

## ***THE CORRELATION BETWEEN LOW BIRTH WEIGHT AND STUNTING IN 2-5 YEARS OLD CHILDREN***

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### **ABSTRACT**

**Background:** *The WHO defines stunting as a growth and development failure of infants and toddlers due to poor nutrition, especially in the first 1,000 days of life, so the child's height is too low for the age. Epidemiologic data shows the prevalence of stunting in children under five years in 2018 reached 30,8%. Since conception, growth, and development greatly affect babies' growth and development at birth and throughout their lives. Low birth weight indicates the fetus's growth and development since the period of conception is inhibited, which results in the non-optimal formation and maturation of the organs in infants, which can chronically appear as stunting.*

**Purpose:** *This research aims to determine the correlation between low birth weight and stunting in children 2-5 years old. Method:* *This study uses an observational analytic method with a case-control study design and purposive sampling. There are 60 subjects in this study. Data used in this research were obtained from medical records. The WHO chart analyzed height. This research was analyzed with the Chi-Square test with the alpha standard value 1,96 ( $\alpha=0,05$ ). Result:* *There's a significant correlation between low birth weight and stunting in children 2-5 years old ( $P$ -value = 0,001, OR = 19,3). Conclusion:* *Low birth weight history significantly correlates with the incidence of stunting in 2-5 years old children.*

**Keywords:** *Low Birth Weight, Stunting*

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## INTRODUCTION

Stunting is defined as an infant (aged 0-11 months) and toddler's (aged 12-59 months) growth and development failure due to chronic malnutrition, especially in the first 1,000 days of life, so that the child's height is too low for their age (1). Stunting is an indicator of chronic malnutrition that can be used as a country's malnutrition monitor over time, which is the impact of disturbances on inadequate nutrition and disease that occurs during the first 1,000 days of life (2-4).

Risk factors of stunting are birth weight and length (5); infection during the first 1,000 days of life (6); breastfeeding and complementary feeding; mother's age, height, and weight; mother's with anemia (7); pregnant women nutrition fulfillment (8); education, occupation, and income of parents; sanitation and availability of clean water (9,10). Stunting can have short-term and long-term effects. The short-term effects of stunting are increased morbidity and mortality, suboptimal cognitive development (11), and increased healthcare costs. The long-term impact of stunting are un-optimal body posture as an adult; increased risk of non-communicable and infectious disease; decreased learning capacity, and un-optimal performance during school; and affecting the economic condition of a country (12-14).

Childhood stunting is one of the most significant barriers to human development, affecting about 162 million children under five years old (15). According to Basic Health Research data in 2018, the prevalence of stunting in children aged 0-59 months in Indonesia reached 30.8%. In East Java, it reached 32.8% (16); in Surabaya, it reached 28.57% (17). In 2019, based on data from the Health Research and Development Agency of the Ministry of Health of the Republic of Indonesia, the prevalence of stunting in children aged 0-59 months in Indonesia was 27.67%. In East Java, it was 26.86% (18).

In the Regulation of the Minister of Health of the Republic of Indonesia (Peraturan Menteri Kesehatan Republik Indonesia) Number 2 of 2020 about Child Anthropometry Standards, children can be categorized as stunting if the z-score for height according to age is  $-3$  Deviation Standards to less than  $-2$  Deviation Standards, and severely stunted if the z-score is  $-3$  Deviation Standards (19).

By knowing the risk factor of stunting, it will be very helpful to be able to reduce the incidence of stunting. Until now, stunting is still a problem that the Indonesian government and the whole world are trying to overcome, as evidenced by the 'Global Nutrition Targets 2025' (20). This study aims to determine the relationship between low birth weight (LBW) as a risk factor for stunting.

## METHODS

This study used an observational analytical research design with a case-control study design, and a total of samples are 60 chosen with a purposive sampling technique. The sample in this study was taken through secondary data from medical records at the Banyu Urip Public Health Center Surabaya according to inclusion and exclusion criteria that had been set. The inclusion criteria for this study were: 1) Children aged 2-5 years; 2) Have data on birth weight and height; 3) Have data on weight and height at the age of 2-5 years, with repeated measurements more than once; 4) Recorded in the medical record at the Banyu Urip Health Center Surabaya. The exclusion criteria for this study were: 1) Children with congenital abnormalities or physical disabilities; 2) Children who suffer from comorbid diseases.

The dependent variable of this study was children aged 2-5 years who experienced stunting, and the independent variable of this study was children aged 2-5 years with a

history of low birth weight. Sixty medical record data comprised 30 children with stunting and 30 children who were non-stunting. They then retrospectively traced their history of birth weight which was divided into LBW ( $\leq 2,500$  grams) (21) and non-LBW ( $> 2,500$  grams). The collected data were analyzed with the SPSS program using the Chi-Square test.

## RESULTS

Table 1 Basic Characteristics of the Research Population

	Frequency (n)	Percentage (%)
<b>Gender</b>		
Female	29	48,3%
Male	31	51,7%
<b>Age</b>		
24-35 months	20	33,3%
36-47 months	16	26,7%
48-59 months	24	40,0%
<b>Birth Weight</b>		
Normal	47	78,3%
LBW	13	21,7%
<b>Total</b>	<b>60</b>	<b>100%</b>

Based on the table above, it was found that from a total of 60 data obtained in this study, the population data were male (51.7%) more than female (48.3%). The highest percentage of age was 48-59 months (40.0%), and the total of children with a history of low birth weight was 13 (21.7%), and children with a history of normal birth weight were 47 (78.3%).

Table 2 Result of Stunting-LBW Analysis

Birth Weight	Stunting Incidence		Total n (%)	P- Value (OR)
	Normal	Stunting		
	n (%)	n (%)	n (%)	
Normal	29 (61,7)	18 (38,3)	47 (100)	0,001 (19,3)
Low Birth Weight	1 (7,7)	12 (92,3)	13 (100)	
<b>Total</b>	30 (50)	30 (50)	60 (100)	

Based on the results of the bivariate analysis in the table above, it is known that 29 children aged 2-5 years are normal (without a history of low birth weight) and do not experience stunting (61.7%), while children aged 2-5 years who are normal (without a history of LBW) and experienced stunting as many as 18 people (38.3%). Children aged 2-5 years with a history of low birth weight and not experiencing stunting as many as one person (7.7%), while children aged 2-5 years with a history of low birth weight and stunting were 12 people (92, 3%). The test results using Chi-Square obtained  $p = 0,001$  and  $OR = 19,3$ .

## DISCUSSION

From the study's results using the chi-square test, it was found that there was a significant relationship between a history of low birth weight and the incidence of stunting in children aged 2-5 years, with  $p = 0,001$  ( $p \leq 0,05$ ). The results of this study also obtained  $OR = 19,3$ . The Odds Ratio (OR) measures the association between exposure to risk factors and disease incidence. This study means that children born with a history of low birth weight ( $\leq 2,500$  grams) are 19,3 times more likely to experience stunting than children with normal birth weight.

Babies with a history of LBW have experienced growth retardation since in the womb, characterized by birth weight  $< 2,500$

The correlation between low birth weight...

grams, which will continue to affect their future growth and development. The growth and development of children with a history of LBW are slower than babies born normally. They often do not receive optimal intervention, so they fail to keep up with the growth and development levels that should be achieved at the age after birth, which can manifest as obstacles to the anthropometric development of children who become shorter for their age. This condition can chronically end up being stunted.

The result of this study supports several other studies that state a correlation between low birth weight (LBW) and stunting in 2-5 years old children. Lestari and friend's research reported there is a significant relationship between a history of low birth weight and stunting in children aged 24-59 months which was conducted on 60 subjects, with  $p\text{-value} = 0,035$  and  $OR = 10,510$ , which means the history of low birth weight increased the risk of stunting by 10,5 times (22). The Faculty of Medicine conducted another study at the University of Lambung Mangkurat, which examined the association between a history of low birth weight and the incidence of stunting in children under two years old. This study involved 117 respondents, and it was found that stunting experienced by children under two years old was most significantly associated with a history of low birth weight ( $p\text{-value} = 0,015$ ), and children with a history of low birth weight increased the risk of stunting by 5,87 times ( $OR = 5,87$ ) (23).

The association between the history of low birth weight and stunting was reinforced by the study of Danaei (2016), which was conducted to determine the most significant risk factors for stunting in 137 developing countries. The result of this study stated that low birth weight caused by intrauterine growth restriction and premature birth was the most common risk factors (10,8

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million out of 44,1 million cases) that resulted in stunting.

## CONCLUSION

Based on the result of research about the relationship between low birth weight and stunting in children aged 2-5 years old held at Banyu Urip Public Health Center Surabaya on 60 research subjects, it was concluded that there was a significant relationship between a history of low birth weight and the incidence of stunting at Banyu Urip Public Health Center Surabaya in children aged 2-5 years with  $p\text{-value} = 0,001$  ( $p \leq 0,05$ ) and history of LBW increased the risk of stunting by 19,3 times ( $OR = 29,3$ ).

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