



RELATIONSHIP BETWEEN LOW BIRTH WEIGHT AND INFECTIOUS DISEASES WITH STUNTING IN CHILDREN AGED 4 TO 5 YEARS

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ABSTRACT

Stunting is a nutritional problem that has a high prevalence in Indonesia. Stunting is directly affected by birth weight and infectious diseases. This study aims to analyze the relationship between low birth weight and infectious diseases with the incidence of stunting in children under two. This type of research uses a case-control design. Sampling was done by purposive sampling technique. The sample size is 105 children (35 stunted children and 70 non-stunted children). In collecting data, researchers used instruments in the form of questionnaires, interviews and height measurement tools. Questionnaires are used to determine birth weight which has been tested for validity and reliability. The collection of data on infectious diseases of children was carried out by structured interviews with the children's parents and medical records from the puskesmas doctors. Then the height measurement tool used is a stature meter SH - 2° with an accuracy of 0.1. To determine stunting using the z-score using the NCHS standard value. The results of this study on the birth weight variable obtained the RE (Risk Estimtae) value of 7.667 (95% CI: 3.718 - 15.807). Then the infectious disease variable obtained RE (Risk Estimate) value of 0.521 (95% CI: 0.418 - 0.649). The conclusion of this study is that there is a relationship between low birth weight and infectious diseases with the incidence of stunting in children aged 4 to 5 years.

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INTRODUCTION

Stunting is a chronic malnutrition problem in toddlers that causes linear growth disorders (RPL). According to the World Health Organization Child Growth Standards, stunting is based on measuring height or height using z-score constraints and using an index of length to age (PB/U) or height to age (TB/U). < -2 SD. Minister of Health Decree No. 1995/MENKES/SK/XII/2010 concerning anthropometric standards for assessing

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children's nutritional status is divided into 2, namely stunted (short / z score < -2SD) and severely stunted (very short / z score < -3S (Saadah, 2020).Health

The Research in 2013 study found that the national prevalence of stunting reached 37.2%, an increase from 2010 (35.6%) and 2007 (36.8%). Or one of three Indonesian children. Indonesia has a higher prevalence of stunting than other Southeast Asian countries, such as Myanmar (35%), Vietnam (23%) and Thailand (16%). Indonesia has the fifth-highest number of stunted children in the world. More than a third of children under five in Indonesia are below average height (Surono, Widiyanti, Kusumo, & Venema, 2021).

One of the risk factors for growth retardation in children under 5 years of age is a birth history of low birth weight (LBW). According to Proverawati and Ismawati (2010) LBW babies grow and develop more slowly because LBW babies experience intrauterine growth retardation since birth and will continue until the next birth age, i.e. grow and develop more slowly than birth babies. Normal and often not keeping up with the growth rate he should have achieved after birth. Babies with low birth weight also suffer from digestive disorders because the digestive tract does not function, such as when B. can absorb fat without digesting protein, resulting in a lack of nutrient reserves in the body. As a result, if this pattern of undernutrition, high infection rates, and poor health care persists, growth and development of LBW babies can be stunted, resulting in stunted children (Proverawati & Ismawati, 2010).

Developmental delay is generally caused by a number of interrelated factors. The consumption of nutrients such as energy, protein, and zinc, as well as a history of infectious diseases, are factors that directly affect the growth process of children. Inadequate nutritional intake in children leads to increased numbers of children with stunting (growth disorders) (Millward, 2017). In addition, the frequency of children experiencing infections will also have an impact on their growth patterns. Infection has a contribution to a decrease in appetite and if it persists it will interfere with the child's linear growth (Millward, 2017).

The infectious disease status of children under five years of age is also a factor that affects the incidence of stunting in children under five years of age. The majority of the stunted infant population had higher disease levels, implying a significant association between disease prevalence and nutritional status in stunted infants (Welasasih & Wirjatmadi, 2012). Based on the exposure of the factors causing stunting based on infectious diseases into clinical and subclinical infections, with examples of infectious diseases as follows: enteric infections, diarrheal diseases, environmental enteropathy, worms, respiratory infections, malaria, decreased appetite due to infection, and inflammation (Dewey & Mayers , 2011).

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This study aimed to analyze the association of low birth weight and infectious diseases with growth retardation in children based on exposure to cases of stunting caused by birth weight and infectious diseases aged 4 to 5 years.

METHOD

The type of research used is cross sectional. This research was conducted in Curug Village, Klari District, Karawang Regency, which was carried out in January-February 2022. The total population was 150 children and the sample size was 105 children, the sample size was adjusted to the sample table from Isaac and Michael with a significance of 5%. Samples were taken from 8 Posyandu in Curug Village, Klari District, Karawang Regency. Sampling was done by purposive sampling technique. The sampling was based on the criteria for the child's age, namely 4-5 years and parents were willing to have their children become respondents by signing the consent form.

In collecting data, researchers used instruments in the form of questionnaires, interviews and height measurement tools. Questionnaires were used to determine birth weight which had been tested for validity and reliability. The collection of infectious disease data for children was carried out by structured interviews with the child's parents and medical records from the puskesmas doctor. Then the height measurement tool used is a stature meter SH - 2° with an accuracy of 0.1. To determine stunting using the z-score using the NCHS standard value.

The data analysis technique is univariate and bivariate analysis. Data analysis performed using SPSS 25 software was used to determine the risk of each interrelated variable.

RESULT AND DISCUSSION

A. Univariate Analysis

1. Gender of Respondents

Characteristics of respondents in this study based on gender are presented in table 1 below:

Table 1. Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	47	44.8	44.8	44.8
	Female	58	55.2	55.2	100.0
	Total	105	100.0	100.0	

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Based on the table of respondents' gender, it can be seen that the respondents in this study were dominated by girls, namely 58 respondents or 55.2%. While the male respondents were 47 respondents or 44.8%.

2. Respondent's Birth Weight

The characteristics of respondents in this study based on birth weight are presented in table 2 below:

Table 2. Respondents Birth Weight

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	69	65.7	65.7	65.7
	Low	36	34.3	34.3	100.0
	Total	105	100.0	100.0	

Based on the table of respondents' birth weight, out of 105 respondents were obtained. There are 69 respondents belonging to normal birth weight children, namely 65.7%. Then there were 36 children with low birth weight, namely 34.3%.

3. Respondents' Infectious Diseases

Characteristics of respondents in this study based on infectious diseases are presented in table 3 below:

Table 3. Respondents' Infectious Diseases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Chickenpox	7	6,7	6,7	6,7
	Worms	9	8.6	8.6	15.2
	Measles	4	3.8	3.8	19.0
	Dengue Fever	9	8.6	8.6	27.6
	Diarrhea	19	18.1	18.1	45.7
	Influenza	20	19.0	19.0	64.8

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Normal	32	30.5	30.5	95.2
Pneumonia	5	4.8	4.8	100.0
Total	105	100 0.0	100.0	

Based on the respondent's infectious disease table, from 105 respondents, it was obtained. There are 32 respondents who are classified as children without infectious disease (normal). Then the respondents who were classified as children with influenza infection were 20 children, namely 19% as the first highest infectious disease and 19 children with diarrheal infection, namely 18.1% as the second highest infectious disease.

4. Respondents Stunting

Characteristics of respondents in this study based on stunting are presented in table 4 below:

Table 4. Stunting Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	70	66.7	66.7	66.7
	Stunting	35	33.3	33.3	100.0
	Total	105	100.0	100.0	

Based on the respondent's stunting table, respondents with normal height category are 70 respondents or 66.7%. Meanwhile, respondents with stunting category were 35 respondents or 33.3%.

B. Bivariate Analysis

Table 5. Chi-Square Tests Birth Weight

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2-sided)	Exact Sig.- sided)
Pearson Chi-Square	48,696 ^a	1	1,000		

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Continuity Correction ^b	45,700	1	,000		
Likelihood	50,230	Ratio	1,000		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	48,232	1	,000		
N of Valid Cases	105				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.00.

b. Computed only for a 2x2 table

Table 6. Risk Estimate of Birth Weight

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Birth Weight_New (Low / Normal)	31,000	10,235	93,896
For cohort Stunting_New = Stunting	7,667	3,718	15,807
For cohort Stunting_New = Normal	,247	,134	,458
N of Valid Cases	105		

1. Birth Weight

Based on tables 5 and 6, it is known that the results of the *chi-square* show that there is a relationship between birth weight and *stunting* with a p value of $p = 48.696$ which means that there is a relationship between low birth weight in *stunted* and *non-stunted*. Then the RE (*Risk Estimtae*) value was obtained at 7.667 (95% CI: 3.718 –

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15.807). The RE (*Risk Estimate*) value means that children aged 4-5 years who have a history of low birth weight are 7.667 times more likely to experience *stunting* than with children aged 4-5 years who do not experience low birth weight.

Table 7. Chi-Square Tests for Infectious Diseases

	Value	df	Asymptotic Significance (2- sided)	Exact Sig. (2-sided)	Exact Sig.- sided)
Pearson Chi-Square	23,014 ^a	1	1,000		
Continuity Correction ^b	20,907	1	,000		
Ratio	32,592	1,000	Likelihood		
Fisher's Exact Test				,000	,000
Linear-by-Linear Association	22,795	1	,000		
N of Valid Cases	105				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.67.

b. Computed only for a 2x2 table

2. Infectious Diseases

Statistical test *chi-square* indicate that there is a relationship between infectious diseases and *stunting* with a *p value* of $p = 23,014$ which means that there is a relationship between infectious diseases in *stunted* and *non-stunted children*. Then the RE (*Risk Estimate*) value was obtained of 0.521 (95% CI: 0.418 – 0.649), the RE (*Risk Estimate*) value means that children aged 4-5 years who have a history of infectious diseases are 0.521 times greater at risk of *stunting* compared to children 4-5 years old who do not have an infectious disease.

Table 8. Risk Estimate of Infectious Diseases

	Value	95% Confidence Interval	
		Lower	Upper
For cohort Stunting_New = Normal	,521	,418	,649
N of Valid Cases	105		

DISCUSSION

Results of the analysis showed an association between low birth weight and stunting in children aged 4-5, with children with a history of low birth weight having a 7,667-fold higher risk of stunting compared to children with normal birth weight. This condition can occur because babies born with low birth weight Babies who have experienced intrauterine growth retardation in utero and will continue into the next postpartum age grow and develop more slowly than normally born babies and often cannot keep up with the growth rate. reached after birth (Proverawati & Ismawati, 2010). Growth inhibition that occurs is related to brain maturity, namely before 20 weeks of gestation, brain growth inhibition occurs, such as somatic growth (Moog et al., 2017).

Research has found that small low birth weight babies during pregnancy, after 2 months of age, experience growth faltering (Trihono et al., 2015). Failure to thrive at an early age (2 months) indicates a risk for failure to thrive in the next period. At the age of 12 months, infants with low birth weight during pregnancy did not reach the body length achieved by normal children, although normal children did not grow optimally, in other words, catch up growth was inadequate. Catch-up growth in children born with low birth weight lasts until the age of two (Negrato & Gomes, 2013). Failure to thrive and inadequate pursuit of growth is a pathological condition that causes stunting in toddlers (Kyle, Shekerdeman, & Coss-Bu, 2015).

In addition to low birth weight, a history of childhood infectious diseases is one of the causes of stunting. The results of the analysis show that there is a relationship between infectious diseases and the incidence of stunting in children aged 4-5 years, which is 0.521 times more risky for stunting in children with a history of infectious diseases than children born without infectious diseases. Similar results were obtained from the research by Picauly & Toy (2013) which showed that children who had a history

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of infectious diseases would be followed by an increase in the incidence of stunting by 2,332 times (Picauly & Toy, 2013).

Children in the stunting group had more history of infectious diseases than children in the normal group. The frequency of children experiencing infectious diseases for a long time not only affects their weight but also has an impact on linear growth. Infections also contribute to deficiencies in energy, protein, and other nutrients due to decreased appetite so that food intake is reduced (Dwi & Wirjatmadi, 2012).

The effect of infection on children's linear growth is obtained through a mechanism by first affecting the child's nutritional status which then affects the child's linear growth (Ahsan, Arifeen, Al-Mamun, Khan, & Chakraborty, 2017). Infection can reduce food intake, interfere with nutrient absorption, cause direct loss of nutrients, increase metabolic needs or decrease catabolic processes of nutrients so that it will affect consumption patterns which in turn will affect the nutritional status of toddlers. If this condition lasts for a long time it will affect the child's linear growth (Martorell & Zongrone, 2012).

CONCLUSION

The results showed that low birth weight Infectious diseases are factors that cause stunting in children aged 4 to 5 years. Statistical analysis showed an association between low birth weight and stunting in children aged 4-5 years, with children with a history of low birth weight having a 7,667 times higher risk of stunting than normal weight children. Along with low birth weight, children with a history of infectious diseases were One of the reasons for stunted growth. The results of statistical analysis showed that there was a correlation between infectious diseases and the incidence of stunting in children aged 4-5 years. Children with a history of infectious diseases were 0.521 times more likely to develop stunting than children born without infectious diseases. It is recommended that children who have low birth weight problems and infectious diseases are given special attention by the posyandu and it is necessary to carry out regular development related reviews so that developmental disorders that may occur can be immediately recognized and treated.

REFERENCE

- Ahsan, Karar Zunaid, Arifeen, Shams El, Al-Mamun, Md, Khan, Shusmita H., & Chakraborty, Nitai. (2017). Effects of individual, household and community characteristics on child nutritional status in the slums of urban Bangladesh. *Archives of Public Health*, 75(1), 1–13. [Google Scholar](#)
- Dewey, Kathryn G., & Mayers, Daniel R. (2011). Early child growth: how do nutrition and infection interact? *Maternal & Child Nutrition*, 7, 129–142. [Google Scholar](#)
- Kyle, Ursula G., Shekerdemian, Lara S., & Coss-Bu, Jorge A. (2015). Growth failure and nutrition considerations in chronic childhood wasting diseases. *Nutrition in Clinical Practice*, 30(2), 227–238. [Google Scholar](#)
- Martorell, Reynaldo, & Zongrone, Amanda. (2012). Intergenerational influences on child growth and undernutrition. *Paediatric and Perinatal Epidemiology*, 26, 302–314. [Google Scholar](#)
- Millward, D. Joe. (2017). Nutrition, infection and stunting: the roles of deficiencies of individual nutrients and foods, and of inflammation, as determinants of reduced linear growth of children. *Nutrition Research Reviews*, 30(1), 50–72. [Google Scholar](#)
- Moog, Nora K., Entringer, Sonja, Heim, Christine, Wadhwa, Pathik D., Kathmann, Norbert, & Buss, Claudia. (2017). Influence of maternal thyroid hormones during gestation on fetal brain development. *Neuroscience*, 342, 68–100. [Elsevier](#)
- Negrato, Carlos Antonio, & Gomes, Marilia Brito. (2013). Low birth weight: causes and consequences. *Diabetology & Metabolic Syndrome*, 5(1), 1–8. [Google Scholar](#)
- Picauly, Intje, & Toy, Sarci Magdalena. (2013). Analisis determinan dan pengaruh stunting terhadap prestasi belajar anak sekolah di Kupang dan Sumba Timur, NTT. *Jurnal Gizi Dan Pangan*, 8(1), 55–62. [Google Scholar](#)
- Proverawati, Atikah, & Ismawati, Cahyo. (2010). BBLR (berat badan lahir rendah). *Yogyakarta: Nuha Medika*, 61. [Google Scholar](#)
- Saadah, Nurlailis. (2020). *Modul Deteksi Dini Pencegahan Dan Penanganan Stunting*. Scopindo Media Pustaka. [Google Scholar](#)
- Surono, Ingrid S., Widiyanti, Dian, Kusumo, Pratiwi D., & Venema, Koen. (2021). Gut microbiota profile of Indonesian stunted children and children with normal nutritional status. *PLoS One*, 16(1), e0245399. [Google Scholar](#)

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Trihono, Trihono, Atmarita, Atmarita, Tjandrarini, Dwi Hapsari, Irawati, Anies, Nurlinawati, Iin, Utami, Nur Handayani, & Tejayanti, Teti. (2015). *Pendek (stunting) di Indonesia, masalah dan solusinya*. Lembaga Penerbit Badan Litbangkes. [Google Scholar](#)

Welasasih, Bayu Dwi, & Wirjatmadi, R. Bambang. (2012). Beberapa faktor yang berhubungan dengan status gizi balita stunting. *The Indonesian Journal of Public Health*, 8(3), 99–104. [Google Scholar](#)

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