


## A Stunting Risk Model Based on Children's Parenting Style

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Article Info	ABSTRACT
<p><b>Article history:</b></p> <p>Received March 29, 2023 Revised April 07, 2023 Accepted April 10, 2023</p> <hr/> <p><b>Corresponding Author:</b></p> <p>Mayang Sari Ayu, Lecture of Islamic University of North Sumatra; Indonesia Email: <a href="mailto:mayang.sari@fk.uisu.ac.id">mayang.sari@fk.uisu.ac.id</a></p>	<p>Out of the 23 million children in the world, 7,8 million are stunted, according to the Global Nutrition Report (2020). In Indonesia, 24.4% of children are stunted. WHO aimed for less than 20% of instances of stunting worldwide in 2024. Stunting is a result of parenting techniques for young children. Parenting techniques include things like a child's immunization history and sole breastfeeding. This study sought to examine parenting-based risk factors that affect stunting. In this study, a case-control methodology was employed. Purposive sampling was used to collect the sample, and the case group consisted of mothers of stunted children between the ages of 1 and 5. 1:1 ratio of comparison to the control group. The Fisher's exact test is employed when the anticipated value is more than 20%. Statistical analysis was done using the chi-square test (2x2). Measurement of the impact of a specific risk assessment for stunting using multivariate analysis and logistic regression analysis. The nominal scale has two categories: stunting and not stunting. Based on logistic regression analysis, nutritional status, exclusive breastfeeding, complementary feeding, vaccination status, infectious illnesses, and low birth weight are risk factors for stunting (<math>p &gt; 0.05</math>). By improving women's nutrition, child nutrition, and home sanitation, stunting can be stopped.</p> <p><b>Keywords:</b> Stunting, Parenting Style, Nutritional Status</p> <p>This article is licensed under a <a href="https://creativecommons.org/licenses/by-sa/4.0/">Creative Commons Attribution-ShareAlike 4.0 International License</a>.</p> <div style="text-align: center;"></div>

### 1. INTRODUCTION

According to the global nutrition report (2020), all countries experienced nutritional problems. Globally stunting is a persistent public health issue. Sub-Saharan Africa is home to one third of the world's malnourished youngsters. Indonesia experiences a triple burden of disease, namely malnutrition, obesity, and stunting. Parenting styles for toddlers contribute to the incidence of stunting where two of the parenting styles is the toddlers immunization status and exclusive breastfeeding. Parenting styles for toddlers contribute to the incidence of stunting where two of the parenting styles is the toddlers immunization status and exclusive breastfeeding. [1]

Stunting is considered a major global nutritional issue by WHO. Ending hunger, ensuring food security, and promoting healthy eating are the second and third Sustainable Development Goals (SDGs) after supporting agriculture. By 2025, the goal is to improve child nutrition worldwide by reducing stunting prevalence by >20%, or by one-fifth of all children under the age of five. The first of the six Global Nutrition Goals (2025) objectives is to reduce stunting in children because it is a persistent public health issue. Future human resource quality, particularly in terms of physical development, IQ, and productivity, is impacted by stunting. [2]

In the conventional anthropometric assessment of children's nutritional status, stunting is defined as nutritional status based on the indices of length/age or height/age, with the measurement results being classified as short or extremely short if the Z score is between -2 SD and -3 SD. Stunting has a 20% maximum tolerance limit, or one fifth of children under the age of five, according to the World Health Organization. Toddlers can start stunting as early as the child's formative years. [3]

Stunting is a pathological condition linked to higher rates of morbidity and mortality, stunted physical development, poor cognitive and neurodevelopmental performance, and a higher risk of chronic disease development as adults. Human development is seriously threatened by the severe, long-lasting physical and mental disability that results from stunted growth. Stunting has been designated a critical global health concern, is the focus of high-level international attention, and has worldwide targets set for 2025 and beyond because of how severe and destructive it is. Prevention of both childhood obesity and overweight, as well as linear growth failure, might be difficult. [4]

According to the World Health Organization (WHO), stunting is responsible for more than 2 million fatalities in children aged 6 to 12 and more than 1 million deaths worldwide are also brought on by a lack of energy, protein, vitamin A, and zinc. Stunting, according to the WHO, is a disruption in a child's growth caused by hunger, persistent viral illnesses, and insufficient psychosocial stimulation percentage of kids between the ages of 2 and 5 who, according to international child development standards, have stunted growth that is either moderately severe or chronic. [5]

Children with nutritional issues are more prevalent in underdeveloped nations, including Indonesia. Malnutrition, obesity, and stunting are all triple burdens of illness in 17 countries, including Indonesia. Stunting will affect 24.4% of Indonesian children under the age of five in 2021. In Indonesia, the rate of stunted children is close to 25%, which is greater than the critical level of nutritional issues worldwide. Programs have been put in place by the government to stop stunting. [6]

Out of 23 million toddlers, 7.8 million in Indonesia were found to be stunted. In Indonesia, where the rate of stunting is 35.6%, 18.5% of toddlers fall into the extremely short group and 17.1% fall into the short category. [7] With the data provided by the WHO, Indonesia is now officially classified as having a malnutrition status. With 7.5 million kids under five, Indonesia is one of the top 5 nations with the highest rates of toddler stunting. [8]

The Indonesian government wants to reduce the prevalence of stunting to 14% by 2024. The national stunting rate has fallen from 37.2% in 2013 to 30.8% in 2018, according to statistics from The 2018 Basic Health Research report from the Ministry of Health. [9] The incidence dropped to 27.7% in 2019, according to The Indonesian Toddler Nutrition Status Study. [10]

The future health and wellbeing of children in Indonesia will be impacted by stunting in newborns under 2 years old. Prevention of stunting can be done by early detection of children who are at risk of being stunted. Predictions are made using factors that influence a child's risk of stunting. Stunting is seen after a child is two years old. If caught early before the age of two, it can be corrected within the first 1,000 days of life. [11]

North Sumatra Province is the 17th province with the highest number of stunted children in Indonesia. In 2019, North Sumatra's stunting rate reached 30.11%, while in 2020 it was 27.7% and in 2021 it was 25.8%. There are 63 sub-districts for stunting in Medan City, the stunting rate currently reaches 550 cases out of 119,225 children under five. Stunting cases in Medan City was found in 20 sub-districts (out of 21 sub-districts). It is necessary to carry out multi-sector approach to identify the risk factors. [12]

## **2. METHOD**

### **Types of research**

This study used an analytical observational case control design. This study aims to investigate the risk factors for stunting that are related to parenting. All moms in Medan City in 2022 with children ages 2 to 5 comprise the research population. The sample is made up of women who have stunted children between the ages of 2 and 5 using a purposeful sampling strategy. Measurement of the nutritional status of kids between the ages of 2 and 5 is done in conjunction with observation, interviews, and recording to gather data on each risk factor for stunting. Then the researchers interviewed the respondents using a structured questionnaire to mothers who had children aged 2-5 years and observations using an information system book from the primary-health-care. The inclusion criteria for the case group included mothers with their children aged 2-5 years, registered at the local primary-health-care height/age which inappropriate according to child's age (standard of the Republic of Indonesia Ministry of Health). The control criteria are children with appropriate Height/age according to the child's age. There are 8 independent variables including nutritional status, exclusive breastfeeding, provision of complementary foods, basic immunization completeness status, presence of infectious diseases, birth length, routine visits to primary-health-care, and birth weight.

### **Location and Time of Research**

#### **Research sites**

This study was carried out in the Amplas Public Health Center's Working Area in Medan, North Sumatra Province.

#### **Research time**

Research Period The research in question will take place in December 2022.

#### **Data analysis**

Data analysis was done in stages using univariate and bivariate methods.

#### **Univariate analysis**

Descriptive analysis used a single variable analysis (percentage table). The chi-square test ( $\chi^2$ ) was used in statistical analysis to examine dichotomous variables. If no cells in the 2x2 table have an expected value that is less than 5 or larger than 20%, a continuity correction is carried out to determine the significance based on the output findings. The Fisher's exact test will be applied if any cells in the 2x2 table have an expected value that is less than 5 or greater than 20%.

### b. Bivariate analysis

Bivariate analysis is the mothers in the control group, who are the closest neighbors of the patients in the five sub-districts of the Medan Amplas District where there are cases of stunting, make up a ratio of 1:1 with the identical age requirements. There is a significant association between the two variables if the significance value (p-value) is less than 0.05 (p < 0.05). It can be concluded that there is no significant association between the two variables if the significance value (p-value) is greater than 0.05 (p > 0.05).

### c. Multivariate analysis

The assessment of the risk of stunting in children under the age of five was the dependent variable in the multivariate analysis, and its impact on it was measured using binary logistic regression analysis. Stunting and not stunting are the two categories with nominal scales in the nominal scale with measuring findings.

## 3. RESULTS AND DISCUSSION

### 3.1 Results

The nutritional state, history of exclusive breastfeeding, availability of complementary meals, completion of the core immunizations, the presence of infectious diseases, birth length, regular trips to the primary-health-care, and birth weight of children are among their characteristics. Characteristics in children are presented in the frequency distribution table as follows:

**Table 1.** Frequency Distribution Based on Stunting Risk (n=20).

Variable Independen	Category	Case (%)	Control (%)	P-Value
Exclusive Breastfeeding	Yes	0 (0)	8 (40)	0,001
	No	10 (50)	2 (10)	
Nutritional Status	Good	0 (0)	10 (50)	0,001
	Not Good	10 (50)	0 (0)	
Giving breast milk replacement food	Appropriate	10 (50)	4 (20)	0,011
	Not Appropriate	0 (0)	6 (30)	
Birth Weight	<2.5 kg	8 (40)	1 (5)	0,005
	≥ 2.5 kg	2 (50)	10 (50)	
Birth Length	<48 cm	7 (35)	1 (5)	0,20
	≥ 48 cm	3 (15)	9 (45)	
Infectious Diseases	≥6x/years	10 (50)	0 (0)	0,000
	<6x/years	0 (0)	10 (50)	
Immunization Status	complete	2 (10)	8 (40)	0,007
	Do not Complete	8 (40)	2 (10)	
Visits to community health centers (minimum 1x /month)	Every month	6 (30)	10 (50)	0, 87
	Never	4 (20)	0 (0)	

Source: Primary Data (2022)

**Based on table 1.** According to the results of the logistic regression analysis (p>0.05), low birth weight, infectious illnesses, exclusive breastfeeding, complementary feeding, the status of a child's basic immunizations, and nutritional status all have a significant impact on the likelihood of stunting.

**Table 2.** Summary Model of Stunting Risk Factors Based on Parenting Style

Variable Independent	Cox and Snell R Square	Nagelkerke R Sqaure
Nutritional Status	0,750	1,0
Exclusive breastfeeding	0,571	0,761
Giving breast milk replacement food	0,422	0,563
Low Birth Weight	0,424	0,565
Infectious Diseases	0,420	0,723
Immunization Status	0,320	0,427

Source: Primary Data (2022)

Based on table 2. It is known that the dominant risk factor that has the most influence based on parenting style on the occurrence of stunting is that there are 6 independent variables, namely nutritional status with Cox and Snell R Square and Nagerkerke R Square values of 75% and 100%. Then giving breast milk for 6 months with Cox and Snell R Square and Nagerkerke R Square values of 57% and 76%. Weight at birth is less than 2500 grams with Cox and Snell R Square and Nagerkerke R Square values of 42% and 56%.

### 3.2 Discussion

Stunting risk is associated with child nutrition issues leading to health issues. mother's lack of understanding of the micro- and macronutrient requirements for growth and development. Children who frequently pick food do not get their recommended nutritious intake. Children with little nourishment will grow more slowly. Growth in a child starts while they are still in the womb and lasts for at least the first two years after birth. [13]

The fact that few children receive breast milk exclusively for six months is likely due to working mothers. The finest and most complete nourishment for babies to meet their physical and psychological needs for growth and development is exclusively breast milk. Before the age of six months, newborns who receive breast milk grow more rapidly than those who receive plain water or supplemental foods. Lactose, a substance found in breast milk, aids in the baby's absorption of calcium during the period of growth. Functional chemicals found in breast milk may have uses in nutrition and medicine. [14]

The production of breast milk is lacking so mother must provide additional food or drink when the child is less than 6 months old to suffice the intake. Complementary food for exclusively breast milk is to complement breast milk, not to replace breast milk and breast milk must still be given until the age of 2 years. Because children only require breast milk for the first six months of life, and because breast milk is insufficient for promoting healthy growth and development after that point, the age at which supplemental foods are introduced has an impact on the prevalence of stunting. [15]

Environmental factors, poor maternal and child health, including poor sanitation, intrauterine growth restriction, nutritional deficiencies, and underweight newborns and young children are risk factors for stunting. feeding methods. [16]

This is because pregnant women who neglect their health and diet may have an impact on the health of their unborn child. Fetal, neonatal, and post-neonatal mortality, newborn and child morbidity, and long-term growth and development are all correlated with birth weight. Low birth weight kids will have a long-term effect on future generations. Stunting in newborns between the ages of 12 and 60 months is significantly predicted by low birth weight, which also impacts developmental anthropometry. Stunting status in toddlers and a history of low birth weight are significantly correlated. [17]

The prevalence of stunting increases the risk of birth length. Compared to toddlers with normal birth length, those with low birth length are more likely to experience growth failure. Children with low birth length have a lower immune system, so children are easily infected with diseases, and experience malnutrition and stunting. The results of a study in Kendal (Central Java) show that there are toddlers with short birth length who are not stunted by 4.2% and toddlers with normal birth length who are stunted by 58.3%. Research in Pati showed that the percentage of toddlers with normal birth length was stunted at 55.2%. [18]

Children with a history of infectious infections are three to eight times more likely to have stunting. Nutritional resources are utilized for the process of mending damaged tissues or cells when infection is a direct cause. 1) Gastrointestinal infections (diarrhea) brought on by viruses, bacteria, or parasites are infections that frequently happen. 2) respiratory infections, 3) worm-related diseases (worms). The presence of infectious illnesses and nutritional status are mutually correlated, where in malnutrition can raise the risk of contracting infectious diseases. Malnutrition reduces food intake, interferes with nutrient absorption, results in direct nutrient loss, and increases metabolite requirements. Stunting will be 8 times more likely to affect 9 infectious diseases.

Based on further interviews, the reasons for parents not completing their child's immunizations were because they were afraid of getting sick after immunization. Research on mother's knowledge about Post-Immunization Follow-up Events in the work area of the Yos Sudarso Health Center, Pontianak, explains that incomplete immunization status is caused by mothers being lazy to bring their children for immunization after previously being refused by health workers on the grounds that the child was sick or the child was underweight. [19]

The reasons for the incompleteness of other child immunizations that were most frequently stated by respondents sequentially were the child being sick, lack of information regarding the immunization schedule, the frequency of a family moving residence, diseases that could be prevented by immunization were considered not too dangerous, no family members brought their children immunizations, do not know the benefits of immunization and do not understand post-immunization side-effects, and there is no health service. [20]

The number of people present at an active come to the primary\_health\_care has a significant impact on monitoring nutrition, and mothers of toddlers who come to the primary\_health\_care will receive the most recent data on health, which is helpful in determining a healthy lifestyle in everyday life. [21] The most important risk factor affecting the prevalence of stunting is nutritional status, which has a Cox and Snell R Square and Nagerkerke R Square value of 75%. The nutritional status of toddlers is a risk factor for stunting and has a significant impact on the likelihood that they will experience it (p value = 0.022 0.05, OR = 0.009).

## 4. CONCLUSION

It was concluded that there was a significant effect of the risk of stunting including nutritional status, exclusive breastfeeding, infectious diseases, breastfeeding replacement feeding for less than 6 months, body weight less than

2500 mg and immunization completeness status. However, routine health checks at posyandu and birth length less than 48 cm do not affect the risk of stunting.

The prevalence of stunting is correlated with calorie intake. Insufficient dietary intake will hinder children's physical development. One of the benchmarks used to determine whether daily nutritional intake is enough and whether nutrients are being used to meet bodily needs is the nutritional status of children. The child's development and growth will be at their best if their nutritional needs are met, and the opposite is true if their nutritional status is problematic, which will have an impact on their development and growth into adulthood. [22]

Prevention of stunting is a national priority to ensure human resource development, especially among the poorest households. The occurrence of stunting in toddlers can be caused by the mother's behavior which is a factor in the occurrence of stunting such as knowledge about nutrition, choosing the wrong food and parenting. Actions taken to alter mother's behavior through health promotion and education. Stop stunting via improving women's nutrition, child feeding, and home hygiene. [23]

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