritional needs because they understand the importance of how nutrients function in the growth and development of their children [41]. Parents with higher education are associated with

broad insights gained during formal education and parental literacy skills in recognizing the disease and its treatment. This will affect the health condition of their children [42].

This study showed that most of stunted children in non-remote areas coming from low-income family. Previous research revealed that child stunting was higher in low-income people than people with high-income [43] and had more than a 20% difference between them [44]. Children from poor families have a greater chance of experiencing stunting [45, 46]. The reason is that children from poor households cannot meet the nutrients needed for growth and development, and are vulnerable to being infected with diseases [34]. In addition, this study showed that toddlers from low-income families are 1.5 times risk to be stunted than toddlers living in non-poor families. Re-search conducted in Southern India showed households with poor economic are at risk of having a stunted child with an Odds Ratio of 1.39–4.30 [47]. A study in South Jakarta revealed that the head of a family with a regional minimum wage is almost seven times more likely to have children stunting than an income above the minimum wage [48]. Family economic status is an indirect factor causing stunting. More than a 20% difference in stunting prevalence is observed between Utopia's poorest and the wealthiest quintiles [49]. Even in urban areas with easy access to health services and food sources, if the household does not have adequate economic status, children are still at risk of stunting. This is due to the inability of families to provide a variety of foods that can meet the nutritional needs of their family members including children [37].

Furthermore, a low family economic level will also result in a family being more dependent on limited and cheap food but unable to meet the good quantity and quality which then has an impact on the family's food insecurity. According to the Food Agriculture Organization (FAO), families with low economic levels can cause food insecurity, worsen the quality of a person's diet and can increase the incidence of malnutrition such as stunting [50]. In addition, a low economic level also allows a family to have limitations on ownership and access to sanitation and a clean environment. A study shows that children who have improved sanitation facilities at home have a 29% lower risk of experiencing stunting compared to children who have unimproved sanitation facilities [51].

Several recent studies have shown that not having health insurance has a significant relationship with families with children stunting. In this study risk of children stunting with mothers who do not have health insurance 1.16 times in urban. Ownership of insurance will encourage mothers to improve their utilization of health services such as prenatal care and post-natal care [52, 53]. Likewise, with a study that conducted in China showed that the existence of health insurance can help improve the health conditions of children in urban areas or areas that are not remote up to 37.4%. The study also explained that children who have health insurance have a lower risk of 11.3% lower risk of experiencing stunting compared to children who do not have health insurance [54]. Similar to the previous study that mothers who do not have health insurance are related to stunting and being underweight [55]. This can be assumed because mothers who have insurance can more easily utilize health care and can reduce health costs so that they can meet nutritional needs.

A study conducted by Elikplim (2022) at Sub-Saharan African countries revealed that the percentage of mothers who had insurance was more antenatal care visits in the first trimester and post-natal visits in the first two months compared to mothers who did not have health insurance [55]. Furthermore, the money that should be used to pay for health costs can be saved or buy food needs to provide adequate nutrition for their children [56–58]. Currently, the policy in Indonesia based on Presidential Instruction No 5 of 2022 concerning Increasing Access to Health Services for Pregnant, Maternity, Postpartum and Newborn Babies through the Maternity Insurance Program (Jampersal) this task will be carried out by the Social Security Agency of Health (BPJS Kesehatan).

The strengths of the research are an advanced analysis of survey data with a large and nationally representative samples. The limitation of the study is not explored more deeply related to direct factors such as nutritional intake and consumption patterns of toddlers in the long term. Future research should be conducted to examine the intervention program with the greatest impact on decreasing stunting prevalence with a quasi-experiment design.

## Conclusions



The proportion of stunting in non-remote areas of Indonesia still quite high despite better food availability and healthcare facilities. In non-remote areas, the significant factor related to stunting incidents is families with a poor economic level, household heads with low education levels and insurance ownership health status. Therefore, the government should emphasize on education as an investment, provide assistance to improve the economy of poor families and ensure health insurance ownership through universal coverage.

## Declarations

**Ethics approval and consent to participate:** This study was approved by Health Research Ethics Commission, Health Research and Development Agency of the Ministry of Health Number LB.02.01/2/KE.267/2017.

**Consent for publication:** Not applicable

**Availability of data and materials:** The Indonesian Basic Health Research data used in this study were supplied by the Health Development Policy Agency of the Indonesian Ministry of Health under license and so cannot be made freely available. Requests for access to these data should be made to the Health Development Policy Agency of the Indonesian Ministry of Health through link website: <https://www.litbang.kemkes.go.id/layanan-permintaan-data-riset/>. On other hand, the Indonesian Basic Health Research's report (pdf version) can be seen through link website: <https://www.litbang.kemkes.go.id/laporan-riset-kesehatan-dasar-risikesdas/>.

**Competing interests:** The authors declare no conflict of interest.

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**Authors' contributions:** Conceptualization, T.M and W.P.N; methodology, D.R.F; software, O.N; validation, D.R.F and Y.P; formal analysis, O.N; investigation, W.P.N, A.Y and D.R.F; resources, W.P.N, A.Y and D.R.F; data curation, O.N; writing—original draft preparation, W.P.N and A.Y; writing—review and editing, D.R.F, Y.P, S.D.L and C.T.A; visualization, S.D.L; supervision, T.M. and W.P.N ; project administration, A.Y; funding acquisition, T.M.

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