



Determinants of Stunting in Toddlers in the Tetaf Health Center Working Area, Kuantana District, South Central Timor Regency (TTs)

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Abstract

Introduction: Stunting is a condition in which a person's height is less than normal at a similar age and sex. The presence of stunting indicates prolonged (chronic) malnutrition. The cause of stunting is low nutrient intake in the first of 1,000 days of life, which is from the fetus until two years old. This study aimed to analyze the determinants of stunting in toddlers in the working area of Tetaf Health Center, Kuantana District, South Central Timor Regency (TTS).

Methods: This study was an analytical survey with a case-control design. The number of samples was 134 people who were divided into 67 case groups and 67 control groups. Data analysis technique using chi-square statistical test.

Results: The results showed that there was a significant association of maternal knowledge (p-value = 0.000, OR = 7.744), maternal parenting (p-value = 0.000, OR = 6.384), history of anemia in pregnant women in the third trimester (p-value = 0.000, OR = 7.744), birth weight (p-value = 0.000, OR = 5.608), basic immunization status (p-value = 0.000, OR = 7.939), nutritional status of toddlers (p-value = 0.000, OR = 3.913), and Residential Environmental Sanitation (p value = 0.000, OR = 5.443) with stunting incidence among toddlers in the Tetaf Health Center Working Area, Kuantana District, South Central Timor District.

Conclusion: Based on the results of the study, it is recommended for prospective parents/families of toddlers to prepare themselves before marriage and during pregnancy, bring pregnant women who are about to give birth to health centers or health facilities, expand their knowledge to be able to prepare sufficient nutrition so that they can reduce the risk of stunting in toddlers.

Keywords: history of anemia, knowledge, nutritional status, parenting, stunting.

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Introduction

According to the WHO in 2016, stunting in the world was 22.9% and the malnutrition of toddlers was the cause of 2.2 million of all causes of death of toddlers worldwide.¹ This

leads to the death of three million children per year. The problem of stunting in Indonesia is a serious threat that requires proper handling.

Stunting is the condition of a person's height that is less than normal based on age and gender. Height is one type of anthropometric examination and indicates a person's nutritional status. The presence of stunting indicates poor nutritional status (malnutrition) over a long period of time (chronic).² Based on data from the Indonesian Toddler Nutrition Status Survey (SSGBI) in 2019, the prevalence of stunting in Indonesia reached 27.7%. This means that around one in four children under five (more than eight million children) in Indonesia are stunted. This figure is still very high when compared to the WHO threshold of 20%.

The incidence of stunting in Indonesia is a concern of the government which is considered a serious health problem, where stunting is one of the five strategic issues that are priorities for national health development 2020-2024. The problem of stunting is important to solve because it has the potential to disrupt the potential of human resources and is related to the level of health, even child death. According to the results of the 2021 Indonesia Nutrition Status Survey (SSGI) conducted by the Ministry of Health, the stunting prevalence rate in Indonesia in 2022 was 24.4%, or a decrease of 6.4% from 30.8% in 2018.

Knowledge gaps that determine stunting, such as the level of education of the head of the household, will affect his ability to provide family nutrition, both materially and materially. This will affect parents' knowledge to provide good parenting, diet, and sanitation. Lack of parental knowledge will increase the risk of children experiencing stunting (Risksdas, 2018).

The independent variable was chosen because the cause of stunting is low nutritional intake in the first 1,000 days of life, which is from the fetus until the baby is two years old. In addition, poor sanitation facilities, lack of access to clean water, and lack of environmental hygiene are also causes of stunting. Poor hygiene conditions make the body have to fight extra against sources of disease, which inhibits the absorption of nutrients.³

The high prevalence of stunting, maternal mortality rate (MMR) and infant mortality rate (IMR) are serious problems in East Nusa Tenggara Province and have become the macro development indicator targets in the

East Nusa Tenggara Province Medium-Term Development Plan 2022-2023 document.⁴ South Central Timor Regency (TTS) has a serious problem, namely the high prevalence of stunting, maternal mortality and infant mortality, so the South Central Timor Regency (TTS). Government is committed to reducing the prevalence of stunting, maternal mortality and infant mortality through improving maternal, infant and toddler health services as outlined in the 2019-2024 Regional Medium-Term Development Plan (RPJMD). The implementation of the Roadmap and RAD to accelerate the reduction of stunting, maternal and infant mortality in South Central Timor District (TTS) is regulated in Governor Regulation No 13 of 2023.⁵

South Central Timor District (TTS) is one of the districts in East Nusa Tenggara (NTT) that has the highest stunting prevalence rate at 48.3%.⁶ Nationally, South Central Timor District ranks first for the prevalence of stunting among 246 districts and cities in 12 priority provinces. According to the Legal Subdivision-BPK Representative of NTT Province.⁷ one of the sub-districts that is the main focus in handling stunting in South Central Timor District is Kuantana Sub-district, because it has a high stunting rate. Kuantana sub-district has one health center, Tetaf Health Center, which is one of the health centers in South Central Timor District that provides health services to the community. The number of stunted toddlers in the August 2023 period based on the list of nutritional status of Tetaf Health Center toddlers in Lakat Village is 53 toddlers, Supul Village is 41 toddlers, Tetaf Village is 119 toddlers, Enoneontes Village is 42 toddlers, Naukae Village is 46 toddlers, Oof Village is 63, Tubmonas Village is 35 toddlers and Oe Ue Village is 26 toddlers, with a total of 425 stunted toddlers. The villages that will be used as research locations are Tetaf Village and Oof Village because they have a high number of 119 and 63 stunted children.

The aim of this study is to analyze the determinants of maternal knowledge, maternal parenting style, history of anemia in pregnant women in the third trimester, birth weight, basic immunization status, nutritional status of toddlers, sanitation of the living environment with the incidence of stunting in toddlers in the working area of the Tetaf

Health Center, Kumatana District, South Central Timor Regency (TTS).

Methods

The research method used in this study was an analytical survey with a case-control study design. The population in this study was divided into a case group and a control group, based on data at the Tetaf Health Centre for the period of August 2023. The cases were toddlers who experienced stunting (n= 425) at age of 24 to 59 months while the controls were toddlers who were not stunting (n=1097). The total number of samples in this study consisted of 134 toddlers with 67 toddlers as a case group and 67 toddlers as a control group from the Tetaf Health Centre working area, Kumatana District, South Central Timor Regency (TTS). The sampling technique used simple random sampling using Microsoft Excel. Control groups were matched at age and place of residence with the case groups.

Data were collected through observation, interviews, and questionnaires. Data were edited, coded, entered, and cleaned before analysis. The chi-square test was used for generating a statistical significant association on each variable. The data was analysed between the dependent variable (incidence of stunting) and the independent variable 1) maternal knowledge: The mother's knowledge about stunting related to the definition of stunting, nutrients needed in stunting prevention, stunting risks, and stunting prevention.⁸ with criteria low, if the percentage of correct answers is <80% and, if the percentage of correct answers is ≥80%, 2) parents' behavior in caring of toddlers.⁹ with criteria Less, if the answer is correct <70% and Good, if the answer is correct

≥70%, 3) history of anemia in pregnant women in the third trimester: with criteria defined by WHO; anemia, if the level of Hb<11 g/dL and normal, if the level of Hb>11g/dL, 4) birth weight: The weight of the baby is the weight of the baby weighed within the first 1 hour after birth, with the criteria; low, if <2,500 gr and normal, if 2,500-3,999 gr, 5) immunization status; with criteria incomplete and complete (Hep B, BCG, Polio, DPT-HB-Hib, IPV and Measles), 6) nutritional status of toddlers. Nutritional status is one of the indicators of growth, nutritional status is the result of the use, absorption, and use of food. Upper arm circumference is one of the indicators of nutritional status, in addition to weight to age and weight to height. The circumference of the upper arm is able to distinguish normal children from malnutrition. With a cut-off point of <11.5cm as Malnutrition, and 11.5 cm-12.5 cm as Malnutrition.¹⁰ The criteria of nutritional status are poor nutrition, if the LILA is below normal (12.5 cm) and normal, if the LILA ≥ 12.5 cm, and 7) Residential Environmental Sanitation. Environmental factors are in the form of poor maintenance, inadequate sanitation and water supply, and poor access and availability of food (World Health Organization, 2013), with criteria poor, if the answer is correct <80% and good, If the answer is correct ≥80%. The standardized questionnaires and KIA books were used to obtain the data. The analyzed data will be presented in the form of tables and narratives to discuss the results of the study and draw conclusions.

Results

1. Characteristics of Respondents and Toddlers

Table 1 Characteristics of Respondents and Toddlers

No	Characteristic	Category	Total (n)	Percentage (%)
1	Respondents by age	21-30 Year	52	39%
		31-40 Year	65	48%
		41-50 Year	16	12%
		51-60 Year	1	1%
2	Respondents by number of children	1 Person	23	17%
		2 Person	46	34%
		3 Person	23	17%
		4 Person	16	12%
		5 Person	9	7%
		6 Person	11	8%
		7 Person	2	2%
		8 Person	1	1%
		9 Person	3	2%
3	Respondents by last education	Never attended school	8	6%
		Elementary School / Equivalent	48	36%
		Junior High School/Equivalent	32	24%
		High School/Equivalent	39	29%
		College	7	5%
4	Respondents by job	Housewife	127	95%
		Temporary workers	5	4%
		PNS	2	1%
5	Toddlers by gender	Man	78	58%
		Woman	56	42%
6	Toddlers by age	24-35 months	46	34%
		36-47 months	58	43%
		48-59 months	30	23%

2. Determinants of Stunting Incidence

Table 2 Determinants of Stunting Incidence

Variable	Category	Stunting Incidence						p-value	OR 95% CI
		Case		Control		Total			
		n	%	n	%	n	%		
Maternal Knowledge	Low	53	70.7	22	29.3	75	100	0,000	7.74 (3.55-16.88)
	High	14	23.7	45	76.3	59	100		
	Total	67	50	67	50	134	100		
Mother's Parenting	Less	39	76.5	12	23.5	51	100	0,000	6.38 (2.89-14.08)
	Good	28	33.7	55	66.3	83	100		
	Total	67	50	67	50	134	100		
History of Anemia	Anemia	45	67.2	14	20.9	59	100	0,000	7.74 (3.55-16.88)
	Normal	22	32.8	53	79.1	75	100		
	Total	67	50	67	50	134	100		
Birth Weight	Low	40	59.7	14	20.9	54	100	0,000	5.608 (2.61-12.05)
	Normal	27	40.3	53	79.1	80	100		
	Total	67	50	67	50	134	100		
Basic Immunization Status	Incomplete	39	79.6	10	20.4	49	100	0,000	7.94 (3.47-18.19)
	Complete	28	32.9	57	67.1	85	100		
	Total	67	50	67	50	134	100		
Nutritional Status	Bad	44	100	0	0,0	44	100	0,000	3.91 (2.75-5.58)
	Normal	23	25,6	67	74.4	90	100		
	Total	67	50	67	50	134	100		
Residential Environmental Sanitation	Bad	38	56.7	13	19.4	51	100	0,000	5.44 (2.51-11.81)
	Good	29	43.3	54	80.6	83	100		
	Total	67	50	67	50	134	100		

Table 2 The maternal knowledge variable showed that 51 toddlers who had mothers with poor parenting patterns were mostly in the case group (stunting); 53 people (70.7%) compared to the control group (not stunting); 22 people (29.3%) while of the 59 toddlers who have mothers with high knowledge are mostly in the control group (not stunting); 45 people (76.3%) compared to the case group (stunting); 14 people (23.7). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between maternal knowledge and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 7.744 ($OR > 1$), it means that toddlers who have mothers with low knowledge are at risk of stunting, 7.744 times greater than toddlers who have mothers with high knowledge in the Tetaf Health Center Working Area.

The variable of maternal parenting style showed that 51 toddlers who had mothers with poor parenting patterns were the most in the case group (stunting); 39 people (76.5%) compared to the control group (not stunting); 12 people (23.5%) while of the 83 toddlers who have mothers with good parenting patterns are most in the control group (not stunting); 55 people (66.3%) compared to the case group (stunting); 28 people (33.7). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between parenting patterns and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 6.384 ($OR > 1$), it means that toddlers who have mothers with poor parenting are at risk of stunting, 6.384 times greater than toddlers who have mothers with good parenting in the Tetaf Health Center Working Area.

The variable of anemia history during third-trimester pregnancy with the results of the Chi-Square test showed that 59 toddlers who had mothers with a history of anemia during the third trimester of pregnancy were mostly in the case group (stunting); 45 people (67.2%) compared to

the control group (not stunting); 14 people (20.9%) while of the 75 toddlers who had mothers with a history of anemia during third-trimester pregnancy were mostly in the control group (not stunting); 53 people (79.1%) compared to the case group (stunting); 22 people (32.8%). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant relationship between the history of anemia during third trimester pregnancy with the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 7.744 ($OR > 1$), it means that toddlers who have mothers with a history of anemia during pregnancy in the third trimester are at risk of stunting, 7.744 times greater than toddlers who have mothers with a history of anemia during third-trimester pregnancy in the Tetaf Health Center Working Area.

The birth weight showed that 54 toddlers with mostly low birth weight were in the case group (stunting); 40 people (59.7%) compared to the control group (not stunting); 14 people (20.9%) while of the 80 toddlers who had normal birth weight were mostly in the control group (not stunting); 53 people (79.1%) compared to the case group (stunting); 27 people (40.3%). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between the birth weight of toddlers with the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 5.608 ($OR > 1$), it means that toddlers who have low birth weight are at risk of stunting, 5.608 times greater than toddlers who have normal birth weight in the Tetaf Health Center Working Area.

The basic immunization status variable showed that 49 toddlers who had incomplete basic immunization status were mostly in the case group (stunting); 39 people (79.6%) compared to the control group (not stunting); 10 people (20.4%) while of the 85 toddlers who had complete basic immunization status were most in the control group (not stunting); 57 people (67.1%) compared to the case group

(stunting); 28 people (32.9). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between basic immunization status and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 7.939 ($OR > 1$), it means that toddlers who have incomplete basic immunization status are at risk of stunting, 7.939 times greater than toddlers who have complete basic immunization status in the Tetaf Health Center Working Area.

Variables of nutritional status of toddlers with the results of the Chi-Square test showed that 44 toddlers who had the most malnutrition status were in the case group (stunting), 44 people (100%) compared to the control group (not stunting); 0 people (0.0%) while of the 90 toddlers who had good nutritional status most were in the control group (not stunting); 67 people (74.4%) compared to the case group (stunting); 23 people (25.6). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between residential environmental sanitation and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 3.913 ($OR > 1$), it means that toddlers who have poor nutritional status are at risk of stunting, 3.913 times greater than toddlers who have good nutritional status in the Tetaf Health Center Working Area.

The variable of residential environmental sanitation showed that 51 toddlers who had poor environmental sanitation were most in the case group (stunting); 38 people (56.7%) compared to the control group (not stunting); 13 people (19.4%) while of the 83 toddlers who had good environmental sanitation were most in the control group (not stunting); 54 people (80.6%) compared to the case group (stunting); 29 people (43.3%). The results of the chi-square test was 0.000 ($p < 0.05$) which means that there is a significant risk factor between residential environmental sanitation and the incidence

of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 5.443 ($OR > 1$), it means that toddlers with poor residential environmental sanitation are at risk of stunting, 5.443 times greater than toddlers who have good residential environmental sanitation in the Tetaf Health Center Working Area.

Discussion

1. *Determinants of Maternal Knowledge with the Incidence of Stunting*

According to Notoadmodjo, knowledge is the result of knowing, and occurs after people perceive a certain object. Sensing occurs through the five senses that humans have, namely the senses of sight, hearing, smell, taste and touch. Most knowledge is gained through the eyes and ears. Knowledge or cognitive is a very important domain in shaping a person's actions⁸. Knowledge can be interpreted as everything that is known, a guide in shaping a person's actions, and can also be defined as the result of sensing everything that has happened and passed based on experience¹¹. Knowledge about stunting is very necessary for a mother because a mother's lack of knowledge about stunting can put her child at risk of stunting¹². Lack of knowledge of parents of toddlers, causes poor quality of children's nutritional intake which will have an impact on stunting. Stunting is caused by multidimensional factors, one of which is due to the lack of knowledge of mothers and families about the health and balanced nutrition of their toddlers. Knowledge about nutrition is the basis of parents' ability to prepare the food their children need¹³.

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between maternal knowledge and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 7.744 ($OR > 1$), it means that toddlers who have mothers with low knowledge are at risk of stunting, 7.744 times greater than toddlers who have

mothers with high knowledge. This is in line with the results of Jumiarsih's research (2021) which states that there is a relationship between maternal knowledge and the incidence of stunting in toddlers aged 12-59 months in the Lawawoi Health Center Working Area, Sidrap Regency, with a p value of 0.02 because $p = 0.02 < 0.05$ (α)¹⁴. The results of Hendrika's research (2023) also show that there is a relationship between maternal knowledge and the incidence of stunting in toddlers in the Bakunase Health Center Working Area of Kupang City with a p value of 0.000 ($p < 0.05$) with an OR value of 6.667 ($OR > 1$), meaning that toddlers who have mothers with low knowledge are at risk of stunting 6.667 times greater than toddlers who have mothers with high knowledge¹⁵. The results of Amalia's research¹⁶ show that there is a significant relationship between maternal knowledge about nutrition and the incidence of stunting in toddlers aged 24-60 months in Planjan Village, Gunung Kidul with a value of $p = 0.00$ (< 0.05).

Based on the results of interviews with respondents in the Tetaf Health Center Working Area, many mothers whose toddlers are stunted do not know the causes of stunting, how to prevent stunting and the impact of stunting and even some mothers when interviewed do not know the definition of stunting. The researcher's assumption is that there are still respondents with insufficient knowledge because respondents do not get information about the definition, causes, impacts and efforts that can be made to prevent stunting, so that many respondents with insufficient knowledge have stunted children. Based on information that researchers get in the field, this is because some of the respondents did not get counseling about stunting, this factor is because when counseling about stunting was carried out at the posyandu there were several respondents who were not present so they did not get counseling and there were several respondents who did not regularly attend posyandu.

2. *Determinants of Maternal Parenting with the Incidence of Stunting*

One of the indirect factors associated with stunting is parenting patterns, in this case what is strongly related is parenting feeding¹⁷. Maternal behavior plays a very important role in caring for children where children really need parental attention and support in dealing with growth and development. To get good nutrition, good parental knowledge is needed in order to provide a balanced menu of choices. Parental behavior in caring for toddlers is one of the problems that can affect the occurrence of stunting in toddlers where parental behavior in terms of poor or low parenting has a greater chance of stunting children than parents with good parenting¹⁸. This poor parenting is indicated by the pattern of exclusive breastfeeding that is still lacking, the husband's role in taking care of children and the pattern of seeking treatment when the child is sick. This condition is influenced by many factors including parental education and close birth distance, making parents hassle and less than optimal in caring for children¹⁹.

Based on the results of the research that has been done, a p-value of 0.000 ($p < 0.05$) is obtained, meaning that there is a significant relationship between maternal parenting and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 6.384 ($OR > 1$), it means that toddlers who have mothers with poor parenting are at risk of stunting, 6.384 times greater than toddlers who have mothers with good parenting. This is in line with research²⁰ which shows that there is a significant relationship between parenting patterns and the incidence of stunting in children under five in the coastal area of Bonto Ujung Village, Tarawang District, Jeneponto Regency with Chi-Square statistical test analysis obtained p value = $0.005 < (\alpha = 0.05)$. Research (Dewi, 2022) also stated the same thing that there was a relationship between parenting patterns and the incidence of stunting. Parenting patterns at

Banjar II Health Center are mostly good, namely 142 people (92.2%), the sufficient category is 12 people (7.8%), based on the results of the Chi-Square statistical test, the fisher exact test is used because the chi square test does not meet the requirements where, the results of the fisher exact test show a p value of 0.001 or p value, <0.005.

Based on the results of interviews with respondents in the Tetaf Health Center Working Area, many mothers have poor parenting patterns such as not providing exclusive breastfeeding to their children and there are several mothers who do not provide exclusive breastfeeding until the child is 2 years old. As for some mothers who do not limit, monitor the type and amount of food that children want to consume, and allow children not to wear footwear when playing outside. So that this lack of parenting causes children to experience stunting. A good and correct way of feeding infants is to exclusively breastfeed infants from birth to 6 months of age and continue breastfeeding children for up to 2 years. Starting at the age of 6 months, babies receive nutritious complementary foods (MPASI) according to their growth and development needs. According to the researcher's assumption, for mothers who provide attention and support for children in this case will have a positive impact on nutritional status. Good parenting is for mothers to pay attention to the frequency and type of food consumed by their children so that their nutritional needs are met.

3. Determinants History of Anemia during third trimester Pregnancy with Incidence of Stunting

One of the factors that can affect the occurrence of stunting in toddlers is the nutritional status of pregnant women. Pregnancy requires more nutritional elements. The nutritional problems of pregnant women that often occur are low levels of red blood cells or hemoglobin (Hb) less than Hb < 11.0 g/dl or what is often

called anemia. Pregnant women with low hemoglobin levels occur because during pregnancy requires more food substances and changes occur in the blood and bone marrow.²¹ Pregnancy anemia also causes decreased appetite, so the mother's nutritional intake is also reduced. This condition will automatically affect the availability of nutrients for the fetus. When the fetus experiences nutritional deficiencies, fetal growth will be disrupted in the womb and increase the occurrence of stunting experiencing malnutrition which results in the baby experiencing the risk of stunting.²²

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between the history of anemia during pregnancy in third trimester with the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 7.744 ($OR > 1$), it means that toddlers who have mothers with a history of anemia during pregnancy in third trimester pregnancy are at risk of stunting, 7.744 times greater than toddlers who have mothers with a history of not anemic or normal during in third trimester pregnancy. This is in line with the results of research²² which also shows that there is a relationship between the history of pregnancy anemia and the incidence of stunting in toddlers aged 24-59 months. Based on statistical tests, it can be concluded that there is a history of anemia in pregnancy with the incidence of stunting ($p < 0.05$). The incidence of stunting is more common in toddlers who have mothers with a History of Anemia during third trimester Pregnancy than mothers who do not have a history of pregnancy anemia. The same results were also obtained from research²³ that all mothers who have a history of pregnancy with anemia are at risk of giving birth to children with stunting. Based on the results of the analysis using the chi square statistical test with computerization with a significance level of $\alpha = 0.05$, it can be seen that Asymp. Sig (p) is 0.000 thus $p < 0.05$ which means H_0 is rejected. So it can be

concluded that there is a relationship between the history of anemia in pregnant women and the incidence of stunting in a child.

Based on the results of interviews with respondents in the Tetaf Health Centre working area, there are many mothers during pregnancy who have a history of anemia in the third trimester, and some mothers do not consume Blood Additive Tablets (TTD) during pregnancy so this is one of the risk factors for their children to experience stunting. A history of anemia during pregnancy will affect the development process in the fetus. Supplementary blood tablets are an important and effective way to prevent and overcome anemia due to iron and folic acid deficiency.

4. *Determinants of Birth Weight and the Incidence of Stunting*

Birth weight is the weight of the baby weighed within the first 1 hour after birth. Babies can be categorized based on their birth weight, namely overweight (birth weight >4000 grams), normal birth weight (birth weight between 2500-3999 grams), and low birth weight (birth weight <2500 grams).²⁴

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between birth weight and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 5.608 ($OR > 1$), it means that toddlers who have low birth weight are at risk of stunting, 5.608 times greater than toddlers who have normal birth weight. This is in line with research²⁵ with the results of the Chi square test obtained a p-value of 0.006 (< 0.05), meaning that there is a significant relationship between birth weight and the incidence of stunting in children aged 6-12 months in Kotamobagu City. The results of the calculation of OR 95% CI = 2.885 (1.408-5.912) which means that mothers who give birth to children with low birth weight (LBW) have a chance of 2.8 times their children experiencing stunting

compared to the control group. Research conducted²⁶ obtained a p-value of 0.000 and an OR value = 35.858 which indicates that a history of low birth weight (LBW) in toddlers is a factor associated with stunting and is a risk factor for stunting by 35.8 times compared to toddlers with normal birth weight.

Based on the results of interviews with respondents in the Tetaf Health Center Working Area, it is known that there is an influence between birth weight and the incidence of stunting due to nutritional deficiencies consumed by mothers before pregnancy and during pregnancy. Judging from the community's livelihoods, namely in agriculture and plantations, but the results are sold and not consumed and there are reasons for being bored if they consume their own agricultural and plantation products. The types of food that grow in the neighborhood that have high nutrition such as moringa, but are not consumed for various reasons.

5. *Determinants of Basic Immunization Status with Stunting Incidence*

Basic immunization is an effort to build children's immunity, thus preventing the transmission of dangerous diseases, epidemics, and helping children not to get sick easily. Complete basic immunization consists of several types of vaccines, namely Hepatitis B, BCG, DPT, Polio, Hib, IPV and Measles. Basic immunization is also a cause of stunting in children. Incomplete basic immunization is very risky for stunting compared to those who get complete basic immunization. This is because immunization can create/increase immunity to disease in infants, which is given through injections. Incomplete immunization causes toddlers' immunity to weaken, making them more susceptible to infection.²⁷

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between basic immunization status and the incidence of stunting in toddlers in the Tetaf Puskesmas

Working Area. Based on the OR value of 7.939 (OR > 1), it means that toddlers who have incomplete basic immunization status are at risk of stunting, 7.939 times greater than toddlers who have complete basic immunization status. This is in line with research²⁸ that there is a relationship between the history of basic immunization status on the incidence of stunting toddlers in Hegarmanah Village, Jatinangor District with a p value < 0.05 ($p=0.00 < 0.05$) and there is a risk of stunting in toddlers with incomplete immunization 4.9 times compared to toddlers with complete immunization. Research conducted by²⁹ with the results of the Chi-Square Test with a meaning value of 95% and $\alpha=0.05$ obtained a probability value of $p < 0.05$ ($p\text{-value}=0.000$) which proves that there is a significant relationship between the completeness of basic immunization and the incidence of stunting in toddlers in Pidie Regency.

Based on the results of interviews with respondents in the Tetaf Health Centre working area, it is known that toddlers who have incomplete basic immunization status, because there are still mothers who do not give birth in health facilities such as puskesmas or hospitals, but prefer to give birth at home with the help of traditional healers. This results in babies not getting Hepatitis B immunization which is usually given to babies before 24 hours of age. So it is necessary to have the readiness of health workers such as village midwives to ensure that every pregnant woman who will give birth to get immunization services for babies even though giving birth at home.

6. *Determinants of Toddler Nutrition Status with Stunting Incidence*

The nutritional status of toddlers is the state of the body as a result of food consumption and the use of nutrients. Nutrition is important to support the growth and development of toddlers. If the nutritional status of toddlers is not fulfilled, complications can occur in their health. The nutritional status of children can be

influenced by two things, namely insufficient food intake and infectious diseases. Insufficient energy intake can cause negative imbalances as a result of lower body weight than normal or ideal. So that this needs support from husbands and families to meet the nutritional needs of children both from the womb until the baby is born. Support provided by husbands to pregnant wives can be in the form of physical, mental and social assistance. Husbands providing advice and information can make mothers feel loved and appreciated. This is the real support of husbands for pregnant women. Attention from the husband will motivate the mother to pay attention to her health and the baby in the womb so that the mother can avoid pregnancy problems and prevent infant mortality.¹⁹

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between the nutritional status of toddlers and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 3.913 (OR > 1), it means that toddlers who have poor nutritional status are at risk of stunting, 3.913 times greater than toddlers who have normal nutritional status. This is in line with research³⁰ which shows that the more normal the nutritional status, the toddler will not easily experience stunting. The results of statistical analysis using the chi square test obtained a p-value of 0.000 ($p\text{-value} < \alpha 0.05$) which means that there is a meaningful or significant relationship between the nutritional status of toddlers and the incidence of stunting in the Kota Timur Health Center working area.

Based on interviews with respondents in the Tetaf Health Center Working Area, it is known that there are toddlers who do not like vegetables and toddlers have a habit of not finishing food. So that this has an impact on the growth of toddlers. As for respondents who do not limit the food they want to consume and do not monitor the type or amount of food consumed by

children so that children are free to consume the desired food.

7. Determinants of Residential Environmental Sanitation with the Incidence of Stunting

Poor sanitation and environmental hygiene trigger the risk of gastrointestinal disorders in children because nutrients are difficult to be absorbed by the body. A child's reduced appetite will result in lower nutrient intake and poor brain growth.³¹ Poor environmental sanitation affects nutritional status in toddlers, namely through infectious diseases experienced. One of them is a healthy toilet, which is a good means of disposing of feces to stop the chain of disease spread.

Based on the results of the study, the p-value of 0.000 ($p < 0.05$) means that there is a significant relationship between residential environmental sanitation and the incidence of stunting in toddlers in the Tetaf Health Center Working Area. Based on the OR value of 5.443 ($OR > 1$), it means that toddlers who have poor residential environmental sanitation are at risk of stunting, 5.443 times greater than toddlers who have good residential environmental sanitation. This is in line with research conducted³² that there is a relationship between environmental sanitation and the incidence of stunting ($p=0.000$). The OR value in this study is 0.143 or ($OR < 1$) with 95% CI 0.048-0.429 (does not include the number 1) which indicates that environmental sanitation is a protective factor for stunting, meaning that there is a relationship between environmental sanitation and the incidence of stunting in toddlers in Wukirsari Village, Cangkringan District.

Based on the results of interviews with respondents in the Tetaf Health Center Working Area, it is known that there are respondents who do not have latrines and have to defecate in the yard around the house or borrow from the nearest neighbor so that this can cause pollution to the

environment and water. The respondents had water sources such as wells and streams located behind the house close to the sewer. There are 31.5% of toddlers whose living environment is good but stunting, this is due to aspects of latrine ownership and the distance between drinking water sources and sewers. So it is expected to have a toilet in every household and make the distance between the drinking water source and the sewer $> 10m$.

Conclusion

There are risk factors between maternal knowledge, maternal parenting, history of anemia during third trimester pregnancy, birth weight, basic immunization status, nutritional status of toddlers, and environmental sanitation of the residence with the incidence of stunting in the working area of Tetaf Health Center, Kuantana District, South Central Timor Regency. Recommended to prospective parents/families of toddlers are expected to prepare themselves before marriage and during pregnancy, bring pregnant women who are going to give birth to the nearest health center or health facility to give birth, expand knowledge to be able to prepare adequate nutrition so that it can reduce the risk of stunting in toddlers. It is hoped that the health center will work with cadres to increase counseling related to the importance of good parenting for toddlers and nutritious food as well as information related to stunting, the importance of bringing children to posyandu, the importance of complete basic immunization, a good living environment, and clean and healthy living behaviors (PHBS).

Ethics Approval

This study has received ethical approval from the Health Research Ethics Commission, Faculty of Public Health, Nusa Cendana University with number: 2023458-KEPK, Year 2024.

Data and Material Availability

Available

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Author Contribution

DEB collected and analyzed data using a questionnaire to determine the risk factors of maternal knowledge, parenting style, history of anemia during pregnancy in the third trimester, birth weight, basic immunization status, nutritional status of toddlers, and environmental sanitation with the incidence of stunting in toddlers in the working area of the Tetaf Health Center, Kuantana District, South Central Timor Regency. All authors have read and agree with the final result of this manuscript.

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