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Analysis of Host and Socio-Economic Factors as Risk Factors for Stunting in Toddlers in the Working Area of the Kesesi II Health Center, Pekalongan Regency, Indonesia

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ABSTRACT

Stunting or failure to thrive causes difficulties for toddlers in achieving optimal physical and cognitive development. Kesesi District is in first place and the Kesesi II Health Center as of February 2023 still has a high stunting rate, namely 165 cases. This study aimed to analyze host factors as risk factors for stunting in toddlers in the working area of the Kesesi II Health Center. This research is an analytical research with a quantitative approach and a case control research design. From the Chi-square test, the results of the maternal pregnancy history were obtained (p-value = 0.000, OR = 6.089, 95% CI = 2.146 - 17.276) history of infectious diseases in toddlers (p-value = 0.000, OR = 8.516, CI 2.953 - 24.561), history of exclusive breastfeeding (p-value = 0.021, OR = 3.478, 95% CI = 1.172 - 10.323), history of LBW (p-value = 0.000, OR = 10.500, 95% CI 3.628 - 30.392), family economic status (p-value = 0.287, OR = 2.188, 95% CI = 0.505 - 9.480). This study shows that the mother's history of pregnancy, history of infectious diseases, history of exclusive breastfeeding, and history of LBW are host factors that are at risk for the incidence of stunting in toddlers in the Kesesi II Health Center working area in 2023.

1. Introduction

Stunting (short) is a measure of chronic malnutrition expressed in body length or height according to age (PB/U or TB/U). Stunting in the first 1000 days of life (HPK) is irreversible and closely related to functional failure, which has an impact on high morbidity and mortality rates in children. The condition of failure to thrive in toddlers is at risk of causing children to experience difficulties in achieving optimal physical and cognitive development. Prolonged nutritional deficiencies can result in permanent brain function disorders. In individuals and society, stunting has long-term effects such as poor health and

reduced productive capacity, reduced cognitive and physical development, and increased risk of degenerative diseases such as diabetes.¹⁻³

Stunting is the forerunner to the emergence of a lost generation, which threatens and becomes a burden on the nation in the future, which then causes losses of up to Rp. 300 trillion per year. Stunting has many impacts, including short-term impacts in the form of high risks of morbidity and mortality, medium-term impacts in the form of low intellectual and cognitive abilities, and long-term risks in the form of the quality of human resources and the problem of degenerative diseases in adulthood. Risk factors for

stunting apart from poor intake include the mother's history of pregnancy, history of infectious diseases, exclusive breastfeeding, history of LBW, and family economic status. The results of research conducted by Ayuningtyas show that there is a significant relationship between energy intake and the incidence of stunting in toddlers, indicated by a value of $p=0.001$ ($p<0.05$). Low energy intake in stunted toddlers may be caused by several factors, including the frequency and amount of feeding, reduced appetite in toddlers, low energy density, and comorbid infectious diseases.^{4,5}

According to the results of the 2022 Indonesian Nutrition Status Survey (SSGI), Indonesia's stunting rate fell from 24.4% in 2021 to 21.6% in 2022, or as many as 4,558,899 children experienced stunting. Based on height for age in Central Java Province, Pekalongan Regency has a stunting prevalence of 23.5% or is in 9th place. As of August 2022, stunting cases recorded at the Pekalongan Regency Health Service were 747 cases or 11.04%. Kesesi District occupies first place with the Kesesi II Health Center, which has not experienced a decrease in cases until February 2023, with a total of 165 stunting cases. From the results of interviews with nutritionists at the Session II Health Center, there are allegations that several factors, one of which is exclusive breastfeeding coverage, can influence the high stunting rate. It is known that the exclusive breastfeeding coverage of the Kesesi II Health Center reaches 55%.⁶ This study aimed to analyze host factors as risk factors for stunting in toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency, Indonesia.

2. Methods

This study is an observational study with a case-control approach and uses primary data from research respondents. A total of 76 research subjects took part in this study, where the research subjects were grouped into case and control groups. The inclusion

criteria for the case group in this study are subject research that has been diagnosed stunting in the working area of the Kesesi II Health Center, Pekalongan Regency, Indonesia, and has received approval for subject research to take part in this study. Meanwhile, group inclusion criteria control is subject research involving toddlers and matching with a group of cases in the working area of the Kesesi II Health Center, Pekalongan Regency, Indonesia.

This study carried out observations of the mother's pregnancy history, history of infections in toddlers, history of exclusive breastfeeding, history of LBW (low birth weight), and history of social family economy related to stunting. Data analysis was carried out using SPSS version 25 software. Data analysis was carried out univariate and bivariate. Univariate analysis was carried out to present the data distribution for each test variable, while bivariate analysis was carried out to explore the relationship between the factor risk of stunting, $p<0.05$.

3. Results and Discussion

The maternal pregnancy history is the condition experienced by the mother during pregnancy. The condition of a mother's pregnancy is closely related to the quality of the fetus born. In this study, from the Chi-square test, a p-value was obtained of 0.000, and this value was $<\alpha 5%$ or 0.05, which means there is a relationship between the maternal pregnancy history and stunting in toddlers in the Kesesi II Health Center working area. From the OR (odds ratio) analysis, the OR was 6.089, and the CI (confidence interval) was 2.146 – 17.247. Because the OR value is > 1 and the CI does not exceed 1, this means that maternal pregnancy history is a risk factor for stunting in toddlers in the Kesesi II Health Center working area because mothers with a poor pregnancy history increase the risk by 6,089 times compared to mothers who have a good pregnancy history.

Table 1. Analysis of maternal pregnancy history as a risk host factor for the incidence of stunting in toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency.

Maternal pregnancy history	Stunting						P-value
	Case		Control		Total	%	
	N	%	N	%			
Poor	31	40,8	16	21,1	47	61,8	0,000
Good	7	9,2	22	28,9	29	38,2	
Total	38	50	38	50	76	100	

OR = 6,089 ; CI = 2,146-17,276.

Infectious diseases are a collection of types of diseases that easily attack children, especially toddlers, which are caused by bacterial infections and parasitic infections. There are many infectious diseases in toddlers and the symptoms they cause. In this study, from the Chi-Square statistical test, a p-value was obtained of 0.000, and this value was α 5% or 0.05, which means there is a relationship between a history of infectious diseases in toddlers and stunting in toddlers in the Kesesi II

Health Center working area. From the OR (odds ratio) analysis, the OR was 8.516, and the CI (confidence interval) was 2.953-24.561. Because the OR value is > 1 and the CI does not exceed 1, this means that a history of infectious diseases in toddlers is a risk factor for stunting in toddlers in the Kesesi II Health Center working area because toddlers who have a history of infectious diseases have an increased risk of 8.516 times. compared to toddlers who have no history of infectious diseases.

Table 2. Analysis of the history of infectious diseases in toddlers as a risk host factor for the incidence of stunting in toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency.

History of infectious diseases in toddlers	Stunting						P-value
	Case		Control		Total	%	
	N	%	N	%			
Yes	31	40,8	13	17,1	44	57,9	0,000
No	7	9,2	25	32,9	32	42,1	
Total	38	50	38	50	76	100	

OR = 8,516 ; CI = 2,953-24,561.

In this study, from the Chi-Square statistical test, a p-value was obtained of 0.021, and this value was α 5% or 0.05, which means there is a relationship between history of breast milk exclusive with stunting in toddlers in the Kesesi II Health Center working area. from the OR (odds ratio) analysis, the OR was 3.478, and the CI (confidence interval) was 1.172-10.323. Because the OR value is > 1 and the CI

does not exceed 1, it means a history of exclusive breastfeeding is a risk factor for stunting in toddlers in the Kesesi II Health Center working area because having a history of non-exclusive breastfeeding increases the risk by 3.478 times compared to toddlers who have a history of exclusive breastfeeding.

Table 3. Analysis of exclusive breastfeeding history as a risk host factor for the incidence of stunting among toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency.

Exclusive breastfeeding history	Stunting						P-value
	Case		Control		Total	%	
	N	%	N	%			
Not exclusive breastfeeding	32	42,1	23	30,3	55	72,4	0,021
Good	6	7,9	15	19,7	21	27,6	
Total	38	50	38	50	76	100	

OR = 3,478 ; CI = 1,172-10,323.

A history of LBW (low birth weight) is a baby's birth weight below 2500 grams, which is one of the risk factors for stunting. In this study, from the Chi-Square statistical test, a p-value was obtained of 0.000, and this value was $< \alpha$ 5% or 0.05, which means there is a relationship between a history of LBW and stunting in toddlers in the Kesesi II Health Center working area. from the OR (odds ratio) analysis, the

OR was 10.500, and the CI (confidence interval) was 3.628 – 30.392. Because the OR value is > 1 and the CI does not exceed 1, this means that a history of LBW is a risk factor for stunting in toddlers in the Kesesi II Health Center working area because having a history of LBW increases the risk by 10,500 times. Compared to toddlers who do not have a history of LBW.

Table 4. Analysis of LBW History as a risk host factor for the incidence of stunting in toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency.

History of LBW	Stunting						P-value
	Case		Control		Total	%	
	N	%	N	%			
LBW	28	36,8	8	10,5	36	47,4	0,000
Not LBW	10	13,2	30	39,5	40	52,6	
Total	38	50	38	50	76	100	

OR = 10,500 ; CI = 3,638-30,392.

In this study, from the Chi-Square statistical test, a p-value was obtained of 0.287, and this value was $> \alpha$ 5% or 0.05, which means there is no relationship between family economic status and stunting in toddlers in the Kesesi II Health Center working area. from the OR (odds ratio) analysis, the OR was 2.188, and the CI (confidence interval) was 0.505 – 9.480. Because the OR value is > 1 , but the CI exceeds 1, the family's economic status is not a risk factor for stunting in toddlers in the Kesesi II Health Center working area. This shows that even though the majority of families' economic status is not classified as low, they have not been able to reduce the risk of stunting in the working area of the Kesesi II Health

Center.

In conditions in the field, many mothers have pregnancies that are too close together or less than 2 years, and this is because having pregnancies that are too far apart is considered to be difficult and more painful during the birthing process. Indicators that influence the mother's condition during pregnancy include the mother's age at pregnancy, pregnancy spacing, history of anemia, and the mother's nutritional status during pregnancy. If the mother's age at pregnancy is too young or too old, it will result in low quality of the fetus and will also be detrimental to the mother's health.

Table 5. Analysis of family economic status as a social factor that is at risk of the incidence of stunting in toddlers in the working area of the Kesesi II Health Center, Pekalongan Regency.

Family economic status	Stunting						P-value
	Case		Control		Total	%	
	N	%	N	%			
Low	6	7,9	3	3,9	9	11,8	0,287
Moderate	32	42,1	35	46,1	67	88,2	
Total	38	50	38	50	76	100	

OR = 2,188 ; CI = 0,505-9,480.

At the age of < 20 years, the reproductive organs are not yet functioning perfectly, and at > 30 years, there is a reproductive decline, so there is a risk of giving birth to a stunted child compared to mothers who give birth at the age of under 30 years. Pregnancy at the age of 20-30 years is a safe period because the reproductive and mental organs are ready to undergo pregnancy and childbirth. Not only the mother's age at the time of pregnancy but mothers who have a history of chronic energy deficiency in pregnancy have a high potential for their babies to develop LBW, which will later lead to stunting. Then, the pregnancy spacing, if the family can arrange a spacing between births of more than 2 years, the child will have a higher probability of survival, and the child's condition will be healthier compared to birth spacing of less than 2 years. Meanwhile, birth spacing that is too close will result in low quality of the fetus/child and will also be detrimental to the mother's health. Apart from the problems above, another indicator is anemia during pregnancy. Anemia in pregnant women can occur due to a deficiency of several micronutrients, one of which is Fe. Fe deficiency conditions can cause problems with fetal growth, both body cells and brain cells. Pregnant women who are anemic will certainly affect the health of the fetus they are carrying because it will cause the baby to be born with a low weight and will likely suffer from stunting. This research is in line with other research, where the results of the Spearman correlation test showed a p-value of 0.001, which means that there is a relationship between the age of the mother during pregnancy, which is one of the indicators that influences the condition of the mother

during pregnancy, and stunting in toddlers 24-59 months in the Citeras Health Center work area. This research is not in line with other research, which shows that the majority of mothers who have stunted children have a normal or good pregnancy history. An overview of the pregnancy history of the mothers was obtained, most of whom were aged 20-30 years, with a pregnancy interval of > 2 years. The nutritional status of most of the mothers was non-CED, and almost 50% had anemia.^{7,8}

Infectious diseases in toddlers are related to exclusive breastfeeding, immunization history, and sanitation of the family environment. Conditions in the field are known to mean that many residents still wash eating utensils in rivers, which can then cause infectious diseases in toddlers, be it diarrhea or worms. The presence of infectious diseases in a toddler's body will have an impact on the nutritional status of the toddler. The first reaction due to infection is a decrease in the toddler's appetite, which means there is a lack of nutritional input into the body. This is in accordance with the theory that stunting is caused by poor maternal nutrition during pregnancy, poor food quality, and the frequency of frequent illnesses. This research is in line with other research. The statistical test results show that the P-value = 0.039, and this value is <5% alpha or 0.05, so H0 is rejected, meaning there is a significant relationship between a history of infectious disease and stunting. Then, from the statistical test results, it was found that OR = 3.455, which means that toddlers with a history of infectious diseases are at 3.455 times greater risk of suffering from stunting compared to

toddlers who do not have a history of infectious diseases.⁹

Exclusive breastfeeding coverage in the Kesesi II Health Center work area only reaches 55%. Based on conditions in the field, the majority of mothers provide additional food before 6 months because many mothers cannot bear to see their babies continue to cry, they think that the baby is crying because he is hungry. Apart from that, another reason is the idea circulating that babies have to be fed a lot so they grow big quickly. Exclusive breastfeeding and feeding, meal preparation and food sanitation also influence the incidence of stunting. Providing MP-ASI that is not appropriate to the baby's age and needs can have an impact on the baby's health and nutritional status. Children under five who are given exclusive breast milk and MP-ASI according to their needs can reduce the risk of stunting. This research is in line with other research. From the results of the chi-square test, a p-value of 0.000 was obtained, and this value was <5% alpha or 0.05 so H₀ was rejected, meaning that there was a significant relationship between the history of exclusive breastfeeding and stunting in toddlers aged 2-5 years in Jadi Semanding Village, Tuban.¹⁰

The impact of LBW in the long term, namely disorders that can arise include growth and development disorders, vision (retinopathy), hearing, chronic lung disease, increased morbidity and frequency of congenital abnormalities, as well as frequent hospital admissions. Immediate complications experienced include hypothermia, fluid and electrolyte disorders, hyperbilirubinemia, respiratory distress syndrome, patent ductus arteriosus, intraventricular hemorrhage infection, apnea of prematurity, and anemia. This research is in line with other research, where the results of the Chi-square Test obtained a value of $p = 0.000$, which means there is a significant relationship between the history of LBW and the incidence of stunting in the Sekupang Health Center area, Batam in 2019. The results of this research are not in line with other research, which is based on the results of the analysis. Using the Chi-square test, the p-value = 0.737 was

obtained, indicating that there was no significant relationship between the history of LBW and the incidence of stunting in toddlers in Panduman Village, Jelbuk District, Jember Regency.¹¹

Family economic status is a risk factor for stunting in toddlers because family economic status plays an important role in providing family food. Malnutrition is often part of a cycle that includes poverty and disease. These three factors are interrelated so that each contributes to the others. Socio-economic and political changes that improve health and nutrition can break the cycle due to certain nutritional and health interventions. Family food security influences family consumption patterns, namely the quality and quantity of family food consumption. The quality of food consumption can be reflected in the diversity of food consumed. Meanwhile, the quantity of food consumption can be determined from the level of adequacy of macronutrients and micronutrients. The quantity of food consumed can affect a person's nutritional status because food intake is one of the direct causes of malnutrition in children. Fulfilling nutritional needs, especially macronutrients has a big influence in determining a child's nutritional status. Macronutrients consist of carbohydrates, fat, and protein.¹²⁻¹⁴

4. Conclusion

Maternal pregnancy history, history of infectious diseases, history of exclusive breastfeeding, and history of LBW are host factors that are at risk for stunting in toddlers in the Working Area of the Kesesi II Health Center, Pekalongan Regency, Indonesia.

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