

ANALYSIS OF FACTORS CONTRIBUTING TO STUNTING INCIDENCE AMONG TODDLERS IN SOUTH SOLOK DISTRICT

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ABSTRAK

Stunting, or short stature in children, is a condition of chronic malnutrition in early childhood that occurs during the period of growth and development in early life. Inadequate nutritional intake during infancy can lead to growth failure and a decrease in intelligence. This condition will further reduce individual productivity, thus impacting the decline in the quality of human resources. The aim of this research is to analyze factors related to the incidence of stunting among toddlers aged 24-59 months in the Work Area of Muara Labuh Community Health Center, South Solok District, in 2022. This is an analytical study with a case-control design. The population consists of mothers with stunted toddlers aged 24-59 months, totaling 64 individuals as cases, and mothers with non-stunted toddlers aged 24-59 months, totaling 64 individuals as controls, with a total of 128 individuals sampled using total sampling technique. Statistical analysis was conducted using the chi-square test. Half (50%) of the toddlers experienced stunting, more than half of the respondents (63.8%) did not provide exclusive breastfeeding, more than half of the respondents (65.6%) had a history of infectious diseases, and less than half (45.3%) had a history of chronic energy deficiency (CED) status. The obtained p-values were 0.001, 0.000, and 0.000, respectively. There is a relationship between exclusive breastfeeding, history of infectious diseases, and maternal nutritional status during pregnancy with stunting incidence. Health workers should provide counseling on the factors causing stunting so that prevention efforts and interventions can be implemented against risk factors.

Keywords: Stunting., Exclusive Breastfeeding., Nutritional Status., History of Infectious Diseases

INTRODUCTION

Stunting is one of the problems closely related to nutrition, where the quality of a child's growth and development does not match their age. The short-term and long-term impacts include hindered height and motor development in children due to suboptimal brain development. They are at risk of experiencing infections and non-communicable diseases in adulthood, as well as reduced productivity, which can affect economic status and contribute to unemployment rates. Stunting can even increase morbidity and mortality. The effects of stunting during childhood have adverse implications for adulthood and are prevalent in developing countries, including Indonesia^{1,2}. Generally, symptoms of stunting become apparent around the age of 24 months, resulting from prolonged nutritional deficiencies that may have originated during fetal development. Therefore, stunting can serve as an indicator of chronic malnutrition in children over an extended period³.

In toddlers, stunting refers to a condition of failed growth, resulting in short stature relative to their age. This occurs due to chronic malnutrition starting from the prenatal stage, leading to disruptions in physical growth. This condition can be assessed through z-scores of length or height for age (length/height-for-age) being less than -2SD (stunted) and less than -3SD (severely stunted)⁴.

In the world, the prevalence of stunting among toddlers reached 21.3%, totaling 144 million, with half of them located in Asia (54%) in 2019⁵. Several studies worldwide have reported stunting rates in various regions: 49.4% in Ethiopia⁶, 38% in Mumbai, India⁷, 37% in Punjab, Pakistan⁸, 46.5% in Papua New Guinea⁹, 48.4% in Malawi¹⁰, and 42% in Rwanda¹¹. The prevalence of stunting in Indonesia is 21.6%, with a targeted reduction to 14% by 2024¹².

According to the SSGI 2022 data, the trend in the prevalence of stunting in Indonesia has shown a decrease over the past three years. In 2019, it was 27.7%, which then dropped to 24.4% in 2021, and further decreased by 2.8% to 21.6% in 2022. However, these figures still fall short of the target set in the Medium-Term Development

Plan for 2020-2024, which aims for a prevalence of 14%. The highest prevalence of stunting in Indonesia is recorded in East Nusa Tenggara Province, with a rate of 35.3%, while the lowest prevalence is in Bali Province, at 8%. West Sumatra is ranked 14th out of 34 provinces in terms of stunting prevalence, with a rate of 25.2%. This rate has increased compared to 2021 (23.3%) and remains higher than the prevalence set by the WHO of $\geq 20\%$ ¹³.

The high prevalence of stunting in 2022 in West Sumatra is distributed across 6 districts/municipalities with rates above the average, while 13 other districts/municipalities have rates below the average. Among these are Pasaman Barat District with 35.5%, Kepulauan Mentawai District with 32%, Solok Selatan District with 31.7%, Sijunjung District with 30%, Pesisir Selatan District with 29.8%, and Pasaman District with 28.9%¹⁴.

South Solok District is one of the districts with a stunting prevalence above the average, ranking third with 31.7%. In South Solok District itself, there are 10 Community Health Centers (Puskesmas). In 2020, the highest prevalence of stunting was found in 4 sub-districts: Sangir Batang Hari Sub-district, with a rate of 61% in the work area of Lubuk Ulang Aling Community Health Center; Sungai Pagu Sub-district, with a rate of 29.9% in the work area of Muara Labuh Community Health Center; Pauh Duo Sub-district, with a rate of 27.1% in the work area of Pakan Selasa Community Health Center; and KPGD Sub-district, with a rate of 21.0% in the work area of Sungai Kalu Community Health Center¹⁵.

In 2021, South Solok District ranked 8th out of 9 districts with the highest prevalence of stunting in West Sumatra Province, with a prevalence of 24.5%. There were 7 sub-districts in South Solok District with the highest prevalence of stunting, one of which was in Sungai Pagu Sub-district with a rate of 26.52% in the work area of Muara Labuh Community Health Center¹⁶.

Some factors contributing to stunting include Clean and Healthy Lifestyle (PHBS) behaviors, exclusive breastfeeding, and early introduction of complementary feeding¹⁷. Parenting patterns in feeding infants and toddlers, parenting styles, and nutritional status, as well as maternal behaviors, also play a role¹⁸. Based on the theoretical framework of the United Nations Children's Fund (UNICEF) (1990) as cited by Bappenas, stunting is caused by various factors categorized into direct causes (such as inadequate nutritional intake and infections) and indirect causes (including family food availability and consumption patterns, parenting styles, and environmental health and healthcare services). Stunting can also be influenced by a history of low birth weight (BBLR) and genetic factors¹⁹.

In 2021, the achievement of pregnant mothers with chronic energy deficiency (KEK) receiving supplementary food at Muara Labuh Community Health Center reached 100%. The exclusive breastfeeding rate

was 67.6%, and the diarrhea cases amounted to 51%. The aim of this research is to analyze factors related to the incidence of stunting in toddlers aged 24-59 months in the Work Area of Muara Labuh Community Health Center, South Solok District, in 2022.

MATERIALS AND METHODS

The study is an analytical case-control design conducted in the working area of Muara Labuh Community Health Center, South Solok District, covering 11 sub-districts: Pasir Talang, Pasir Talang Timur, Pasir Talang Barat, Pasir Talang Selatan, Sako Pasir Talang, Sako Utara Pasir Talang, Pasar Muara Labuh, Koto Baru, Sako Selatan, Pulakek, and Bomas, from July 2022 to February 2023. The population in this study comprises all mothers with toddlers aged 24-59 months in 2022, totaling 1,419 toddlers. The sample includes all cases and controls selected at a 1:1 ratio. Cases are children aged 24-59 months with a z-score of TB/U < -2 SD (stunting), while controls are children aged 24-59 months with a z-score of TB/U ≥ -2 SD (not stunted). The sample size ratio for cases and controls is 64:64. The inclusion criteria for the study are mothers with toddlers aged 24-59 months, both in the case and control groups, with similar or nearly similar characteristics in both groups (same gender and a maximum age difference of 3 months), residing in the research area, and willing to participate in the study. The sampling technique is total sampling. The instrument used in this study is a questionnaire containing questions about exclusive breastfeeding, history of diarrhea infection, and history of chronic energy deficiency (KEK) during pregnancy.

Univariate and bivariate data analysis will be conducted using the Chi-Square test with a confidence level of 95%.

RESULTS

Table 1. Distribution of Respondent Characteristics

No.	Characteristics	Case		Control	
		n	%	n	%
Gender					
1.	Male	23	35.9	23	35.9
2.	Female	41	64.1	41	64.1
Education					
1.	Low	19	29.7	10	15.6
2.	High	45	70.3	54	84.4
Occupation					
1.	Not working	53	82.8	42	65.6
2.	Working	11	17.2	22	34.4
Total		64	100	64	100

Based on Table 1, the results show that respondents who are male account for 35.9%, while those with low parental education level are 29.7% in the case group and 15.6% in the control group. Those who are not working comprise 82.8% in the case group and 65.6% in the control group.

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Table 2. Frequency Distribution of Stunting Incidence among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

No.	Stunting Incidence	Total	Percentage (%)
1.	Stunting	64	50%
2.	Not Stunting	64	50%
	Total	128	100

Based on Table 2, it is found that 50% of toddlers experience stunting in the case group.

Table 3. Frequency Distribution of Exclusive Breastfeeding among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

No.	Exclusive Breastfeeding	Case		Control	
		n	%	n	%
1.	Not Breastfeeding	44	63.8	25	39.1
2.	Breastfeeding	20	31.2	39	60.9
	Total	64	100	64	100

Based on Table 3, the results show that more than half (63.8%) of the respondents in the case group did not provide exclusive breastfeeding, while less than half (39.1%) of the respondents in the control group did not provide exclusive breastfeeding.

Table 4. Frequency Distribution of History of Diarrhea Infections among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

No.	History of Infection Disease	Case		Control	
		n	%	n	%
1.	Yes	42	65.6	7	10.9
2.	No	22	34.4	57	89.1
	Total	64	100	64	100

Based on Table 4, the results show that more than half (65.6%) of the respondents in the case group have a history of infection disease, while a small portion (10.9%) of respondents in the control group do not have a history of infection disease.

Table 5. Frequency Distribution of Maternal Nutrition History during Pregnancy among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

No.	Nutritional Status	Case		Control	
		n	%	n	%
1.	Chronic Energy Deficiency (KEK)	29	45.3	3	4.7
2.	Not KEK	35	54.7	61	95.3
	Total	64	100	64	100

Based on Table 5, the results show that less than half (45.3%) of the respondents in the case group had chronic energy deficiency (KEK) during pregnancy, while a small portion (4.7%) of respondents in the control group had KEK during pregnancy.

Table 6. Relationship between Exclusive Breastfeeding and Stunting Incidence among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

Exclusive Breastfeeding	Stunting				Total		P. Value	OR
	Stunting (Case)		Not Stunting (Control)		n	%		
	f	%	f	%				
Not Breastfeeding	44	68.8	25	9.1	69	53.9	0.001	3.432
Breastfeeding	20	31.2	39	10.9	59	47.5		
Total	64	100	64	100	128	100		

Based on Table 6, it is found that respondents who did not receive exclusive breastfeeding in the case group amounted to 44 individuals (68.8%), while in the control group, there were 25 individuals (39.1%). The statistical Chi-Square test resulted in a p-value of 0.001. Therefore, it can be concluded that there is a relationship between exclusive breastfeeding and stunting incidence among toddlers aged 24-59 months. With an odds ratio (OR) of 3.4, it means that toddlers who do not receive exclusive breastfeeding are 3.4 times more likely to experience stunting compared to those who receive exclusive breastfeeding.

Table 7. Relationship between History of Infection Disease and Stunting Incidence among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

History of Infection Disease	Stunting				Total		P. Value	OR
	Stunting (Kasus)		Not Stunting (Kontrol)		n	%		
	f	%	f	%				
No	22	34.4	57	89.1	79	61.7	0.000	0.064
Yes	42	65.6	7	10.9	49	38.3		
Total	64	100	64	100	128	100		

Based on Table 7, it is found that respondents who have a history of infection disease in the case group amounted to 42 individuals (65.6%), while in the control group, there were 7 individuals (10.9%). The statistical Chi-Square test resulted in a p-value of 0.000. Therefore, it can be concluded that there is a relationship between history of infection disease and stunting incidence among toddlers aged 24-59 months. With an odds ratio (OR) of 0.06, it means that toddlers with a history of infection disease are

0.06 times less likely to experience stunting compared to toddlers without a history of infection disease.

Table 8. Relationship between Maternal Nutrition History during Pregnancy and Stunting Incidence among Toddlers Aged 24-59 Months in the Work Area of Muara Labuh Community Health Center, South Solok District.

Nutritional Status	Stunting				Total		P.Value	OR
	Stunting (Case)		Not Stunting (Control)		n	%		
	f	%	f	%				
Not KEK	35	54.7	61	95.3	96	75	0.000	0.059
KEK	29	45.3	3	4.7	31	25		
Total	64	100	64	100	40	100		

Based on Table 8, it is found that mothers with a history of chronic energy deficiency (KEK) during pregnancy gave birth to 29 toddlers with stunting (45.3%) and 3 toddlers without stunting (4.7%). The statistical Chi-Square test resulted in a p-value of 0.000. Therefore, it can be concluded that there is a relationship between maternal nutrition history of KEK during pregnancy and stunting incidence among toddlers aged 24-59 months. With an odds ratio (OR) of 0.05, it means that mothers with a history of KEK during pregnancy are 0.05 times more likely to give birth to toddlers with stunting compared to mothers without a history of KEK during pregnancy.

DISCUSSION

The research results obtained data from 128 respondents, with 25 (39.1%) respondents not receiving exclusive breastfeeding and 39 (60.9%) respondents who received exclusive breastfeeding not experiencing stunting (control group). In the case group, 44 (68.8%) respondents did not receive exclusive breastfeeding, while 20 (31.2%) respondents who received exclusive breastfeeding experienced stunting. The statistical test resulted in a p-value of 0.001, indicating a significant relationship between exclusive breastfeeding and stunting incidence.

ASI is the best food for babies, and exclusive breastfeeding is the provision of breast milk to infants from birth to 6 months of age without any other food or drink. This is consistent with Sasi's research (2023), which found a relationship between a history of exclusive breastfeeding and stunted growth in children¹⁸. Similarly, Louis's study (2022) also found a significant relationship between exclusive breastfeeding and stunting incidence. The odds ratio analysis concludes that infants not provided with exclusive breastfeeding are 61 times more likely to experience stunting²⁰.

The low rate of exclusive breastfeeding is one of the triggers for stunting in toddlers, which is caused by past events and will impact the future of the child. It poses a threat to the growth and development of children and affects the overall quality of human resources. In 2021, the

coverage of exclusive breastfeeding in the work area of Muara Labuh Community Health Center was 67.6%.

From the research results involving 128 respondents, 57 (89.1%) respondents had no history of diarrhea disease, and 7 (10.9%) respondents with a history of diarrhea disease did not experience stunting (control group). On the other hand, 22 (34.4%) respondents had no history of infection disease, while 42 (65.6%) respondents with a history of infection disease experienced stunting.

There is a reciprocal interaction between nutritional status and the history of infection disease in toddlers. When a toddler suffers from a disease, it affects the intake received by the toddler, which, in turn, influences the nutritional status of the toddler.

If a toddler experiences diarrhea for more than two weeks, it can lead to nutrient malabsorption and may result in stunting. Infectious diseases accompanied by diarrhea and vomiting can cause fluid loss and loss of several nutrients²¹. Children suffering from diarrhea will experience malabsorption and nutrient loss, therefore, it should be promptly addressed and balanced with appropriate intake to prevent growth failure²².

Extended diarrhea increases the risk of growth deficit. Significant loss of zinc minerals occurs when toddlers experience diarrhea, so replacement is needed to support the healing process and maintain the child's health in the following months²³.

The findings of this study are consistent with the research conducted by Sitti Hutami Megantari (2020), which found that a history of infectious diseases is related to stunting in the Bontoala District of Makassar City²⁴. Another supporting study is by Amrul Hasan et al., (2023), which found that a history of illness in children is associated with stunting, with an odds ratio of 2.48. This means that children with a history of illness are 2.48 times more likely to experience stunting compared to children who are not sick²².

Diarrhea is closely related to malnutrition. Each episode of diarrhea can cause malnutrition due to anorexia and reduced ability to absorb nutrients from food, so prolonged periods of diarrhea will impact the growth and health of children²⁵. In 2021, the incidence of diarrhea in the work area of Muara Labuh Community Health Center reached 51%.

From the research results involving 128 respondents, 61 individuals (95.3%) with non-chronic energy deficiency (KEK) nutritional status and 3 individuals (4.7%) with chronic energy deficiency (KEK) nutritional status did not experience stunting (control group). Meanwhile, 35 individuals (54.7%) with non-chronic energy deficiency (KEK) nutritional status and 29 individuals (45.3%) with chronic energy deficiency (KEK) nutritional status experienced stunting (case group).

Mothers experiencing malnutrition during pregnancy lead to inadequate food transfer to the fetus, resulting in fetal growth restriction and a risk of giving birth to low birth

weight babies. Children with a history of low birth weight are at high risk of stunting if they cannot catch up in weight after birth due to inadequate nutrition and healthcare^{26,27}.

Poor maternal nutritional status during pregnancy reflects poor household feeding practices²⁸. Mothers who are less skilled in preparing daily food tend to apply feeding practices just to satisfy hunger without considering its nutritional adequacy²⁹. Therefore, children of malnourished mothers are more likely to have low birth weight and experience stunting³⁰. Apart from feeding practices at the household level, family support is also a factor that can improve health status and adaptation in life. The family plays a crucial role in all stages of healthcare services³¹.

This research aligns with a case-control study by Elya Sugianti (2023), where the maternal nutritional status during pregnancy was statistically significant with the occurrence of stunting³⁰. The obtained p-value was 0.016 and OR was 3.4, indicating that mothers experiencing chronic energy deficiency during pregnancy are 3.4 times more likely to give birth to stunted children compared to mothers with good nutritional status during pregnancy. Another case-control study also supports this finding²⁷, showing a significant relationship between maternal nutritional status during pregnancy and stunting (p-value < 0.05) with an OR of 1.9. Meanwhile, in the work area of Muara Labuh Community Health Center in 2021, pregnant mothers with chronic energy deficiency who received supplementary feeding reached 100%.

CONCLUSION AND RECOMMENDATIONS

The research findings indicate a significant relationship between the history of exclusive breastfeeding, history of infectious diarrhea, maternal nutritional status during pregnancy, and the occurrence of stunting, with p-values and OR (p = 0.001, OR = 3.432), (p = 0.000, OR = 0.064), (p = 0.000, OR = 0.059) respectively.

For the Muara Labuh Community Health Center (UPT Puskesmas Muara Labuh), it is recommended to enhance more optimal socialization regarding diarrhea prevention, promotion of exclusive breastfeeding, and ensuring maternal nutrition adequacy during pregnancy.

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