PROFESIONAL HEALTH JOURNAL
Volume 7, No. 2, June (Page. 574-581)
Available Online at https://www.ojsstikesbanyuwangi.com/index.php/PHJ/index
E-ISSN 2715-6249
DOI: https://doi.org/10.54832/phj.v7i2.1124

Relationship Between Short Birth Length And Stunting Incidence In Toddlers

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ARTICLE INFORMATION

Article history
Received (4 June 2025)
Revised (13 June 2025)
Accepted (16 June 2025)

Keywords
Toddler; Short Birth Length; Stunting

ABSTRACT

Introduction*: The length of a baby's birth can describe linear growth during pregnancy. If a baby is born with a short body length, it indicates a disorder during pregnancy which usually indicates a state of malnutrition suffered by the mother. Short birth length is a risk factor for stunting*
Objectives*: The purpose of this study was to determine the relationship between short birth length and the incidence of stunting*
Methods*: The type of research used was correlation analytic with a cross-sectional design. The research location was at the Bengkuring Health Center, Samarinda City, East Kalimantan Province. The number of samples was 30 people with inclusion criteria, toddlers aged 2-5 years who experienced stunting with a history of mothers giving birth at term. The sampling technique used was Purposive Sampling. Data collection used KIA books, Microtoise to measure toddler height, scales to measure toddler weight, KMS sheets to see the baby's birth length, and nutritional reports at the Health Center. Data analysis techniques used univariate and bivariate analysis using the chi-square test*
Results*: Most of the children's birth weight is normal (2500-4000 gr) totaling 23 people (76.7%), then the birth length of the children is mostly short (<48 cm) totaling 20 people (66.7%). All toddlers in this study were classified as stunted, namely 30 people (100%). Bivariate analysis using the chi-square test with a ρ-value = 0.000*
Conclusions: *There is a relationship between short birth length and the incidence of stunting*

Introduction

The birth length of a baby can describe linear growth while in the womb. If a baby is born with a short body length, this indicates that there was a disorder while in the womb which usually indicates a state of malnutrition (chronic malnutrition) suffered by the mother.(Holil M. Par'i et al., 2017). Short birth length is the proportion of children aged 0-59 months who have a history of short birth length (<48 cm) based on documents or based on documents/respondent memories.(Ministry of Health, 2023).

Research conducted by Rarastiti, CN in 2022 found that the maternal nutritional status factors that affect the baby's birth length are upper arm circumference <23.5 cm and maternal weight gain during pregnancy <9 kg (Rarastiti et al., 2022). Pregnant women with upper arm circumference <23.5 cm tend to experience Chronic Energy Deficiency (CED), which means that the mother has been malnourished for a long period of time, if this happens then the nutritional needs for the growth and development of the fetus are hampered. This CED causes pregnant women to not have adequate nutrient reserves to provide the physiological needs of pregnancy, namely hormonal changes and increased blood volume for fetal growth, so that the supply of nutrients to the fetus is reduced which causes the baby to be born with a short length. Children who are born with a short birth length are generally less able to absorb new environmental pressures, which can result in stunted. Stunting can interfere with a child's growth and development. Stunting also causes children to be unable to

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develop their intellectual abilities to the maximum, children have a less immune system, and high risk of developing cardiovascular disease as adults, such as coronary heart disease and stroke. Therefore, all factors that can relate with stunting must be prevented (Rarastiti et al., 2022).

The results of the 2018 Riskesdas, in Indonesia the percentage of short birth length babies was 22.7%.(Health Research and Development Agency (Badan Litbangkes), 2018), While the results of the Indonesian Health Survey in 2023 were 19.8%, there was a decrease in the percentage of short birth length in Indonesia from 2018 to 2023. In 2018 in East Kalimantan province, the percentage of short birth length was around 19.4%, and in 2023 it was 22.7%, so there was an increase in the percentage of short birth length in East Kalimantan province.(Ministry of Health, 2023).

Short birth length is one of the risk factors for stunting (Antun, 2016). Stunting is a condition of a short and very short body that exceeds a deficit of -2 SD below the median length or height of a child. Research in 2016 by Antun, R (2016) with the results of short birth length has a risk of 1.56 times becoming stunted, so if not handled properly, babies with short birth length will become stunted and have an impact on cross-generational stunting (Antun, 2016). Stunting occurs when the fetus is still in the womb and only appears when the child is two years old or is known as the golden period.(Tobing et al., 2021).

In 2020, the prevalence of stunting in the world was 149.2 million or 22% in toddlers under 5 years of age.(United Nations Children's Fund (UNICEF), 2020). Stunting is said to be a health problem in society if the prevalence of toddlers experiencing stunting is above 20%.(Ministry of Health of the Republic of Indonesia, 2016). The prevalence of stunting according to the results of the 2023 Indonesian Health Survey (SKI) decreased from 21.6% (SSGI 2022) to 21.5% (Ministry of Health, 2023). This figure is still relatively high, when compared to the target of reducing stunting to 14% in 2024. For the East Kalimantan Province, the prevalence of stunting in 2023 was 22.9%, while Samarinda City was the area with the second highest prevalence of stunting in toddlers in East Kalimantan in 2022, reaching 27.1%.(Kemenkes RI, 2022). Bengkuring Health Center is one of the Health Centers in Samarinda City with 100 stunted toddlers in 2022. The objective of this research was to determine the relationship between short birth length and stunting incidence.

Methods

The type of research used in this study is the correlation analytic method with a cross-sectional design. The research location was at the Bengkuring Health Center, Samarinda City, East Kalimantan Province. The research time was from July to August 2024. The population in this study was all toddlers who experienced stunting in July - August 2024, which was 57 people. The sample determination used purposive sampling with inclusion criteria, toddlers aged 2-5 years who experienced stunting with a history of mothers giving birth at term. The sample size is 30 people.

Secondary data includes birth length obtained through maternal and child health books. Assessment of stunting in toddlers is carried out using a stunting assessment form containing toddler anthropometric measurements and assessment of toddler nutritional status based on height per age. Height measurement uses a microtoise. Data collection is carried out during integrated health posts with the help of cadres and health workers at the health center. All data is written in a form for each patient and then entered into the master table. Data analysis techniques using univariate and bivariate analysis using the chi-square test.

Results

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1. Characteristics of Mother and Child

Characteristics of mothers and children include maternal age, education, occupation, parity, birth weight and length of toddlers. Respondent characteristics can be seen in the following table.

Table 1. Frequency Distribution of Characteristics of Mothers and Toddlers in Bengkuring Health Center

Variables	Category	Frequency	
		N	%
Mother's Age	<20 years	0	0%
	20-35 years	27	90%
	>35 years	3	10%
Mother's Education	Basic education	11	36.7%
	Secondary education	15	50%
	Higher education	4	13.3%
Mother's job	Housewife	24	80%
	Farmer	1	3.3%
	Self-employed	4	13.3%
	Civil servant	1	3.3%
Parity	Primipara	7	23.3%
	Multipara	23	76.7%
Toddler birth weight	<2500 gr	7	23.3%
	2500-4000 gr	23	76.7%
Toddler's birth length	Short (<48 cm)	20	66.7%
	Normal (48-52 cm)	10	33.3%

Source: Primary Data, 2024

Based on table 1, it shows that most mothers are between 20-35 years old, totaling 27 people (90%), most mothers have a secondary education background, totaling 15 people (50%), most mothers work as housewives, totaling 24 people (80%), most mothers are multiparas, totaling 23 people (76.7%). Most of the children's birth weight is normal (2500-4000 gr) totaling 23 people (76.7%), then the birth length of the children is mostly short (<48 cm) totaling 20 people (66.7%). All toddlers in this study were classified as stunted, namely 30 people (100%).

2. Relationship between Short Birth Length and Stunting Incidence in Toddlers

The relationship between birth length and stunting incidence was analyzed using the chi-square test. The results of the analysis can be seen in the following table.

Table 2. Relationship between Short Birth Length and the Incidence of Stunting in Toddlers in Bengkuring Health Center

Variables	Stunting Incident		P-Value
	N	%	
Toddler Birth Length			
Short (< 48 cm)	20	66.7 %	0.000
Normal (48-52 cm)	10	33.7 %	
Amount	301	100%	

[a]Chisquare Test

Based on table 2 above, it shows that the relationship between short birth length and the incidence of stunting has a p-value of 0.000 (<α = 0.05), which means that there is a significant relationship between short birth length and the incidence of stunting.

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Discussion

1. Short Birth Length

In this study, most toddlers were born with short body length. The results of this study are in line with research conducted by Antun, R. (2016) that most toddlers aged 12-59 were born with short birth lengths. Babies with low birth length are 1.56 times more at risk of stunting compared to babies born normally. Low linear size usually indicates a state of malnutrition due to a lack of energy and protein suffered in the past. The birth length of the baby will have an impact on subsequent growth (Antun, 2016).

The length of the baby at birth describes the baby's linear growth during pregnancy. A low linear size usually indicates malnutrition due to a lack of energy and protein in the past, which begins with slow growth or developmental delays in the fetus. Short birth length (less than 50 cm) has a strong relationship with the incidence of stunting in children. Children with short birth length are at higher risk of stunting compared to children with normal or longer birth lengths. Research shows that children with short birth lengths have a 1,645 times higher risk of stunting, and around 60% of toddlers with short birth lengths experience stunting (Dasantos & Dimiati, 2020).

Birth length describes the linear growth of the baby while in the womb. Children born with short birth lengths must receive more attention in fulfilling nutrition and parenting patterns so that their growth and development can proceed normally. Abnormal birth lengths have the opportunity to grow abnormally because most of the nutrients needed are inadequate and inadequate nutritional intake, especially total energy, is directly related to physical growth deficits in children. Low energy consumption in children with abnormal birth lengths will cause stunting. Birth length is greatly influenced by the fulfillment of the mother's nutrition during pregnancy, therefore nutritional needs during pregnancy must be met properly so that the growth and development of the fetus can be optimal and give birth to a baby with a normal birth length.

2. Stunting Incidence in Toddlers

In this study, all toddlers were classified as stunted, namely 30 people (100%). Most mothers were of reproductive age, namely 20-35 years old. This study is in line with research conducted by Trisyani, et al. in 2020 with the results that most of the ages when pregnant mothers were of reproductive age and their toddlers were stunted, the maternal age factor did not have a significant relationship with stunting in toddlers. Trisyani, et al. assumed that stunting was not related to the age of pregnant mothers, which could occur because maternal age was an indirect factor that influenced the occurrence of stunting and there were also other factors that had a greater influence on stunting. Factors that can influence stunting are food intake (energy and protein), history of infectious diseases, history of birth weight, economic status, and exclusive breastfeeding (Trisyani et al., 2020).

The reproductive age of the mother between 20-35 years is the best age to get pregnant. However, nutritional intake during pregnancy is an important thing that must be considered. Because even though the mother's body condition is healthy but the nutritional intake during pregnancy is less than optimal, the growth and development of the fetus in the womb will be disrupted so that it can cause problems when the baby is born. Thus, what needs to be considered is not only the reproductive age but also the mother's nutritional intake during pregnancy.

In this study, most mothers had a secondary education level. The results of this study are in line with research conducted by Mutingah, et al. (2021) that respondents who had stunted toddlers were mothers who had a secondary education background (Mutingah et al., 2021). Education level, especially the mother's education level affects the level of health. This is related to the mother's role which is the most important in forming children's eating habits because the mother is the one who

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prepares food starting from arranging the menu, shopping, cooking, preparing food, and distributing food. On the other hand, mothers with higher education usually work outside the home so that children are entrusted to grandmothers or other relatives. This causes the mother to be unable to carry out her role optimally. Maternal education is basic for achieving good toddler nutrition. The mother's education level is related to the mother's ease in receiving information about nutrition and health from outside. Mothers with higher education levels will find it easier to receive information from outside, compared to mothers who have lower education levels.(Trisyani et al., 2020).

Mother's education can affect the mother's knowledge about healthy pregnancy management. Mothers with higher education tend to try to get the best knowledge for their condition, including pregnancy. Mothers will better understand good nutritional intake during pregnancy to optimize the growth and development of the fetus in her womb. This will also continue until after birth related to understanding how to care for babies so that babies who are born can grow up healthy and intelligent.

In this study, most mothers work as housewives (IRT). The results of this study are in line with research conducted by Fauzi, et al. (2020), that most mothers who have stunted toddlers are housewives.(Fauzi et al., 2020). Parents who do not have jobs will affect the economic situation of the family. The purchasing power of the community for healthy and nutritious food will affect the nutritional status of the child. So the work factor can affect the incidence of stunting in children or toddlers. Economic status is inseparable from the amount of per capita family income. The low economic status of the family will affect the quality and quantity of food consumed by the family. The food obtained will usually be less varied and small in quantity, especially for food that functions for child growth such as sources of protein, vitamins, and minerals, thus increasing the risk of malnutrition(Sulistyawati, 2020).

Housewives have more time at home. Thus, housewives can have more time to prepare food to meet their nutritional needs during pregnancy. Housewives also do not have pressure related to work that must be completed so that it can reduce the incidence of stress during pregnancy. However, this also depends on the household activities carried out. Housewives who have a lot of housework and without any help from any party can also experience pressure and stress, so that they are unable to pay attention to their pregnancy and stress. This greatly affects the growth and development of the fetus they are carrying

In this study, most respondents were multiparas. The number of births and the number of children can be one of the causal or risk factors that can cause stunting. The number of family members can affect the allocation of family income in meeting nutritional needs, including food sources that must be shared by each child so that there are differences in the food obtained. Having many children will also cause the affection given to be divided, the attention received by each child to be reduced, and it will be worse if the family's economic status is low. The results of this study are also supported by research conducted by Rina Nuraeni (2016) showing that toddlers from mothers with multiparity parity have a 3.5 times greater risk of experiencing abnormal or poor nutritional status compared to toddlers from primiparous mothers.(Soleha & Zelharsandy, 2023).

Mothers who have given birth more than once have experience in going through pregnancy and childcare. In going through her pregnancy, she will know more about what is good for her pregnancy including about fulfilling nutrition. She will be able to learn from her previous pregnancy experience. The same goes for childcare. Of course she will pay attention to her child's growth and development the same or even better than her previous child's experience.

In this study, most toddlers were born with normal weight. The results of this study are in line with research conducted by Dasantos (2020) that most stunted toddlers were born with normal weight (Dasantos & Dimiati, 2020). Birth weight has no relationship with stunting because the effect of birth weight occurs in the first 6 months of life, and then decreases until the age of 24 months. Thus, if babies can catch up on their growth in the first 6 months of life, there is a great possibility of achieving normal weight and height. Toddlers who have normal birth weight, but are stunted

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(97.5%) have a deficit in energy consumption and have a history of chronic infectious diseases. If energy consumption is insufficient to maintain metabolism, then the fulfillment of energy sufficiency is obtained from fat reserves and muscle glycogen. If this condition persists for a long time, catabolism will occur to meet energy needs so that the impact of insufficient energy consumption is the occurrence of growth disorders in children so that children experience stunting (Bening, Salsa., Margawati, 2016).

Birth weight greatly affects subsequent growth and development. Low birth weight babies must receive good nutritional intake so that their growth and development can also run optimally. If the nutrition obtained is inadequate, growth and development problems can occur such as stunting, chronic lack of energy, malnutrition, and inhibited motor development in children.

3. **The relationship between short birth length and stunting incidence in toddlers**

Based on Table 2, the relationship between short birth length and the incidence of stunting has a p-value of 0.000 (<α = 0.05), which means that there is a significant relationship between short birth length and the incidence of stunting. The results of this study are in line with the results of research conducted by Antun, R. (2016) with the resultsthere is a relationship between birth length and the incidence of stunting in children aged 12-59 months in Lampung Province. This is possible due to the inability to increase the length of the baby's body or the inability to pursue height growth so that the older the baby, the more cases of stunting increase. The length of the baby's body at birth describes the linear growth of the baby while in the womb. Low linear measurements usually indicate a state of malnutrition due to a lack of energy and protein suffered in the past which began with a slowdown or retardation of fetal growth. Inadequate maternal nutritional intake before pregnancy causes growth disorders in the fetus it can cause babies to be born with a short birth length (<48 cm).

Determining good intake is very important to meet the growth period of children, especially those aged 2-3 years, and will reduce the prevalence of stunted growth in children. (Antun, 2016). Short birth length is one of the risk factors for stunting.(Trihono et al., 2015). According to research conducted by Hidayanti, N (2019), babies with short birth lengths are 1.56 times more at risk of stunting compared to babies born with normal birth lengths. (Hidayati, 2019). Body length is a common indicator in measuring body and bone length. Body length is an important body measurement in newborns. In addition, body length can be an indicator of the health and nutritional status of infants. Body length will grow along with age in normal infants (Mayestika & Hasmira, 2021).

Stunting is a nutritional status based on the body length index for age (PB/A) or height for age (TB/A) which is the equivalent of the terms stunted (short) and severely stunted (very short). Stunting which is formed by growth faltering and inadequate catch-up growth is a pathological condition. Stunting reflects the inability to achieve optimal growth caused by suboptimal health status and/or nutritional status. Stunting conditions only appear after the baby is 2 years old.(Antun, 2016).

Stunting at the age of 12-59 months which increases is not only caused by inadequate catch-up growth in short-born babies but also due to inadequate nutrient intake in normal-born babies which causes growth faltering. Low nutrient intake and exposure to infection have a more severe impact on growth faltering in normal toddlers.(Hidayati, 2019).

Exposure to infectious diseases can cause stunting, because when in the womb the child has experienced growth retardation or stunted growth while still in the womb (Intra Uterine Growth Retardation/IUGR). IUGR is caused by poverty, disease, and nutritional deficiencies. This means that mothers with poor nutrition from the first trimester to the end of pregnancy will give birth to LBW, which in the future the child will be at high risk of becoming stunted (Antun, 2016).

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Children who experience stunting earlier, namely before the age of six months, will experience more severe stunting approaching the age of two years. Severe stunting in children results in a decrease in physical and mental development abilities so that they are unable to learn optimally at school, compared to children with normal height. Children with stunting are also at risk of having an IQ 5-10 points lower than normal children. In addition, stunting in toddlers also risks increasing child mortality rates, reducing cognitive abilities, low child motor development, lack of academic achievement results, and unbalanced body functions.(Hidayati, 2019). This is also supported by research conducted by Daracantika, et al. (2021) with the results that children who experience stunting in the first 2 years of life are likely to have a non-verbal IQ below 89 and an IQ of 4.57 times lower than the IQ of children who are not stunted.(Daracantika et al., 2021). Stunting has biological implications on brain and neurological development which translates into decreased cognitive values which impact on lack of learning achievement.

Stunting can also have the risk of developing diabetes, obesity, heart disease, clogged blood vessels, stroke, cancer and even disability in old age. In the world of work, stunted children can reduce the quality of work that is not competitive which results in low economic productivity.(Ministry of Health of the Republic of Indonesia, 2016).

According to WHO, one of the efforts to prevent stunting can be started since adolescence. This is done for adolescent girls to be given knowledge, and understanding about the importance of fulfilling nutrition that starts during adolescence. The hope of fulfilling nutrition that starts during adolescence can prevent malnutrition during pregnancy. Adequate nutrition during pregnancy can prevent stunted growth in the fetus being carried.(Mayestika & Hasmira, 2021).

Realizing the serious impact of stunting, the government and the community have started to make prevention and mitigation efforts, for example through the first 1,000 days of life (HPK) movement with various activities such as nutrition counseling, nutritional supplementation for infants and toddlers, and supplementation for pregnant women (Hidayati, 2019).

Babies born with a short birth length can affect their further growth and development. Babies born with a short birth length indicate a lack of maternal nutritional intake during pregnancy, so that fetal growth in the womb is not optimal. Good nutritional intake is important to support the growth of children born with a short birth length so that they get a normal body length as they get older. Determining good intake is very important to achieve the proper body length. The length of a baby at birth is one of the risk factors for stunting in toddlers.

Conclusion

Most mothers are aged 20-35 years (90%), most mothers have a secondary education background of 50%. Most mothers work as housewives (IRT) of 80%. Most mothers are multiparas of 76.7%. Most toddlers have a history of normal birth weight (2500-4000 gr) of 76.7%. Most toddlers have a history of short birth length (<48 cm) of 66.7%. The results of this study prove that there is a relationship between short birth length and stunting with a p-value of 0.000 ($<\alpha = 0.05$).

For Pregnant Women, they should diligently check their pregnancy, at least 6 times according to government recommendations, especially to find out the mother's weight gain during pregnancy so that the rate of fetal growth can be estimated. The Samarinda City Health Service, can further improve the prevention of mothers who give birth to short babies which is one of the risk factors for stunting and provide counseling for mothers who give birth to short babies so that they can provide good parenting patterns for their babies to prevent stunting when the child is 2 years old.

Ethics approval and consent to participate

This research has received ethical approval from the Health Research Ethics Committee of the East Kalimantan Health Polytechnic with ethic number DP.04.03/F.XLII.89/0033/2024

Acknowledgments

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The researcher would like to thank the East Kalimantan Health Polytechnic for providing funding for this research

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