

# Family Socioeconomic Factor of Child Stunting in Bangko Village, West Halmahera

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**Abstract:** Stunting is caused by chronic inadequate intake of nutrition that affects the growth of children. It is identified by the standard of height for age using WHO growth chart. A child identifies as stunting if the z-score is below -3 SD. North Maluku is one of province in Indonesia which has prevalence of stunting higher than the national prevalence. This study aimed to determine family socioeconomic factors that caused stunting in Bangko Village, West Halmahera, North Maluku. As much as 30 children between 0-12 years old were selected as the subject of research. The subjects were measured for weight, height, and age. Socioeconomic data was obtained by interviewing the parents of the child. Research data was analyzed using chi-square and fisher's exact test. The result showed more than three quarter of children were either severe or moderate stunted and 30% children with severe stunting were underweight. Parents level of education, mother's occupation, the number of family in one household were not significantly related to stunting status of children. Whereas, father's occupation was significant related to stunting. Furthermore, children with stunting status mostly had father who work as a farmer, while children with normal high for age status mostly had father who work as a fisherman.

**Keywords :** *under nutrition, father occupation, height for age, stunting*

## 1. Introduction

Stunting is chronic inadequate nutrition intake and can be worsened by infection disease that impact the linear growth of children [1]. Growth retardation is not only the impact of stunting, but stunting is also the cause of complex syndrome such as brain development delay, inadequate immune system, low cognitive function, and increase the risk of metabolic syndrome disease in the future [2][3]. Furthermore, stunting in children increase the mortality and morbidity that associate with pathological disorder [4]. The history of stunting leads to some diseases during the adulthood. Under nutrition children tend to have high risk of hypertension and obesity [5] which are major risk of generative diseases such as diabetes mellitus and coronary heart disease (CVD).

Method to identify child stunting is by comparing the height and age to the World Health Organization (WHO) standard. The standard is divided or categorized by the range of z-score [4]. Children with height for age (HfA) z-score < -2 SD is categorized as moderate stunting and children with HfA z-score < -3 SD is categorized as severe stunting [6]. Children who had moderate stunting in early life have high probability to remain in moderate stunting or swift to severe stunting, while children with severe stunting will highly remain in the same state or move to moderate stunting in the future. Furthermore either moderate or severe stunting are highly will grow into stunted adult [7].

Stunted mother will likely gives birth to stunted children. Study in Bangladesh reported stunted mother had 2.36 times high probability to have stunted children [8].

There are several risk factors of child stunting from nutritional intake, environmental factor, and socioeconomic factor. Environmental risk factors including rural or urban setting, inadequate sanitation, inadequate trash management, low quality of cooking fuels, unclean house, and foodborne mycotoxins are significantly influenced stunting among children [9][10]. Socioeconomic factors that related to stunting are gender, parent's education, breast feeding status, and household income [11]. Similar to environment factors, socioeconomic factors also have significant influence to the occurrence of stunting. Meanwhile, inadequate nutritional intake, low birth weight, short pregnancy interval, food insecure household are important risk factors of stunting [12].

Asian Development Bank reported Indonesia was in 10 rank of child stunting number among Southeast Asia countries in 2022 [13]. Ministry of Health of Indonesia reported the number of child stunting in 2022 was 21.6%. North Maluku is a province in the east part of Indonesia. The prevalence of child stunting in North Maluku was higher than Indonesia. Based on data from Ministry of Health, as much as 26,1% children were stunted in North Maluku [14]. The President of Indonesia was declared national target in 2024 child stunting prevalence in Indonesia must be less than 14%. The current number of child stunting in Indonesia especially in North Maluku province is still beyond the national target. Further study about the important risk factor of stunting is essential as the basic data to decide suitable policy to reduce child stunting prevalence. This study was designed to identify socioeconomic factors of child stunting in Bangko Village in West Halmahera regency which had high child stunting number.

## 2. Methodology

This study was an non experimental observational study with cross sectional method. The subjects were 30 children under 12 years old in Bangko Village, West Halmahera, North Maluku.

### 2.1 Anthropocentric Measurement

Children were measured for weight and height. The weight was measured using digital weighing scales for >24 months children and digital infant scales for  $\leq$  24 months children. Children were using as minimum clothes as possible during the weighing process. Under 24 months baby was lain on the infant scales and waited for the baby to stay still. Children > 24 months was removed from heavy clothing and shoes then asked to stand on the digital scale and stay still during the process. The weight was recorded to the nearest 0.1 kg. Height was measured using microtoise for children > 2 years old and baby length scale for  $\leq$  2 years old. The height or length was recorded to the nearest 0.1 cm.

### 2.2 Socioeconomic Data Collection

Socioeconomic data was collected by interviewing the parents or other family members who lived with the children. Data was recorded in questioner paper. It consisted of date of birth, gender, parent's education, parent's occupation, number of family member in one household, number of children in one household, number of children under 2 years old in one household, and exclusive breast feeding status.

### 2.3 Nutritional Status

Nutritional status was identified using WHO standard for height for age (HfA), weight for age (WfA), and body mass index (BMI) for age (BMIfA). Below was the categories (based on z-score) for each standard:

- a. Height for age (HfA)
  - 1) Severe stunting : < -3 SD
  - 2) Moderate stunting : -2 to -3 SD
  - 3) Normal : -2 to 2 SD
- b. Weight for age (WfA)
  - 1) Severe underweight : < -3 SD
  - 2) Moderate underweight : -2 to -3 SD
  - 3) Normal : -2 to 2 SD
- c. BMI for age (BMIfA)
  - 1) Wasting : < -3 SD
  - 2) Thinnes : -2 to -3 SD
  - 3) Normal : -2 to 2 SD

#### 2.4 Data Analysis

Data was analyzed using chi-square and fisher's exact test ( $\alpha=0,05$ ). Software used to analyse was SPSS and Microsoft Excel.

### 3. Results and Discussions

#### 3.1 Nutritional Status

Nutritional status assessment is a model that present the body composition and biochemical indexes as a result of nutrition intake and the nutritional demands, and how it is used to maintain or compensate the lost [15]. There are several standard to identify nutritional status for children by WHO, namely height for age, weight for age, height for weight, and BMI for age. Each standard represents different meaning to describe child nutritional status. In this research height for age, weight for age and BMI for age were used to determine the nutritional status of the subjects.

**Table 1.** Percentage of Nutritional Status

Nutritional Status		Height for Age			Total	p
Weight for Age	Severe Stunting	Moderate Stunting	Normal			
Severe Underweight	13,3	6,7	0,0	20,0	0,002	
Moderate Underweight	16,7	0,0	0,0	16,7		
Normal	10,0	30,0	23,3	63,3		
Total	40,0	36,7	23,3	100,0		
BMI for Age		Severe Stunting	Moderate Stunting	Normal	6,7	0,073
Wasting	0,0	6,7	0,0			
Thinness	10,0	0,0	0,0	10,0		
Normal	30,0	30,0	23,3	83,3		
Total	40,0	36,7	23,3	100,0		

More than three quarters of children in Bangko Village were severe or moderate stunted while the nutritional status based on WfA and BMIfA showed the majority of children had normal status. As much as 30% children with severe stunting has either severe underweight of moderate underweight. Meanwhile, 30% children with moderate stunting had a normal nutritional status by WfA. There was a significant correlation between nutritional status based on HfA and WfA where

more than one third of children with severe or moderate stunting also had severe or moderate underweight.

BMI for age is allowed to calculate body mass index which age and gender are taken to account. The majority of children in Bangko Village had normal BMI<sub>fA</sub> but 60% of children with normal BMI<sub>fA</sub> status identified to have severe or moderate stunting. Therefore, there was no significant correlation between nutritional status based on BMI<sub>fA</sub> and H<sub>fA</sub>.

### *3.2 Socioeconomic Factors*

Socioeconomic are indirect factor that influence stunting in children. Stunting or other under nutrition problem mostly occurs in many poor household in development countries. Socioeconomic factors such as parent's education, joint family system, birth order, family income and social-economic condition are great influence on risk of stunting [16]. Bangko Village is a small village in West Halmahera Regency, North Maluku Province, Indonesia. The residences are mostly working as a farmer (coconut, nutmeg, clove, or other horticultural products) who living in middle class to poor family. Beside farmer, some of the residences work as fisherman, self-employee as producer of sago or cassava flake, private sector worker (shop keeper or cashier), and housewife.

**Table 2.** Socioeconomic Factors of Child Stunting in Bangko Village

Socioeconomic Factors	Height for Age			Total	p
Gender	Severe Stunting	Moderate Stunting	Normal	Total	p
Male	19,0	9,5	19,0	47,6	0,034
Female	19,0	33,3	0,0	52,4	
Mother's education level	Severe Stunting	Moderate Stunting	Normal	Total	p
Elementary school	19,0	23,8	4,8	47,6	0,904
Junior high school	9,5	9,5	9,5	28,6	
Senior high school	9,5	9,5	4,8	23,8	
Father's education level	Severe Stunting	Moderate Stunting	Normal	Total	p
Elementary school	23,8	28,6	14,3	66,7	1,000
Junior high school	0,0	4,8	0,0	4,8	
Senior high school	14,3	9,5	4,8	28,6	
Mother's occupation	Severe Stunting	Moderate Stunting	Normal	Total	p
Self employed	14,3	14,3	4,8	33,3	0,298
Farmer	14,3	23,8	0,0	38,1	
Private employee	0,0	0,0	4,8	4,8	
Housewife	9,5	4,8	9,5	23,8	
Father's occupation	Severe Stunting	Moderate Stunting	Normal	Total	p
Self employed	4,8	9,5	0,0	14,3	0,011
Farmer	23,8	33,3	0,0	57,1	
Private employee	4,8	0,0	4,8	9,5	
Fisherman	4,8	0,0	14,3	19,0	
Number of family	Severe Stunting	Moderate Stunting	Normal	Total	p
< 4 people	14,3	0,0	4,8	19,0	0,196
4 people	9,5	9,5	0,0	19,0	
> 4 people	14,3	33,3	14,3	61,9	
Number of children	Severe Stunting	Moderate Stunting	Normal	Total	p
< 2 people	19,0	9,5	4,8	33,3	0,856
2 people	4,8	9,5	4,8	19,0	
> 2 people	14,3	23,8	9,5	47,6	
Number of children under 2 years old	Severe Stunting	Moderate Stunting	Normal	Total	p
< 2 people	23,8	28,6	14,3	66,7	1,000
2 people	9,5	4,8	0,0	14,3	
> 2 people	4,8	9,5	4,8	19,0	
Total	38,1	42,9	19,0	100,0	

Gender was a significant factor of child stunting in Bangko Village. More than 50% of children with severe or moderate stunting were female. Meanwhile, normal HfA status was found in male children. Stunting is common among male children than female children [1]. However in this research female children had higher percentage of stunting than male. Study in Ethiopia also reported the same result which female children had higher stunting number than males [17].

Parent's education was not significantly correlated with child stunting ( $p > 0,05$ ), but high percentage of child stunting was found in parent's with elementary school education level. Higher education will give more knowledge and skill to respond on future challenges, include how to practice good child care. Previous study in Lamongan City, Indonesia showed a similar result where more than 70% of child stunting's parent had low education level [18].

Mother and father occupation is related to family income that will affect the state of food security among the family. Food insecure family tends to purchase less protein, dairy product, and fruit but buy large amount of carbohydrate source of food to their list [19]. In this study there was no significant correlation between mother's occupation with child stunting. However the highest percentage 38,1% of child stunting had mother who works as farmer. Father's occupation showed different result, where there was a significant correlation between it and child stunting prevalence. Similar to mother's occupation data, more than 50% stunting children had father who works as a farmer. Interesting result was found that children with normal HfA status had father who works as a fisherman. It may related to high consumption of fresh fish and seafood as high protein source of food.

The number of family, children in total, and children under 5 years old in one household did not have significant correlation with child stunting. However, the majority of stunting children were found in family with more than 4 people in one household. The number of family live under the same roof will affect the economic burden. More family members means more live expense to cover. Low income will increase the risk of food insecurity which is one of the cause of stunting.

#### 4. Conclusion and Recommendations

Child stunting is a result of complex factors including nutritional aspect, environment, and socioeconomic factor. More than 70% of children in Bangko Village were stunting, where 40% of it were in severe stunting state. Female children were all either severe stunting or moderate stunting, none of them had normal HfA status. Father's occupation was significant factor which mostly child stunting was found in family with father as a farmer. Interesting result showed that father who work as fisherman tend to have children with normal HfA status. Mother's occupation and parent's education level did not have a significant correlation with stunting, but similar to father's occupation, high percentage of child stunting was found in mother who works as a farmer, and higher percentage of child stunting also found in parent's with low education level. The number of family, number of children in total, and number of children under 5 years old were not significantly related to stunting, but high percentage of child stunting was found in more than 4 people family members in one household. Solution to reduce child stunting needs to consider all the factor that may related to it. Collaboration between all the interested parties is essential to hasten the solution implementation.

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