



Risk Factors for Stunting Among Children Under Five Years of Age in The Kokoda Tribe, Sorong City

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A B S T R A C T

Stunting is a chronic nutritional deficiency resulting in short stature and cognitive impairment. Sorong City has the highest incidence of very short and short toddlers in West Papua Province, 52.58%. This study analyzes the risk factors for stunting among children under five years of age in the Kokoda tribe, Sorong City. This study used a case-control design. The population was all parents and children aged 12-59 months registered at Integrated Health Post in 8 selected villages in Sorong City in 2021, totaling 1,890 children. There were 168 samples, 84 in the cases group and 84 in the control group, with the purposive sampling technique. Data collection used a stunting risk factors questionnaire on toddlers and measured body length, weight, and upper arm circumference. The data was processed by analyzing the Odds Ratio (OR) with the SPSS application. Results showed that children with birth lengths less than 48 centimeters had a 2.652 times greater risk of experiencing stunting compared to those more than equal to 48 centimeters. Children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. Respondents with no clean water availability had 2.013 times more experienced stunting. Mothers not taking iron supplements during pregnancy could increase the risk of stunting three times. The risk factors for stunting among under-five children in the Kokoda tribe, Sorong City, are birth length, birth weight, the availability of clean water, and iron supplements during pregnancy.

INTRODUCTION

Stunting is a disorder related to chronic malnutrition resulting in short stature and cognitive impairment (Baidho et al., 2021). In 2017, 22.2 percent of children aged 0-5 worldwide, or one in every four children, were stunted. South Asia has the highest stunting frequency (35%), followed by East and South Africa (34.1%) and West and Central Africa (33.7%) (Indonesia, 2018).

According to the Ministry of Health Republic of Indonesia, Nowadays, Indonesia has a stunting rate of 30.8 percent. The trend decreased compared to 2007 (36.8%) and 2013 (37.2%). Nevertheless, it remains the focus of government attention. In 2020, the percentage of stunted children, according to national standards, decreased to 27.6 percent. However, it was still above the World Health Organization (WHO) guidelines that the percentage should not exceed 20% (Rahmadhita, 2020).

The average prevalence rate of very short toddlers in West Papua was 42.64%. Furthermore, its prevalence reached 52.58% in Sorong City, West Papua Province. In addition, according to the 2019 routine reports of the integrated SIGIZI (Nutrition Information System), its number in Sorong City was 994 under five years old children. The highest number was in the working area of East Sorong Health Center, with 247 toddlers (Office, 2021).

Many factors contribute to the global prevalence of stunting, including maternal age at birth, early pregnancy, and delivery (Nasir et al., 2021). In addition, other factors are inadequate sanitation, child nutrition, and disease history. Moreover, maternal awareness about nutrition, family income, exclusive breastfeeding, genetics, and level of nutritional adequacy are also predisposing factors for stunting (Budiastuti & Rahfiludin, 2019; Supariasa & Purwaningsih, 2019; Wulandari Leksono, 2021).

Previous studies showed that, apart from an infection, stunting was also associated with nutritional deficits of micronutrients and macronutrients. Stunting children also correlated with a lack of protein, iron, zinc, calcium, and vitamins D, A, and C. In addition, other predisposing factors for stunting were hormonal factors, genetics, inadequate parental knowledge, poverty, poor environmental sanitation, and limited access to food. Moreover, low-income families and limited access to health services also contributed to stunting. Efforts to overcome issues of wealth inequality between provinces were also critical, especially in vulnerable areas (Sudiarmanto, 2019; Wahyuni et al., 2021; Andriansyah et al., 2022).

Stunting is a sensitive indicator of economic decline and a long-term predictor of mortality and morbidity. Thus, the continuing incidence of stunting in under-five children is worrying. This study analyzes the risk factors for stunting among children under five years of age in the Kokoda tribe, Sorong City.

METHOD

This research was a retrospective or case-control study to determine risk factors for stunting. The case-control study is observational research assessing the exposure-disease correlation by identifying a group of people with the disease (called cases) and a group without the disease (called controls) and then comparing the frequency of exposure in both groups. Cases are subjects with negative effect characteristics selected from the same conditions as controls, especially in this paper, by matching the respondent's age. This research was conducted in Sorong City from January 2021 to November 2022. The population was all parents and children aged 12-59 months registered at Integrated Health Post in 8 selected villages in Sorong City in 2021, totaling 1,890 children. There were 168 samples, 84 in the cases group and 84 in the control group, with the purposive sampling technique. The Cases were selected from the three Integrated Health Posts with the most significant stunting incidence, while children under five years of age as controls. Data collection used a stunting risk factors questionnaire on toddlers and measured body length, weight, and upper arm circumference. The data was processed by analyzing the Odds Ratio (OR) with the SPSS application. The magnitude of the OR can estimate the strength of the association. The OR calculation uses a 2 x 2 cross table. When the OR value = 1, indicates that the independent variable no is a risk factor for the dependent variable. In addition, $OR < 1$ means that the independent variable is a protective factor against the dependent variable. Moreover, $OR > 1$ implies the independent variable is a

risk factor for the dependent variable. The analysis results are meaningful if the upper (UL) and lower limits (LL) are above the value of 1 or 1, and vice versa.

RESULT

Results showed that 32.1% of children in this study were 24-35 months, and 53% were boys. In addition, 36.3% of mothers graduated from elementary school, and 80.4% were unemployed. Furthermore, 36.9% of fathers graduated from Senior High School, and 48.8% were farmers or fishermen. Most respondents' family incomes were less than IDR 1,000,000 (71.4%).

Table 1. The Characteristics of Respondents (n=168)

The characteristics of respondents	Case		Control		Total	
	n	%	n	%	n	%
Child's age:						
12-23 months	28	33.3	22	26.2	50	29.8
24-35 months	30	35.7	24	28.6	54	32.1
36-47 months	15	17.9	26	31.0	41	24.4
48-59 months	11	13.1	12	14.3	23	13.7
Child's sex:						
Boy	47	56.0	42	50.0	89	53.0
Girl	37	44.0	42	50.0	79	47.0
Maternal education:						
University	1	1.2	4	4.8	5	3.0
Senior High School	21	25.0	27	32.1	48	28.6
Junior High School	22	26.2	18	21.4	40	23.8
Elementary School	30	35.7	31	36.9	61	36.3
No School	10	11.9	4	4.8	14	8.3
Paternal education:						
University	9	10.7	11	13.1	20	11.9
Senior High School	25	29.8	37	44.0	62	36.9
Junior High School	20	23.8	14	16.7	34	20.2
Elementary School	26	31.0	20	23.8	46	27.4
No School	4	4.8	2	2.4	6	3.6
Maternal profession:						
Civil servant	2	2.4	0	0	2	1.2
Private employee	0	0	1	1.2	1	0.6
Entrepreneur	9	10.7	12	14.3	21	12.5
Farmer / Fisherman	5	6.0	4	4.8	9	5.4
Unemployment	68	81.0	67	79.8	135	80.4
Paternal profession:						
Civil servant	1	1.2	5	6.0	6	3.6
Private employee	8	9.5	14	16.7	22	13.1
Entrepreneur	10	11.9	2	2.4	12	7.1
Farmer / Fisherman	42	50.0	40	47.6	82	48.8
Unemployment	23	27.4	23	27.4	46	27.4
Family income:						
Less than IDR 1,000,000	64	76.2	56	66.7	120	71.4
From IDR 1,000,000 to 3,000,000	18	21.4	27	32.1	45	26.8
More than 3,000,000	2	2.4	1	1.2	3	1.8

Four of the five variables in this research were risk factors for stunting. They were birth weight with an OR=3, birth length with an OR= 2.652, availability of clean water with an OR=2.013, and iron tablet supplements during pregnancy with OR = 3. Thus, children with birth lengths less than 48 centimeters

had a 2.652 times greater risk of experiencing stunting compared to those more than equal to 48 centimeters. Children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. Respondents with no clean water availability had 2.013 times more experienced stunting. Mothers not taking iron supplements during pregnancy could increase the risk of stunting three times.

Table 2. Analysis of Risk Factors for Stunting among Under Five Children in Kokoda Tribe, Sorong City (n=168)

Variable	Case		Control		Total		OR	LL-UL
	n	%	n	%	n	%		
Birth weight:								
< 2,500 grams	42	50.0	21	25.0	63	37.5	3.000	1.561 – 5.766
≥ 2,500 grams	42	50.0	63	75.0	105	62.5		
Birth length:								
< 48 centimeters	42	50.0	23	27.4	65	38.7	2.652	1.395 – 5.043
≥ 48 centimeters	42	50.0	61	72.6	103	61.3		
Maternal nutritional status during pregnancy:								
Undernutrition	50	59.5	47	56.0	97	57.7	1.158	0.627 – 2.136
Normal	34	40.5	37	44.0	71	42.3		
Availability of Clean Water:								
High	41	48.8	27	32.1	68	40.5	2.013	1.076 – 3.767
Low	43	51.2	57	67.9	100	59.5		
Taking Iron tablet supplements during pregnancy:								
No	28	33.3	12	14.3	40	23.8	3.000	1.401 – 6.422
Yes	56	66.7	72	85.7	128	76.2		

DISCUSSION

Stunting is the leading cause of malnutrition in children, resulting in less optimal adult height, decreased cognitive capacity, and increased susceptibility to disease, primarily degenerative diseases. Short (stunting) or very short (severe stunting) is a term that refers to nutritional status by measuring body length for age or height for age (Apriluana & Fikawati, 2018).

Our findings showed that birth length was one of the predisposing factors for stunting. Children with birth lengths less than 48 centimeters in this study had a 2.652 times greater risk of experiencing stunting compared to 48 cm. The body length measurement in the supine position is suitable for children aged 0 to 24 months when measured. It is because the findings increased by 0.7 cm when measured in a standing position. Meanwhile, height measurement in the upright position is for children >24 months (Abdullah & Sari, 2017).

Furthermore, this study indicated that children with birth weight less than 2,500 grams had a three times greater risk of stunting compared to those more than equal to 2,500 grams. According to Apriluana's research (Apriluana & Fikawati, 2018), low birth weight (LBW) significantly increased the incidence of

stunting in children by 3.82 times. Nutrient deficiency during pregnancy can affect the birth weight, resulting in LBW or weighing less than 2500 grams in babies. Low birth weight was also associated with birth length. The importance of nutritional intake during the first 1000 days of life begins at 270 days during pregnancy and 730 days during the first two years of the baby's life. That golden period will affect growth and development from childhood to adulthood (Tatu et al., 2021).

In this paper, respondents with no clean water availability had 2.013 times more experienced stunting. Rahayu Research also found that children who lived in homes with clean water and toilet facilities had a lower prevalence of diarrhea and stunting (Rahayu et al., 2018). Water availability also affects maternal health, pregnant women, and toddlers. Thus, the availability of safe drinking water is closely related to human development issues, particularly in the health sector, and mainly to prevent stunting. Clean wells and water sources can minimize the chances of spreading infectious diseases, especially gastrointestinal infections, and diarrhea. Thus, inadequate water sanitation potentially increases the prevalence of diarrhea in children. Further, diarrhea can cause food malabsorption in children (Usman & Umar, 2020).

This investigation revealed that mothers not taking iron supplements during pregnancy could increase the risk of stunting three times. Women with anemia during pregnancy potentially give birth to babies with stunting and LBW. Thus, iron supplements are essential to prevent anemia and iron deficiency during pregnancy.

CONCLUSION

The risk factors for stunting among under-five children in the Kokoda tribe, Sorong City, are birth length, birth weight, the availability of clean water, and iron supplements during pregnancy.

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