



Risk Factors for Stunting in Toddlers in the Public Health Center Working Area Embo Jeneponto, South Sulawesi

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Abstract: Stunting is still a nutritional problem in Indonesia, including in South Sulawesi. The impact of stunting is very broad, starting from the individual, family, community, and country levels. This study aims to analyze the risk factors for stunting incidents in the Embo District Health Center Work Area, Jeneponto. The type of research used in this research is observational with a "Case-Control Study" (case-control) approach, namely the status of the research design carried out by identifying subjects in the form of cases, using primary data through interviews with questionnaires. The variables studied included maternal education, birth weight, birth length, and exclusive breastfeeding. The sampling technique uses simple random sampling. The number of samples in this study was 136 samples which included 68 case groups and 68 control groups. The results of the study showed that the variables that were risk factors for stunting were maternal education (OR= 9.758), birth weight (OR= 5.590), body length (OR= 8.065), and exclusive breastfeeding (OR= 4.286). Therefore, efforts are needed to increase the knowledge of every prospective mother by providing education on nutritional requirements for pregnant women so that they can prevent low birth weight and short birth length as well as postpartum education for exclusive breastfeeding.

Keywords: Education; Exclusive breastfeeding; Stunting; Toddlers

Introduction

Malnutrition is often found in community groups. Malnutrition can be seen as a process of reducing the food intake required by the body for one or several nutritional substances. Stunting is a form of growth failure due to the accumulation of insufficient nutrients that persists from pregnancy to 24 months (Bloem et al., 2013). This situation is then made worse by the subsequent growth imbalance in children (Jesmin et al., 2011). The period from 0 to 24 months is the period that determines the quality of life, so it is called the golden period. This time is a vulnerable period because it will last a lifetime and cannot reverse the effects caused to the baby at this time, therefore at this time adequate nutrition is needed (Hossain et al., 2017).

Globally in 2018 as many as 149 million or one in three children aged 0-5 years in the world experienced stunting. The highest prevalence of stunting at 33.6% is occupied by East and South Africa, followed by South

Asia at 34.4% and West and Central Africa at 33.1% (6). There are several risk factors for stunting in children. In several studies conducted in Indonesia, low birth weight was the most dominant risk factor for stunting (Aryastami et al., 2017).

Some of the causes of LBW include pregnant women experiencing chronic energy deficiency (KEK), anemia, lack of nutritional supply during pregnancy, pregnancy complications, maternal parity, and birth spacing. Babies with LBW need serious treatment because in this condition babies easily experience hypothermia and the formation of their body organs is not yet complete so they are vulnerable to death (Proverawati et al., 2017).

The impact of babies born with low birth weight will experience slow growth, imperfect and causes stunting in children. Improving nutrition during pregnancy can improve the nutritional status of

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pregnant women so that it can prevent stunting (Syakur, 2021).

The results of basic health research in Indonesia in 2018, the national prevalence of stunting was 30.8 percent. This data has decreased compared to 2013, namely 37.2% percent and in 2007, namely 36.8 percent. There are 18 provinces that have a prevalence above the national prevalence, one of which is South Sulawesi (Risksed, 2018).

The stunting rate for Jeneponto district, South Sulawesi Province in 2021 reached 12.58%, and in 2022 there will be an increase of 13.97%. The stunting rate at the Embo Health Center in 2021 reached 20.05% and in 2022 there was an increase of 345 children under five with a percentage of 28.63% (Jeneponto Health Office, 2022).

The aim of this research is to analyze the risk factors for stunting among toddlers at the Embo Community Health Center, Jeneponto Regency, South Sulawesi, Indonesia.

Method

The type of research used in this study was observational with a "Case Control Study" approach that is the status of the research design carried out by identifying subjects in the form of cases, which were stated to be 68 who experienced stunting by comparing a control group of 68 who did not experience stunting.

The research was conducted in the working area of the Embo Health Center, Jeneponto Regency, South Sulawesi Province. This research lasted for 1 (month) from April 3 to May 30 2023. The population in this study were all mothers of toddlers in the working area of the Tamalatea Community Health Center, totaling 740 toddlers. The sample cases in this study were 68 toddlers suffering from stunting at the Embo Community Health Center in 2023. The sample was taken using purposive sampling, namely sampling using certain criteria. After the sample is obtained, a search is carried out according to the identity of the sample obtained from the medical record.

Result and Discussion

The results of data analysis are presented in table form which is equipped with the following explanation. Based on table 1, it shows that of the 58 toddlers who had risk+ maternal education (maternal education < high school) there were 67.6% cases of stunting, and 17.6% of the children were controls, while of the 78 toddlers who had risk-(maternal education ≥ Senior High School) there were 32.4% of stunting cases, and 82.4% of controls.

Table 1. Risk Factors for Maternal Education and Stunting in the Embo District Health Center Area, Jeneponto (Primary data source, 2023)

Mother's Education	Stunting Incident				Total	OR (CI 95%)
	Case		Control			
	n	%	n	%		
Risk Factor +	46	67.6	12	17.6	58	9,758
Risk Factor -	22	32.4	56	82.4	78	(4,366-
Total	68	100	68	100	136	21,809)

The results of the odds ratio analysis with a 95% confidence interval obtained a value of OR=9.758, meaning that maternal education is a risk factor for stunting in toddlers. Toddlers who have mothers with less than high school education are at 9,758 times the risk of experiencing stunting. The results of the lower limit value of 4.366 and the upper limit of 21.809 do not include a value of 1, this means that there is a significant (significant) relationship between maternal education and the incidence of stunting.

Table 2. Risk Factors for Toddler Birth Weight with Stunting Incidents in the Embo Community Health Center Area, Jeneponto Regency (Primary data source, 2023)

Birth Weight	Stunting Incident				Total	OR (CI 95%)
	Case		Control			
	n	%	n	%		
Risk Factor +	43	63.2	16	23.5	59	5,590
Risk Factor -	25	36.8	52	76.5	77	(2,650-
Total	68	100	68	100	136	11,790)

Based on table 2, it shows that of the 59 toddlers who had a birth weight of risk+ (baby birth weight < 2500 grams), there were 63.2% cases of stunting, and there were 23.5 controls, while of the 77 toddlers who had a birth weight of risk- (Baby birth weight ≥2500 grams), there were 36.8 cases of stunting, and there were 76.5% controls.

The results of the odds ratio analysis with a 95% confidence interval obtained a value of OR=5.590, this means that birth weight is a risk factor for stunting in toddlers. Toddlers who have a low birth weight have 5 times the risk of experiencing stunting compared to toddlers who have a normal birth weight. because OR > 1 means birth weight is a risk factor for stunting. The results of the lower limit value of 2,650 and the upper limit of 11,790 do not include a value of 1, this means that there is a significant relationship between birth weight and the incidence of stunting.

Based on table 3, shows that of the 60 toddlers who had a birth length of risk+ (<48 cm), there were 67.4 % cases of stunting, and there were 20.6 controls, while of the 76 toddlers who had a birth length of risk- (≥ 48 cm), there were 32.4 cases of stunting, and there were 79.4% controls.

The results of the odds ratio analysis with a 95% confidence interval obtained a value of OR=8.065, this means that a short birth length is 8 times more likely to experience stunting compared to people who have a normal birth length, because $OR > 1$ means that birth length is a risk factor.

The result of the lower limit value is 3,708, the upper limit is 17,540, and does not include the value 1, this means that there is a significant (significant) relationship between birth body length and the incidence of stunting.

Table 3. Risk Factors for Birth Length of Toddlers, Stunting Incidents in the Embo Community Health Center Area, Jeneponto Regency (Primary data source, 2023)

Birth Length	Stunting Incident				Total	OR (CI 95%)
	Case		Control			
	n	%	n	%		
Risk Factor +	46	67.6	14	20.6	60	8,065 (3,708-17,540)
Risk Factor -	22	32.4	54	7.4	76	
Total	68	100	68	100	136	

Based on table 4, it shows that of the 57 toddlers who had a history of Exclusive Breastfeeding at risk+ (not Exclusive Breastfeeding), there were 58.8% cases of stunting, and there were 25.0% controls, while of the 79 toddlers who had a history of Exclusive Breastfeeding at risk- (ASI Exclusive), there were 41.2% stunting cases, and 75.0% controls.

The results of the odds ratio analysis with a 95% confidence interval obtained a value of OR=4.286, this means that a history of exclusive breastfeeding who are not exclusively breastfed have 4 times the risk of experiencing stunting compared to people who have a history of exclusive breastfeeding who are exclusively breastfed because $OR > 1$ means exclusive breastfeeding is a factor. risk.

The results of the lower limit value of 2.063 and the upper limit of 8.903 do not include a value of 1, this means there is a significant (significant) relationship between the history of exclusive breastfeeding and the incidence of stunting.

Table 4. Risk Factors for Exclusive Breastfeeding with Stunting Incidents in the Embo Community Health Center Area, Jeneponto Regency (Primary data source, 2023)

History of Exclusive Breastfeeding	Stunting Incident				Total	OR (CI 95%)
	Case		Control			
	n	%	n	%		
Risk Factor +	40	58.8	17	25.0	57	4,286 (2,063-8,903)
Risk Factor -	28	41.2	51	75.0	79	
Total	68	100	68	100	136	

Discussion

Maternal Education and Stunting Incidence

A mother's education will generally influence employment opportunities, whereas higher education tends to lead to better job opportunities. This will have an impact on low-income and less-than-optimal care and attention to children. Another thing is that the level of ability to receive information also tends to make it easier for people with higher education to consult.

The results of this study show that maternal education is a risk factor for the incidence of stunting, toddlers who have mothers with low education are 9 times more likely to experience stunting compared to toddlers who have mothers with sufficient education. The results of the lower limit of 4,366 and the upper limit of 21,809 do not include a value of 1, this means that the incidence of stunting is significantly related to maternal education, meaning that maternal education is a risk factor for stunting in toddlers. Education can influence a mother's knowledge about nutrition and influence the mother's behavior in providing food for her child so that mothers who are sufficiently educated are expected to be able to provide optimal nutrition.

Other research that supports the results of this study states that the mother's education level has a positive effect or has a significant relationship with the incidence of stunting with the risk of toddlers having mothers with a low level of education being 0.12 times more likely to experience stunting compared to toddlers having mothers with a higher education level. According to this research, maternal education greatly influences the child's health status (Nurudeen et al., 2020).

This statement is strengthened by research in Nigeria, mothers with low education did not provide colostrum at the birth of their children, did not provide exclusive breast milk, and did not maintain the cleanliness of the food their children were given. Maternal education also influences the receipt of information regarding the care and nutrition of their children (Putri, 2018), but this is not in line with research conducted in Kupang City showing that maternal education is not related to the incidence of stunting (Amalo et al., 2023).

Education, especially maternal education, influences health status. This is related to the role that plays the most in forming children's eating habits, because it is the mother who prepares the food, starting from arranging the menu, shopping, cooking, preparing food, and distributing food. Apart from that, mothers who have \geq a high school education tend to be better at parenting and are better at choosing the type of food for their children. This is because mothers have greater opportunities to access information regarding children's

nutritional status and health so that their knowledge increases. Then this information is put into practice in the child care process which will have an impact on the child's nutritional status and better health.

Birth Weight with the Incidence of Stunting

Birth weight has a big impact on a child's growth, child development, and height as an adult. Babies born with low birth weight will be at high risk of morbidity, death, infectious diseases, underweight, and early in the neonatal period until childhood. Children who experience stunting are caused by the fact that while in the womb the child has experienced growth retardation or stunted growth while still in the womb (Triwahyuningsih et al., 2018). Some of the causes of LBW are chronic energy deficiency during pregnancy, anemia during pregnancy, lack of nutritional supply during pregnancy, pregnancy complications, maternal parity, and birth spacing (Syakur et al., 2022).

The results of this study indicate that birth weight is a risk factor for the event. Low birth weight has a 5 times risk of experiencing stunting compared to normal birth weight. The results of the lower limit of 2,650 and the upper limit of 11,790 do not include 1, this means that the incidence of stunting is significantly related to birth weight.

The results of this research are in line with research conducted in Semarang which found a relationship between the history of BBL and the incidence in toddlers (Widya, 2022). Another study also found that babies weighing less than 2,500 grams will have stunted growth and development, and may experience impaired mental function and be more susceptible to infection and hypothermia (Estherina et al., 2022).

Based on the description above, researchers hypothesize that baby birth weight influences the prevalence of stunting in babies, with low birth weight babies at higher risk of experiencing stunting. This research is not in line with research by (Murti et al., 2020) which shows that there is no significant relationship between birth weight and stunting.

Birth Length with Stunting

Birth length describes the baby's linear growth during pregnancy. Low linear size usually indicates a state of malnutrition due to a lack of energy and protein in the past, which begins with slowed growth or delayed development in the fetus (Supriasa et al., 2012). Insufficient nutritional intake of pregnant women before pregnancy can cause fetal growth problems, which can result in a short birth time. If the birth length of the baby is 48-52 cm, then the birth length of the baby is normal (Akib et al., 2022).

The results of this study show that birth length is a risk factor for stunting, there is a significant relationship

between short birth weight and an 8 times risk of experiencing stunting compared to normal birth length. The results of the lower limit of 3,708 and the upper limit of 17,540 do not include 1, this means that the incidence of stunting is significantly related to birth weight.

The results of this study are in line with research in Wonorejo, Semarang, showing that short birth length was 34 children (97.1%), while normal birth length was 12 children (30.8%), so it can be concluded that the prevalence of stunting in toddlers at short birth body length is higher when compared to normal birth length. Based on the risk estimate test, the OR = 76,500 was obtained, so the results of this study show that toddlers with short birth lengths are at 75.5 times greater risk of experiencing stunting compared to toddlers with normal birth lengths (Andini et al., 2020).

The risk of failure to grow (slow growth) is higher in babies who previously had a deficiency, ie. during pregnancy and in premature babies. In other words, body length at birth that is far below average is caused by growth retardation that has been present since in the womb. Delayed growth in the uterus indicates a lack of nutrition (Zurhayati et al., 2022).

Exclusive Breastfeeding with Stunting Events

Exclusive breastfeeding is a nutritional intake that suits the baby's needs and will help the growth and development of toddlers, especially in the golden period. Carbohydrates in breast milk are lactose, and the fat content is polyunsaturated fatty acids. The main protein is lactalbumin which is easily digested and has a high vitamin and mineral content. Apart from that, breast milk also contains anti-infective substances.

According to Agustina et al. (2022), exclusive breastfeeding is still lacking in lower-middle-income countries, especially among mothers with low levels of education. Children of low-educated mothers live in poor areas and are at high risk of morbidity and mortality due to lack of breast milk. Exclusive breastfeeding is a nutritional intake that suits the baby's needs and will help the growth and development of toddlers, especially in the golden period.

The results of this study indicate that exclusive breastfeeding is a risk factor for stunting. Babies who are not exclusively breastfed have 4 times the risk of experiencing stunting compared to those who are exclusively breastfed. The results of the lower limit of 2.063 and the upper limit of 8.903 do not include 1, this means that the incidence of stunting is significantly related to exclusive breastfeeding.

Exclusive breast milk contains various natural protective substances that protect babies from bacterial, viral, fungal and parasitic infections which are also factors that cause stunting due to repeated infections.

Exclusive breast milk contains the right composition because the content of breast milk is in accordance with the baby's needs, which is well absorbed in the baby's intestines, and avoids allergies which usually arise due to consumption of formula milk and the baby's intestines do not function optimally when given food other than breast milk so it is not digested properly and does not guarantee cleanliness so there is a risk of infection.

The results of this research are in line with research in Mamasa Regency showing that there is a relationship between exclusive breastfeeding and the incidence of stunting in toddlers and in the odds ratio test, the value OR = 61 was obtained, which means that toddlers who are not given exclusive breastfeeding are 61 times more likely to experience stunting than toddlers who are breastfed exclusive. Exclusive breastfeeding can reduce the risk of stunting (Sampe et al., 2020). Research conducted in Kab. Selayar also shows that there is a significant relationship between exclusive breastfeeding and the incidence of stunting (Musaidah et al., 2020).

Conclusion

Based on the research results, the following conclusions can be drawn; (a) Maternal education is a risk factor for the incidence of stunting in the Embo District Health Center Working Area; (b) Birth weight is a risk factor for stunting incidents in the Embo District Work Area, Jeneponto; (c) Birth length is a risk factor for stunting incidents in the Embo District Health Center Work Area, Jeneponto, (d) Exclusive breastfeeding is a risk factor for stunting incidents in the Embo District Health Center Work Area, Jeneponto.

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Conflicts of Interest

The authors declare no conflict of interest

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