Education Role in Stunting Under Two Years among Poor Communities in Indonesia

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ABSTRACT

Background: *Indonesia still has a stunting problem, even though the stunting rate has decreased. The study analyses the association of the maternal education level with the incidence of stunted children under the age of two in poor communities in Indonesia.*

Method: *The cross-sectional data from the Indonesian National Nutritional Status Survey 2021 examined 24,920 children under two years old. The relationship between the variables was tested using binary logistic regression.*

Result: *The odds of having stunted children below the age of two are 1.705 times greater for women with no education than women with higher levels of education (AOR 1.705; 95% CI 1.667-1.744). Primary-educated mothers were 1.178 times increased risk of having stunted children under age two compared to higher-educated mothers (AOR 1.178; 95% CI 1.157-1.199). The study analysis found no significant difference between secondary and higher education to have stunted children. In addition to education level, the study also identified six other important control variables associated with stunting in children under the age of two: residence location, age of mother, married status, child's age, child's gender, and EIBF. According to the study's findings, stunting in children under the age of two is related to maternal educational levels among Indonesia's poor communities. An increased incidence of stunting in children under the age of two is associated with lower levels of maternal education.*

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Article History
Received 27 August 2024
Revised 11 September 2024
Accepted 19 November 2024
Available Online 17 December 2024

Keywords
Education level
Nutrition
Public health
Stunting

DOI
10.14710/jpki.20.1.30-36

INTRODUCTION

Socioeconomic conditions are closely related to the health status of the community. Children are one of the age groups most affected by family poverty. It is estimated that around 356 million children in the world live in conditions of extreme poverty.(1) A systematic review concluded that family income is positively related to outcomes in children, such as their cognitive development, social behaviour development, and health. In addition, family income is an intermediate factor in the relationship between child development, the mother's mental health, parenting, and the child's home environment.(2) *Stunting* is a focus global health problem that must be addressed because it is a risk factor for death, morbidity, and disability in children.(3) This chronic nutritional problem will also impact the low quality of human resources, impacting productivity and competitiveness.(4) In 2020, around 22% or 149 million children under five years worldwide are estimated to be stunted.(5) The condition mainly occurs in children in Asian and African countries. Even though there has been a significant decline since 2000, stunting is still very high in low and lower-middle-income countries, namely more than 30%.(6) Indonesia is also still facing the problem of stunting, although there has been a trend of decreasing cases yearly since 2013. Survey data conducted by the Ministry of Health of the Republic of Indonesia in 2022 shows that the prevalence of stunting is around 21%.(7)

Multidimensional factors cause stunting. Besides the lack of nutritional intake for pregnant women and toddlers, it is also due to inadequate parenting practices, limited access to health services, including antenatal care, lack of household access to nutritious food, and restricted access to clean water and sanitary facilities.(8) Stunting in children has been associated with gender factors, food and dietary restrictions, unrepaired family latrines, untreated drinking water, a lack of access to health care, and living in rural areas.(9,10) The study on working mothers in Indonesia concluded that place of residence, maternal age, marital status, maternal education, and child's age are related to stunting.(11)

Several characteristics of individual, family, and environmental factors were identified as related to the incidence of stunting. Maternal education is one of the

variables in family characteristics associated with the incidence of stunting in toddlers, in addition to age, mother's knowledge, and mother's occupation.(12) Studies in South Africa show maternal education indirectly affects stunting, primarily through socioeconomic status and the antenatal environment.(13) Studies showed that the level of education of mothers has a different risk of child stunting.(14) Another study has shown that maternal education is not a determinant of stunting in children.(15) According to the previous justification, more research findings are still needed about the significance of maternal education on the occurrence of stunting in children. This study analyses the relationship between maternal level of education and stunting in children under the age of two among poor communities in Indonesia.

METHOD

The data used in this analysis is the 2021 Indonesian National Nutritional Status Survey. The Indonesian Ministry of Health performed the cross-sectional survey on a national level. Poor communities with children under two years made up the study's population. Poor communities in this study were based on the poorest and poorer groups based on economic status, consisting of five quintiles: poorest, poorer, middle, richer, and richest. Children under two served as the analysis unit in this study, with mothers serving as the respondents. The survey with the multi-stage cluster random sampling approach pooled the weighted sample of 24,920 children.

The dependent variable in this study was stunting in children under two. Stunted is an indicator of nutritional status based on height for age or when a child's height reached a specific age. The height indicator for a period is determined using WHO growth standards and the z-score or height deviation from average height. There are two types of stunted children under the age of two: normal and stunted. The nutritional status category limit based on height index/age is stunted if < -2.0 SD and normal if ≥ -2.0 SD.

The independent variables were the mother's education, type of residence, maternal age, marital status, employment status, child's age, child's gender, and early initiation of breastfeeding (EIBF). The survey assessed maternal education based on the last certificate given by mothers of children under two years of age. There are four levels of maternal education: no formal education, primary, secondary, and higher education. There are two categories of residence: urban and rural. Maternal age was divided into seven groups: 20, 20-24, 25-29, 30-34, 35-39, 40-44, and >44. Marital status consists of married and divorced/widowed women. There are two types of maternal employment status: unemployed and employed. The child's age was identified by the last month's birthday (in months). Children under two were classified as either boys or girls. EIBF is nursing within one hour of birth. EIBF consists of two kinds: no and yes.

The Chi-square test was performed. We carried out a co-linearity test to make sure there was no significant relationship between the independent variables. We conducted a binary logistic regression test. The IBM SPSS Statistics was used for all statistical analysis. The study created an overview of the distribution of stunted children under two by the province in Indonesia using ArcGIS 10.3 (ESRI Inc., Redlands, CA, USA). The Indonesian Bureau of Statistics provided a shapefile of administrative boundary polygon for the study's use. The national ethics committee has granted a license to conduct the 2021 Indonesian National Nutritional Status Survey (License Number: LB.02.01/2/KE.248/2021).

RESULT AND DISCUSSION

Based on the results, 20.3% of children under two in Indonesia are stunted. Figure 1 visualizes the prevalence of stunted children under two years old among poor communities in Indonesia, especially in North Kalimantan (27.75%) and South Kalimantan (27.37%), where the prevalence is at the highest level. The other highest group is also in the western region, Aceh Province (26.83%). Meanwhile, the lower categories shown in brighter colours are spread in the Provinces of Bali (12.61%) and Yogyakarta (12.64%), having the lowest levels.

Table 1 provides an analysis of education levels among poor communities in Indonesia. The proportion of under two who are not stunted is four times compared to those who are stunted in the higher education group. Mothers in rural areas have a proportion almost twice that of mothers with higher education who live in urban areas. Based on marital status, all education levels were dominated by married mothers. Meanwhile, based on employment status, all education level categories were dominated by unemployed mothers, except those with higher education, who employed mothers dominated.

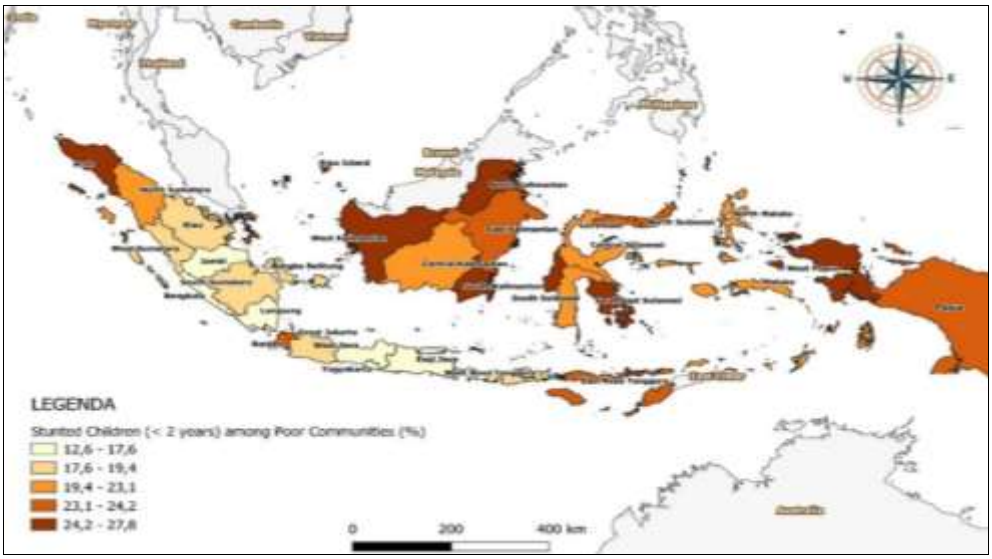

Figure 1. Distribution map of stunted children under two years among poor communities in Indonesia in 2021

Table 1. Descriptive statistics of respondents

Variables	Maternal education level				P-value
	No education (n=1,073)	Primary (n=15,828)	Secondary (n=6,905)	Higher (n=1,114)	
Stunting					*<0.001
No	71.6	79.1	82.1	81.8	
Yes	28.4	20.9	17.9	18.2	
Residence					*<0.001
Urban	21.2	37.7	45.4	35.3	
Rural	78.8	62.3	54.6	64.7	
Maternal age					*<0.001
<20	4.8	6.4	2.1	0.0	
20-24	19.8	18.1	27.6	4.9	
25-29	19.4	22.6	31.2	36.3	
30-34	25.0	24.0	20.8	32.7	
35-39	16.8	18.8	13.6	22.5	
40-44	8.9	7.8	4.2	3.1	
>44	5.3	2.3	0.4	0.4	
Marital status					*<0.001
Married	95.8	98.0	98.8	99.0	
Divorced/widowed	4.2	2.0	1.2	1.0	
Employment status					*<0.001
Unemployed	66.5	77.4	74.5	33.9	
Employed	33.5	22.6	25.5	66.1	
Age of under two (mean)	(12.99)	(12.30)	(12.10)	(12.16)	*<0.001
Gender of under two					*<0.001
Boy	45.8	49.2	50.4	52.8	
Girl	54.2	50.8	49.6	47.2	
Early initiation of breastfeeding					*<0.001
No	58.9	51.7	53.0	49.6	
Yes	41.1	48.3	47.0	50.4	

Note: *p-value < 0.001

The gender proportion of children under two years old is almost the same between boys and girls at all levels of the mother's education. All levels of education dominate not doing early initiation of breastfeeding, except for mothers with higher education. The collinearity test was performed next. The findings indicate that the tolerance values for all variables are more significant than 0.10 on average, and the inflation factor of variance for all variables is less than 0.00

concurrently. By referring to the basis of selection in the multicollinearity test, the study stated that there is no indicator of a strong association between multiple independent variables in the regression model.

The result of binary logistic regression is shown in Table 2. Based on education level, the study shows that mothers without education are 1.705 times more likely than those with higher education to have stunted children under the age of two. Mothers with primary education are 1.178 times more likely to have stunted children than those with higher education. Moreover, the study found no difference between secondary and higher education. The result shows that mothers without education are more likely than those with higher education to have stunted children under two years among poor communities in Indonesia. This result aligns with several other studies that say education is one factor that significantly influences the incidence of stunting. The higher the mother's education level, the lower the stunting prevalence rate(16,17) is likely because mothers with higher education levels will be more exposed to health information and aware of children's nutritional needs, child feeding practices, and access to health services.(18,19) Moreover, highly educated mothers generally have jobs and income, which allows them to make decisions regarding child health.(20) These study findings showed that in poor communities, a mother should get an education up to the secondary level to reduce the risk of stunting. Children from mothers who get the education to secondary and tertiary level have the lowest chance of not being stunted or severely stunted.(21,22)

Mothers in urban areas are 1.031 times more likely than those in rural areas to have stunted children under two years. Although several previous studies have stated that children living in rural areas are more vulnerable to stunting (17,23), this study shows that mothers in urban areas are more likely than those in rural areas to have stunted children. It means that in poor communities in Indonesia, the risk of having stunted children is higher in urban areas. This result is in line with studies conducted in Pakistan and Bangladesh, which stated that children living in urban areas are more prone to stunting.(24,25) It might be caused by people living in poor urban communities who come from poor households and tend to have limited access to nutritious food and health services.(25) Meanwhile, mothers living in poor rural communities probably have more ability than mothers in poor urban communities to meet their children's nutritional needs from available food, such as agricultural products and household-scale farms, including access to better clean water.(22)

Table 2. Binary logistic regression of nutritional status of children under two years among poor communities in Indonesia

Predictors	P-value	Stunting		
		AOR	95% confidence interval	
			Lower bound	Upper bound
Education: No	*<0.001	1.705	1.667	1.744
Education: Primary	*<0.001	1.178	1.157	1.199
Education: Secondary	0.803	1.002	0.984	1.021
Education: Higher	-	-	-	-
Residence: Urban	*<0.001	1.031	1.025	1.037
Residence: Rural	-	-	-	-
Maternal age: <20	*<0.001	1.244	1.215	1.273
Maternal age: 20-24	*<0.001	0.949	0.929	0.969
Maternal age: 25-29	*<0.001	0.938	0.918	0.957
Maternal age: 30-34	*<0.001	0.944	0.925	0.964
Maternal age: 35-39	*<0.001	1.214	1.189	1.239
Maternal age: 40-44	*<0.001	1.049	1.025	1.072
Maternal age: >44	-	-	-	-
Marital status: Married	*<0.001	1.307	1.280	1.335
Marital status: Divorced/widowed	-	-	-	-
Employment status: Unemployed	0.480	1.002	0.996	1.009
Employment status: Employed	-	-	-	-
Age of under two (mean)	*<0.001	1.115	1.114	1.115
Gender of under two: Boy	*<0.001	1.322	1.315	1.330
Gender of under two: Girl	-	-	-	-
Early initiation of breastfeeding: No	*<0.001	1.084	1.078	1.090
Early initiation of breastfeeding: Yes	-	-	-	-

Note:
AOR = Adjusted Odds Ratio
∗p<0.001

Based on maternal age, the age group <20, 35-39, and 40-44 are more likely than the age group >44 years to have stunted under two years children, except 20-24, 25-29, and 30-34 are less likely than age group >44 years to have stunted children. Based on maternal age, the age group <20, 35-39, and 40-44 are more likely than the age group >44 years to have stunted children, except 20-24, 25-29, and 30-34 are less likely than age group >44 years to have stunted children. Children of adolescent mothers were more likely to be stunted than mature mothers. Other studies have found that older maternal age correlates with a higher risk of stunting.(26,27) The study found a significant rise in stunting for children with mothers who were 35 years or older. As a result of these issues, the quantity and level of care, nursing, and nurturing their mothers give to children may be lower than that of children of adult mothers (20-34), which is likely to impact children's growth and development. Meanwhile, based on marital status, married mothers are 1.307 times more likely to have stunted under two years children. Regarding maternal and marital status, the results show that children with married mothers are more likely to be stunted than those with widowed/divorced mothers. Widowed mothers can be interpreted as single mothers who, in this study, have a lower risk of having stunted children. The results of this study are similar to studies conducted in Burundi and Nigeria, which say that children of single mothers are less likely to experience stunting.(28) Single mothers can have sound support systems so that children's growth and development can run optimally. Other studies have shown conflicting results. The risk of stunting increases 4.27 times in children of divorced/widowed mothers compared to children of married mothers.(29) The results of the research are still varied, possibly because many factors influence the occurrence of stunting in children, not only because of the mother's marital status.

The result found that age under two is related to stunting. This finding aligns with previous studies in Indonesia (30) and other countries.(23,31) Generally, factors contributing to stunted children under two years vary between countries. This study also indicated that boys were likelier than girls to become stunted children. Previous studies in India (32) and Bangladesh (31) reported that the odds of stunting were 38% and 32% higher in boys than girls, respectively. Complementary feeding, initiated earlier for boys than girls, may become a causal factor that explains higher stunting in boys than girls.(33) Unhygienic feeding environments and food hygiene may become the pathway of fecal-oral transmission in children under two years.(34)

Mothers who do not do EIBF are 1.084 times more likely to have stunted children than mothers who do EIBF. A previous study in Eastern Indonesia also reported that children under two who get exclusively breastfed from poorer households were 20% less likely to be stunted.(35) Globally, the EIBF prevalence varies across countries and may be impacted by maternal complications during pregnancy, caesarean delivery, and the absence of hospital postnatal or neonatal care guidelines.(36)

The 2021 Indonesian National Nutrition Status Survey was the secondary data source for this study's analysis. In the analysis, the researchers focused on the variables provided by the survey. This study is a cross-sectional study that is only exploratory and does not or cannot describe the causal aspects of stunting. Future research on stunting needs to be conducted through a case-control or cohort approach to explore the causal aspects of stunting further and use more detailed data on research variables to reduce possible bias. This research includes cultural factors that impact stunting in Indonesia, which cannot be explained by quantitative methods, thus requiring further qualitative exploration.

CONCLUSION

The study concluded that education level correlates with stunting in children under the age of two among poor communities in Indonesia. The lower the maternal education level, the higher the probability that the mother would have stunted children under the age of two. Strengthening the education sector, especially for poor communities, is expected to be one of the keys to reducing the prevalence of stunting in developing countries. Another specific focus is mothers with children under two who live in urban areas and do not participate in EIBF.

Acknowledgment

The authors thank the Indonesia Ministry of Health for processing the 2021 National Nutrition Status Survey data.

Conflict of Interest

The authors declare there is no conflict of interest.

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