p-ISSN 2086-6380
e-ISSN 2548-7949

Jurnal Ilmu Kesehatan Masyarakat, Nov2022, 13(3):306-320
DOI: https://doi.org/10.26553/jikm.2022.13.2.306-320
Available online at http://ejournal.fkm.unsri.ac.id/index.php/jikm

THE DETERMINANTS OF STUNTING INCIDENCE IN CHILDREN AGED 24-59 MONTHS

Sri Agusty Putri*, Ade Kartikasari Sebba, Asmuni
Public Health Department, Institute of Health Science Bina Bangsa Majene, Jln. Sultan Hasanuddin, Banggae Timur West Sulawesi, 91412 Indonesia

ABSTRACT

Majene Regency has the second highest prevalence of stunting in West Sulawesi by having the highest number of cases found in the village of Rangas. Due to these reasons, it is necessary to research the determinants of stunting to provide input to the Majene district government in conducting interventions related to stunting. A case-control study design was used. The subjects were the children aged 12-59 months who lived in the Rangas Village which the children under five years diagnosed stunting based on measurements from the Nutrition Executors of the Public Health Center. Meanwhile, the controls were children under five years who had not been diagnosed stunting based on measurements from the Nutrition Executors of the Public Health Center. The samples were 72 respondents with a ratio of 1:1, and the under-five children's mothers as the research respondents. Purposive sampling was used. Data analysis used the chi-Square test and multiple logistic regression tests. Multivariate analysis results showed that the incidence of stunting was influenced by several factors, including parity (OR=30.40; 95%CI: 3.86-239.43), MUAC < 23.5 cm during pregnancy (OR=2.41; 95%CI: 1.04-5.56) and not exclusive breastfeeding (OR=3.21; 95%CI: 1.29-7.94). The conclusion of this study is parity, a history of maternal MUAC during pregnancy, and not exclusive breastfeeding are risk factors for stunting in children under five years in Bang Rangas Village. Therefore, it is necessary to improvement of health promotion strategy for pregnant women by maximizing the first 1000 days of life and campaign two healthy children needs to be maximized.

Keywords: *stunting, determinants stunting, children under five years*

ABSTRAK

Kabupaten Majene memiliki prevalensi *stunting* tertinggi kedua di Sulawesi Barat dengan jumlah kasus tertinggi terdapat di Kelurahan Rangas. Oleh karena itu, perlu dilakukan penelitian tentang determinan kejadian *stunting* untuk memberikan masukan kepada pemerintah Kabupaten Majene dalam melakukan intervensi terkait *stunting*. Penelitian ini menggunakan desain *case control study* dengan subjek penelitian adalah anak usia 12-59 bulan di kelurahan rangas dengan kasus adalah balita yang terdiagnosis *stunting* berdasarkan pengukuran dari tenaga pelaksana gizi puskesmas sedangkan kontrol adalah balita yang tidak terdiagnosis *stunting* berdasarkan pengukuran dari tenaga pelaksana gizi puskesmas. Besar sampel sebanyak 72 responden dengan perbandingan 1:1 dengan ibu balita sebagai responden. Kriteria pengambilan sampel dilakukan dengan *purposive sampling*. Analisis data menggunakan uji *chi-Square* dan uji *regresi logistik* berganda. Hasil analisis multivariat menunjukkan bahwa kejadian stunting dipengaruhi oleh beberapa faktor, antara lain paritas (OR=30,40; 95%CI: 3,86-239,43), Riwayat Lingkar Lengan Atas (LILA) ibu < 23,5 cm selama hamil (OR=2,41; 95%CI: 1,04-5,56) dan tidak ASI eksklusif (OR=3,21; 95%CI: 1,29-7,94). Kesimpulan penelitian ini adalah paritas, riwayat LILA, dan riwayat tidak asi eksklusif berhubungan dengan kejadian stunting pada anak usia 6-24 bulan di Kelurahan Rangas. Diperlukan peningkatan strategi promosi kesehatan kepada ibu hamil dengan memaksimalkan 1000 hari pertama kehidupan dan kampanye dua anak sehat harus di maksimalkan.

Kata Kunci: *stunting*, determinan *stunting*, balita

* *Correspondence Address: Sri Agusty Putri, Public Health Department, STIKes Bina Bangsa Majene, Jln. Sultan Hasanuddin, Banggae Timur West Sulawesi, 91412 Indonesia E-mail: sriagustyputriutsman@gmail.com*

Received : ***September 29, 2022*** ***Accepted :*** ***December 16, 2022*** ***Published:*** ***December 20, 2022***

Introduction

Stunting is a chronic nutritional problem in children under five years, which is characterized by a shorter height compared to children his age. The impact of stunting on children under five years is not only in terms of health but also poor child development and poor learning capacity in schools. Thus, it will reduce productivity and financial ability in the future.[1] Research by Renyoet., *et al,* found that the potential economic loss due to decreased productivity due to stunting is around Rp. 3.057 billion – Rp. 13.758 billion (0.04-0.16%) of Indonesia's total Gross Domestic Product (GDP).[2] The target of reducing the prevalence of stunting to 14 percent in 2024 is a big challenge for the Indonesian people. So, it is hoped that this target can be achieved so that Indonesia's demographic bonus in 2030 can be helpful for the nation with the birth of a productive generation.

Based on data from Joint Child Malnutrition Estimates, 2018 that in 2017 around 22.2 percent or around 150.8 million children under five years in the world experienced stunting. There was a decrease compared to the stunting rate in 2000, which was 32.6 percent. Children under five years stunting in Asia reached 83.6 million, with the highest proportion in South Asia (58.7%) and the lowest proportion in Central Asia (0.9%). According to data from the World Health Organization (WHO), Indonesia is the third country which has the highest prevalence in the South - East Asia Region (SEAR). The average majority of stunting children under five years in Indonesia from 2005 - 2017 was 36.4%.[3]

In Indonesia in 2013, the prevalence of stunting children under five years was 37.2 percent, decreasing to 27.7 percent in 2019. Despite a significant decline of 9.5 percent or around 1.6 percent per year, stunting is still a problem in Indonesia, and it refers to the target of less than 20 percent that has been set by WHO as a limit that stunting is no longer a public health problem.[4] In addition, this figure is still far from the target to be achieved in 2024, as much as 14 percent.[5-6]

Based on the Study on Nutritional Status of Indonesian Children Under Five Years (SSGBI, 2021), the province with the highest prevalence of stunting is East Nusa Tenggara (43.8%), and it is followed by West Sulawesi Province, which occupies the second highest prevalence of stunting (40.4%). The estimated prevalence of stunting in West Sulawesi Province by Regency/City is Majene Regency ranks second highest (43.70%) after Mamasa Regency (45.02%), Polewali Mandar (39.45%), Mamuju (43.68%). [4] Data from Office of Population Control and family planning Majene Regency, the highest stunting case is in Banggai District, with the highest number of issues found in Rangas Village.[7] Rangas Village is one of the largest slum areas and the most extensive slum level in the sub-district of Banggai. The majority of the population work as fishermen.[8]

Several determinants of stunting in infants are demographic characteristics such as the mother's education, father's education, history of maternal antenatal care, history of taking blood-boosting tablets during pregnancy, and maternal age at delivery. They have a significant influence on the incidence of stunting in children under five years.[9] The results of the literature review also show that birth length, low birth weight (LBW), antenatal care, immunization, and exclusive breastfeeding are risk factors for stunting in children under five years.[10] Child stunting is also associated with determinants such as male sex, premature birth, short birth length, short maternal height, low maternal education, living in a house with inadequate latrines, drinking water that is not appropriately treated, lack of access to health services and living in rural areas.[11]

Based on this background, the purpose of this study is to determine the determinants of stunting in children under five years in Rangas Village, Majene Regency. The results of the study are expected to provide the input to the Majene district government in conducting interventions related to stunting.

Methods

This research is a quantitative study in the terms of case-control study design. The research was conducted for one year, from January to December 2022. The research location is in Rangas Village, Banggai District, Majene Regency, West Sulawesi Province. This location was chosen because Rangas village is included in the stunting locus with the highest number of stunting cases in the Majene district. The population of this study was all stunting children aged 12-59 years who lived in Rangas Village with a total of 670 children. After calculating the sample, a minimum sample size of 72 respondents is obtained with a ratio of 1:1. So the total sample as a whole is 144 respondents. The sampling technique was carried out by purposive sampling. The Research subject was children aged 12-59 months who lived in the Rangas Village, with cases being children under five years diagnosed with stunting based on measurements from the Nutrition Executors (NE) of the Public Health Center and while the controls were children under five years who had not been diagnosed with stunting based on measurements from the Nutrition Executors (NE) of the Public Health Center. The exclusion criteria for this study were the case group and the control group, mothers of children under five years who did not live in the Rangas Village who came to the Integrated Healthcare Center.

The variables measured in this study were maternal characteristics: maternal age was obtained from direct interviews, Mother's weight and height were obtained by taking anthropometric measurements by Nutrition Executors (NE) of the Public Health Center, Body Mass Index (BMI) was determined by researchers based on the WHO BMI classification, history of anemia and MUAC was carried out by midwives or health workers where the information was obtained from the MCH Handbook, and parity history was obtained based on the results of

interviews using research questionnaires. While, child characteristics: body weight and height were obtained by taking anthropometric measurements by Nutrition Executors (NE), history of premature birth, history of exclusive breastfeeding, and medical history filled in based on the results of interviews using a research questionnaire and the respondents' answers were strengthened with data from Mother and Child Health (MCH) Book.

Data processing was done by using SPSS. Univariate analysis was carried out to see the description of each research variable, while bivariate analysis was carried out using the chi-square test. The data analysis in this study was a univariate analysis to see the description of respective variables. Bivariate analysis was performed using the chi-square test. This analysis was used to see the relationship between determinants and the incidence of stunting in children aged 12-59 months. It is said that there is a relationship if the p-value < 0.05 and not related if the p-value > 0.05. To see the most dominant factor, a multivariate analysis was performed with a multiple logistic regression tests. The terms of the variables included in the follow-up test (multivariate analysis) are variables with a p-value <0.25 in bivariate analysis (maternal age, parity, maternal Mid- Upper Arm Circumference (MUAC), birth lenght < 48 cm, premature birth, not exclusive breasfeeding, and history of childhood infection). The data is then presented in table form accompanied by narration. The research instrument used a questionnaire, while the data related to the measurement results were obtained from the respondent's maternal and child health books. This research has received ethical approval from the Institute of Health Science Nani Hasanuddin Makassar with number: 665/STIKES-NH/KEPK/X/2022.

Results

Table 1. showed that the mother's occupation in the case group mainly was housewives, with 62 respondents (86.1%), and in the control group 69 respondents (95.8%). While the father's occupation in the case group was mostly fisherman, with 48 respondents (66.7%), and in the control group, most also worked as fishermen, as many as 55 respondents (74.4%). The mother's education in the case group mostly graduated from elementary; there were 29 respondents (40.3%), while the mother's education in the control group mostly graduated from elementary school; there were 38 respondents (52.8%). Most of the father's education in the case group graduated from elementary, there were 41 respondents (56.9%), and in the control group, the majority also graduated from elementary; there were 49 respondents (68.1%). In the case group, the highest income level of mothers was not having an income, namely 64 respondents (88.9%), while the control group also showed that most not having an income, as many as 70 respondents (97.2%). The income levels of fathers and mothers in the case and control groups showed the same distribution, which was at most < 500,000/month, namely 51 respondents (70.8%).

Table 1. Characteristics of Respondents

Variables	Stunting			
	Case		Control N	
	n	%	n	%
Mother's occupation				
Housewives	62	86.1	69	95.8
Honorary	2	2.8	1	1.4
Private employees	2	2.8	1	1.4
Self-employed	4	5.6	1	1.4
Fisherman	2	2.8	0	0.0
Father's occupation				
Unemployment	2	2.8	0	0.0
Honorary	5	6.9	0	0.0
Private employees	3	4.2	0	0.0
Self-employed	2	2.8	13	18.1
Fisherman	48	66.7	55	76.4
Farmer/ rancher	2	2.8	0	0.0
Construction workers	10	13.9	4	5.6
Educational status of mothers				
No Formal Education	2	2.8	0	0.0
Not Completed in Elementary School	3	4.2	0	0.0
Graduated from Elementary School	29	40.3	38	52.8
Graduated from Junior High School	14	19.4	23	31.9
Graduated from Senior High School	21	29.2	10	13.9
Graduated from College	3	4.2	1	1.4
Educational status of fathers				
No Formal Education	4	5.6	0	0.0
Not Completed in Elementary School	4	5.6	0	0.0
Graduated from Elementary School	41	56.9	49	68.1
Graduated from Junior High School	5	6.9	15	20.8
Graduated from Senior High School	13	18.1	7	9.7
Graduated from College	5	6.9	1	1.4
Income of mothers				
Have no income	64	88.9	70	97.2
< 500.000/ month	7	9.7	1	1.4
500.000-1.000.000/ month	1	1.4	1	1.4
Income of fathers				
Have no income	18	25.0	20	27.8
< 500.000/ month	51	70.8	51	70.8
500.000-1.000.000/month	3	4.2	1	1.4

Based on Table 2. The maternal factors were against stunting incidence. The result showed that mothers who gave birth at the age of < 20 years were more in cases (20.8%) compared to the control group (6.9%). While the age of the mother giving birth in the age group 20 -35 years was more in the control group (66.7%) than in the case (52.8%). Based on maternal Body Mass Index (BMI) during pregnancy, mothers with good nutrition in the case group (72.7%) were more than the control group (56.9%). Based on the length/height of the mother, the short category <150 cm was more common in the case group (55.6%). Based on the history of maternal anemia during pregnancy, more in the control group (15.3%) while in the case group (8.3%). In the parity variable, mothers with poor category (> 3 times) were more in the case group (36.1%) than in the control group (1.4%). Based on Maternal Mid-Upper Arm Circumference (MUAC) history, the case group experienced more CED (MUAC <23.5 cm) (36.1%) than the case group.

Table 2. The Maternal Factors Against Stunting Incidence

Variables	Stunting			
	Case		Control	
	n	%	n	%
Maternal age				
< 20 years	15	20.8	5	6.9
20 – 35 years	38	52.8	48	66.7
>35 years	19	26.4	19	26.4
BMI	4	5.6	9	12.5
Underweight (< 18,5 kg/m^2)	52	72.2	41	56.9
Healthy weight (18,5-25 kg/m^2)	11	15.3	17	23.6
Overweight (>25-29 kg/m^2)	5	6.9	5	6.9
Obese (>29kg/m2)				
Mothers height				
low < 150 cm	40	55.6	36	50.0
Normal ≥ 150 cm	32	44.4	36	50.0
History of Anemia				
Yes	6	8.3	11	15.3
No	72	91.7	61	84.7
Parity				
Not good (> 3 Times)	26	36.1	1	1.4
Good (≤ 3 Times)	46	63.9	71	98.6
Maternal Mid-Upper Arm Circumference (MUAC) history				
CED < 23.5 cm	26	36.1	15	20.8
CED ≥ 23.5 cm	46	63.9	57	79.2

Table 3. The Children Under Five Years Factors Against Stunting Incidence

Variables	*Stunting*			
	Case		Control	
	n	%	n	%
Birth Weight				
LBW (< 2500 gr)	9	12.5	9	12.5
Normal (≥ 2500 gr)	63	87.5	63	87.5
Birth length				
Short	36	50.0	24	33.3
Normal	36	50.0	48	66.7
Premature Birth				
Yes	7	9.7	3	4.2
No	65	91.3	69	95.8
Exclusive breastfeeding				
No	34	47.2	10	13.9
Yes	38	52.8	62	86.1
History of childhood infection				
Yes	46	63.9	39	54.2
No	26	36.1	33	45.8

Based on Table 3, the children under five years factors were against stunting incidence. The result showed that infants with LBW have the same percentage between the case and control groups (12.5%). Judging from the length of the child born, mothers who gave birth with a short child were more stunted (50%) than those who were not stunted (33.3%). For premature births, children under five years who were born prematurely were more in cases (9.7) compared to children under five years who were not stunted. For a history of exclusive breastfeeding, children under five years who are not exclusively breastfed are more stunted than children under five years

who are not stunted. Likewise, with a history of infectious diseases in children under five years, those with a history of infection experienced more stunting (63.9%) compared to children under five years who were not stunted (54.2%). The results of bivariate analysis obtained the following results (Table 4).

Table 4. Bivariate Analysis of Dependent and Independent Variables

Variable	Stunting				OR 95% CI	*P-Value*
	Case		Control			
	n	%	n	%		
Maternal age						
< 20 years or > 35 years	34	47.2	21	29.2	2.173 (1.093-4.320)	**0.026***
20 – 35 years	38	52.8	51	70.8		
Body Mass Index						
No normal	23	31.9	29	40.3	0.696 (0.351-1.379)	0.298
Normal	49	68.1	43	59.7		
Mothers' height						
Short < 150 cm	40	55.6	36	50.0	1.250 (0.649-2.407)	0.504
Normal ≥ 150 cm	32	44.4	36	50.0		
History of anemia						
Yes	66	91.7	61	84.7	1.984 (0.691-5.690)	1.984
No	6	8.3	11	15.3		
Parity						
Yes	26	36.1	1	1.4	40.130 (5.263-306.00)	**0.000***
No	46	63.9	71	98.6		
Maternal Mid-Upper Arm Circumference (MUAC) history						
CED	26	36.1	15	20.8	2.148 (1.020-4.523)	**0.042***
Not CED	46	63.9	57	79.2		
Birth Weight						
LBW (< 2500 gr)	9	12.5	9	12.5	1.000 (0.372-2.685)	1.000
Normal (≥2500 gr)	63	87.5	63	87.5		
Birth length						
Short (< 48 cm)	36	50.0	24	33.3	2.000 (1.020-3.922)	**0.043***
Normal (≥ 48 cm)	36	50.0	48	66.7		
Premature Birth						
Yes	7	9.7	3	4.2	2.477 (0.614-9.987)	0.190
No	65	90.3	69	95.8		
Not Exclusive Breastfeeding						
Yes	34	47.2	10	13.9	5.547 (2.462-12.501)	**0.000***
No	38	52.8	62	86.1		
History of childhood infection						
Yes	46	63.9	34	47.2	1.977 (1.015-3.854)	**0.044***
No	26	36.1	38	52.8		

According to table 4, the variables associated with the incidence of stunting with $p < 0.05$, namely maternal age, parity, Maternal Mid-Upper Arm Circumference (MUAC) history, the history of birth length, the history of exclusive breastfeeding, and history of infectious diseases in children under five years. The result shows that mothers who gave birth at the age of < 20 years or > 35 years were more in the stunting group (47.2%) than those who were not stunted (29.2%). The results of the chi-square test showed that there was a significant relationship between maternal age and the incidence of stunting in children under five years, with a p-value of 0.026. The results of the OR calculation showed that mothers who have an age of < 20 years or > 35 years have a 2,173

times greater risk of having stunted children under five years compared to mothers who give birth at an average age (95% CI 2.173 (1.093-4.320).

In the parity variable, it showed that mothers with parity > 3 times have more children under five years who experience stunting than children under five years who are not stunting. The results of the chi-square test found there is a significant relationship between parity and the incidence of stunting in children under five years with a p-value of 0.000. For the variable history of Maternal Mid-Upper Arm Circumference (MUAC) history (MUAC <23.5 cm) in the first trimester, the results of the analysis found a relationship between Maternal Mid-Upper Arm Circumference (MUAC) history with stunting incidence with p value 0.042. The results of the OR calculation show that Maternal Mid-Upper Arm Circumference (MUAC) < 23.5 cm has a 2.14 times greater risk of having a stunted child compared to those with Maternal Mid-Upper Arm Circumference (MUAC) > 23.5 cm.

While the variable body length of children under five years was born, the results of the analysis showed that a significant relationship between the body length of children under five years born with the incidence of stunting with a p-value of 0.043. The results of the OR calculation show that children under five years born with short birth length (< 48 cm) have a 2 times greater risk of stunting compared to children under five years with birth length > 48 cm. Meanwhile, if it was seen from the history of exclusive breastfeeding, the results of the analysis showed that there was a significant relationship between the history of exclusive breastfeeding and the incidence of stunting with a p-value of 0.000. The results of the OR calculation showed that children under five years who were not exclusively breastfed had a 5.547 times greater risk of stunting compared to children under five years who were exclusively breastfed.

For the variable history of infectious diseases in children under five years, it showed that there was a relationship between children under five years with a history of having an infectious disease and the incidence of stunting with a p-value of 0.044. The results of the OR calculation showed that children under five years who have a history of infectious diseases would have a 1.977 times greater risk of stunting compared to children under five years who do not have a history of infectious diseases.

The next step after bivariate analysis was multivariate analysis, which aimed to determine a predictive model for several variables that are related to or affect the incidence of stunting using a multiple logistic regression tests.. Variables can be included in the further analysis are variables with a p-value < 0.25.

Based on Table 5, seven independent variables have a p-value of 0.25were maternal age, parity, Maternal Mid-Upper Arm Circumference (MUAC) history, birth length, premature birth, not exclusive breastfeeding, and history of childhood infection. The seven variables that became candidates were entered into the multivariate analysis modeling. The variables that had the largest

p-value were removed gradually (backward selection method). The results of the multivariate analysis modeling were presented in the following table.

Table 5. Multivariate Analysis

Variables	Model I		Model 2		Model 3		Model 4		Model 5	
	OR (95% CI)	***P - value***	**OR (95% CI)**	***P- value***	**OR (95% CI)**	**P-value**	**OR (95% CI)**	**P-value**	**OR (95% CI)**	**P-value**
Parity	31.79 (3.70-272.78)	0.002	31.88 (3.78-268)	0.001	29.60 (3.72-234.95)	0.00	28.97 (3.66-229.15)	0.00	30.40 (3.86-239.43)	**0.001**
Not exclusive breastfeeding	2.98 (1.15-7.43)	0.024	2.93 (1.15-7.41)	0.023	2.92 (1.15-7.37)	0.02	3.11 (1.25-7.73)	0.01	3.21 (1.29-7.94)	**0.012**
Maternal age < 20 years / > 35 years	1.00 (0.42-2.38)	0.983								
Maternal Circumference of the upper arm (MUAC) history < 23.5 cm	2.31 (0.98-5.43)	0.053	2.31 (0.99-5.41)	0.052	2.32 (0.99-5.41)	0.041	2.41 (1.04-5.58)	0.03	2.41 (1.04-5.56)	**0.039**
Birth length < 48 cm	1.46 (0.64-3.32)	0.357	1.46 (0.65-3.32)	0.355	1.45 (0.54-3.27)	0.36	1.37 (0.61-3.03)	0.437		
History of childhood infection	1.33 (0.58-3.08)	0.495	1.34 (0.58-3.06	0.488	1.35 (0.59-3.08)	0.474				
Premature Birth	0.70 (0.09-5.16)	0.733	0.71 (0.09-5.09)	0.733						

Based on Table 5, there were five models performed on multivariate analysis. The results found that the variables that were strongly related to the incidence of stunting in children under five years were parity, Maternal Mid-Upper Arm Circumference (MUAC), and not exclusive breastfeeding. The results showed that mothers with parity > 3 times had a 30.40 times risk of having stunted children under five years compared to mothers with parity ≤ 3 times. Likewise, non-exclusive breastfeeding showed that children under five years who were not exclusively breastfed had a 3.21 times risk of stunting compared to exclusively breastfed children under five years. In addition, Maternal Mid-Upper Arm Circumference (MUAC) history < 23.5 cm were also at risk of 2.41 times for stunting compared to mothers> 23.5 cm.

Discussion

The results based on multivariate analysis showed that the incidence of stunting was influenced by several factors, including parity, Maternal Mid-Upper Arm Circumference (MUAC) history < 23.5 cm during pregnancy, and not exclusive breastfeeding.

Mother's Parity was associated with stunting in children under five years. The study found that mothers with parity > 3 times more children under five years experienced stunting compared to

children under five years who were not stunted. In this study, parity mothers with poor category (> 3 times) were more in the case group than in the control group. The same finding was found by Taufiqoh et.al., (2017) in Surabaya showing that the proportion of multiparous mothers was more common in the case group compared with the control group.[12] The same study was conducted by Sarman et al., (2021) who also found a parity relationship with the incidence of stunting.[13] Children under five years who have mothers with high parity have a 3.25 times greater risk of experiencing stunting compared to children under five years who have mothers with low parity.[14] where's Taufiqoh et.al., (2017) in Surabaya, suggest that children under five years born from multiparous mothers 4.97 times more at risk of stunting compared to those from primiparous mothers.[12] whereas this study found a 25.95 times greater risk for stunting. That there is no relationship between parity and cases of stunting in children aged 24–59 months in the study area. A different study found by Podungge et.al., that there is no correlation between parity and stunting cases in children aged 24–59 months.[15] According to Faye, et.al., that maternal parity is an essential factor associated with time to recovery from stunting in the first five years of life Research conducted in Nairobi.[16]

Research was conducted by Palino in the Work Area of the Puuwatu Health Center in Kendari City in 2016 found that mothers with high parity tend to have children under five years who were stunting while mothers with low parity tend to have children under five years who are not stunting. In other words, mothers with high parity tend to have children under five years who would grow up to be stunting. This happened because families with many children under five years, especially those with poor economic status, generally was not able to provide sufficient attention and food to all their children under five years. Children under five years who were in their infancy, especially children aged 1-2 years need nutrients in sufficient quantities for their physical growth. In addition, they also required great attention and stimulation for brain development.[14] The same condition was found in this study. In the case group, the highest level of maternal income was that of having no income, while in the control group, the control also showed that most did not have income. The income levels of fathers in the case and control groups show the same distribution; namely, most are < 500,000/month. In general, the economic level of the respondents in the study was still deficient.

This study found a relationship between a Maternal Mid-Upper Arm Circumference (MUAC) history with the incidence of stunting. The same research was found by Hapsari et al.,(2019) in Darajuanti Public Health Center Working Area in Sintang District; Lestari et al., (2021) in Rama Indra Central Lampung; Royani (2021) in Mamuju District, West Sulawesi; Jannah (2021) in Turikale Health Center, Maros Regency found a relationship between status MUAC history and the incidence of stunting.[17- 20] The same study found by Ruaida et.al., (2018) in the Tawiri health center in Ambon City shows that Maternal Mid-Upper Arm Circumference

(MUAC) history < 23.5 cm during pregnancy were 5.93 times more likely to have children under five years with low birth weight (LBW) compared to mothers who did not.[21] Mothers who suffer with MUAC < 23.5 cm during pregnancy have a 6.9 times risk of having stunted children under five years compared to mothers who do not have CED.[22] Different research conducted by Warsini that the CED history during pregnancy was not the risk factor of the stunting incident.[19]

A healthy baby was more likely to be born if the mother's nutritional status was good during pregnancy. Chronic Energy Deficiency in pregnant women can increase the risk of stunting in children under five years when giving birth to babies with low birth weight (LBW). Pregnant women who suffered from chronic lack of energy and babies born with LBW will cause growth and development disorders.[23-24] The risk of growth restriction would be exacerbated if the incidence of malnutrition in the fetus was followed by inadequate food intake in the first two years of life.[21] Research conducted by Aobama and Purwito shows that mothers who had a history of CED during pregnancy will affect the growth process of the baby in the womb. However, the fulfillment of nutrition for children under five years can be improved during the first 1000 days of life by providing exclusive breastfeeding for 6 months and providing complementary foods for breast milk. Breast milk by the nutritional needed of infants.[25]

This study also found a relationship between exclusive breastfeeding and the incidence of stunting. The same research by Hapsari (2019) in Sintang District; [17] Batiro (2017) at Kindo Didaye woreda; [26] Usman et. al., (2021) at the Rumbia Health Center; [27] Taufiqoh (2017) in Surabaya; [12] also found that there was a relationship between exclusive breastfeeding and the incidence of stunting (p-value = 0.002). In this study, it was found that children under five years who were not exclusively breastfeeding were more stunted than children under five years who were not stunted. Breast milk was a source of good-quality protein and was very easy to obtain. The content contained in breast milk was very different from the others. Exclusively breastfed babies had antibodies in their stools that protect against E Coli bacteria in high concentrations to minimize the risk of the baby developing infectious diseases. One of the cost-effective strategies to accelerate stunting reduction in Indonesia was to increase exclusive breastfeeding. Exclusive breastfeeding plays a vital role in protecting children under five years from stunting. Especially for people with low incomes, exclusive breastfeeding will help people reduce spending.[28]

Rangas Village was one of the densely populated residential areas in the Banggai District. This Village was in an area with marine waters, so the majority of the people's livelihoods were fishermen, while the majority of their mothers only worked as housewives. The level of family income is categorized as still low, with a high rate of early marriage. Therefore, parity in this study is one of the factors in the incidence of stunting that needs attention. The high rate of self-marriage was directly proportional to the number of children under five years born. With a high birth rate, it was directly proportional to the expenditure and needs of the community. Therefore, exclusive

breastfeeding, which in this case is also a factor in the incidence of stunting, can help reduce the burden of spending on the family. Even more interesting, the use of local food, such as abundant fish, can be utilized by mothers in meeting nutritional needs during pregnancy and lactation, especially for Maternal Mid-Upper Arm Circumference (MUAC) during pregnancy experiencing CED. Fish has a lot of protein content which is very good for fetal growth and maternal health, so the use of local food in Majene to fulfill maternal nutrition is expected to improve the nutritional status of mothers during pregnancy.

Conclusion

Parity, Maternal Upper Arm Circumference (MUAC) <23.5 cm during pregnancy and not giving exclusive breastfeeding are the factors most related to the incidence of stunting in Rangas Village. Therefore, the campaign for two healthy children under five years needs to be maximized, and education strategies for exclusive breastfeeding and nutritional fulfillment during pregnancy need to be improved by maximizing the first 1000 days of life. In addition, the use of local food in the Majene area, which was a water area needs to be utilized by the community, such as abundant fish that can be used by mothers to meet nutritional needs during pregnancy and lactation so that the use of local food in Majene to fulfill maternal nutrition was expected to improve nutritional status mother during pregnancy.

Acknowledgement

We would like to thank the KEMENDIKBUDRISTEK for providing funding for this research. The Head of STIKes Bina Bangsa Majene, Chairman of LPPM and the academic community at STIKes Bina Bangsa Majene for support this research. We also thank the Majene District Health Office, posyandu cadres who have assisted in carrying out the research and all respondents who have agreed to be respondents in this study.

Funding

The author obtained grant research funding from KEMENDIKBUDRISTEK with contract number 204/LL9/PK.00.PG/2022.

Conflict of Interest

The authors declare that they have no conflict of interest

Reference

1. Stewart, C. P., Iannotti, L., Dewey, K. G., Michaelsen, K. F., & Onyango AW. Contextualising complementary feeding in a broader framework for stunting prevention.

Matern Child Nutr. 2013; 9(2): 27–45. https//doi.org/101111/mcn12088.

2. Renyoet, B. S., Martianto1, D., & Sukandar D. Potensi Kerugian Ekonomi Karena Stunting Pada Balita Di Indonesia Tahun 2013. J Gizi Pangan. 2016; 11(3):247–254. doi:https://doi.org/10.25182/jgp.2016.11.3.%25p
3. Kemenkes RI. Situasi Balita Pendek (Stunting) di Indonesia. Kementeri Kesehat RI. 2018
4. Kemenkes RI. Laporan Pelaksanaan Integrasi Susenas Maret 2019 dan SSGBI Tahun 2019. 2019
5. Sekretariat Wakil Presiden RI. Strategi Nasional Percepatan Pencegahan Stunting 2018 - 2024. 2020
6. Teja M. Percepatan Penurunan Prevalensi Stunting 14 %. Pusat Penelitian Badan Keahlian DPR RI. 2022;14(13):25–30.
7. DP2KB. Laporan Stunting Kabupaten Majene Tahun 2021. Sulawesi Barat.2021.
8. Direktorat Pengembangan Kawasan Pemukiman, Direktorat Jenderal Cipta Karya KPU dan PR. Dokumen Rencana Pencegahan dan Peningkatan Kualitas Pemukiman Kumuh Perkotaan (RP2KPKP) Kabupaten Majene. Kabupaten Majene, Provinsi Sulawesi Barat. 2016.
9. Ardian D, Utami ED. Pengaruh Karakteristik Demografi Terhadap Kejadian Stunting Pada Balita Di Provinsi Sulawesi Barat. Semin Nas Off Stat. 2021;2020(1):397–406. doi:10.34123/semnasoffstat.v2020i1.365
10. Budiastutik, I., & Rahfiludin MZ. Faktor Risiko Stunting pada anak di Negara Berkembang Risk Factors of Child Stunting in Developing Countries. Amerta Nutr. 2019; 3(3). doi: 10.20473/amnt.v3.i3.2019.122-129.
11. Beal, T., Tumilowicz, A., Sutrisna, A., Izwardy, D., & Neufeld LM. A review of child stunting determinants in Indonesia. Matern Child Nutr. 2018; 14(4):e12617. doi: https//doi.org/101111/mcn12617.
12. Taufiqoh S, Suryantoro P, Kurniawati HF. Maternal parity and exclusive breastfeeding history are significantly associated with stunting in children aged 12-59 months. Maj Obstet Ginekol. 2017; 25(2):66-70. https://doi.org/10.20473/mog.V25I22017.66-70.
13. Sarman, Darmin. Hubungan ASI Eksklusif dan Paritas dengan Kejadian Stunting pada Anak Usia 6-12 Bulan di Kota Kotamobagu : Studi Retrospektif. Gema Wiralodra. PLoS ONE. 2021;2(2):206–216. https://doi.org/10.31943/gemawiralodra.v12i2.186.
14. Palino, I., Majid, R., & ainurafiq A. Determinan Kejadian stunting pada balita usia 12-59 bulan di wilayah kerja puskesmas puuwatu kota kendari tahun 2016. J Ilm Mhs Kesehat Masy Unsyiah. 2017; 2(6). doi: 10.37887/jimkesmas.v2i6.2870.
15. Podungge Y, Yulianingsih E, Porouw HS, Saraswati E, Tompunuh MM, Claudia JG, et al. Determinant factors of stunting in under-five children. Open Access Maced J Med Sci.

2021;17:9(B):1717–26. doi: https://doi.org/10.3889/oamjms.2021.6638

16. Faye, C. M., Fonn, S., & Levin J. Factors associated with recovery from stunting among under-five children in two Nairobi informal settlements. PLOS ONE. 2019;14(4): 1-17. https://doi.org/10.1371/journal.pone.0215488.
17. Hapsari DI, Dewi RRK, Selviana. Determinan Kejadian Stunting Pada Balita Di Wilayah 3T (Tertinggal , Terdepan, dan Terluar). J Publ Kesehat Masy Indones. 2019;6(2):72–8. doi:10.20527/jpkmi.v6i2.7456
18. Lestari ND, Sari NE, Iqmy LO, Susilawati. Riwayat Lila Ibu Saat Hamil Dan Asi Eksklusif Dengan Kejadian Stunting. Midwifery J. 2021;1(3):163–71. doi: 10.33024/mj.v1i3.5206
19. Royani I, Mappaware NA, Darma S, Khalid N, Utami DF. The Relationship between Nutritional Status of Pregnant Women and Stunted Children. Green Med J. 2021;3(1):39–46. doi:10.33096/gmj.v3i1.80
20. Jannah M, Nadimin. The Relationship of Chronic Energy Deficiency (KEK) in Mothers with Stunting Incidence in Toddlers in the Work Area of the Turikale Health Center. Media Kesehat Polteknik Kesehat Makassar. 2021;XVI(2):343–52. . doi: https: //doi.org/10.32382/ medkes. v16i2 .2421
21. Ruaida N, Soumokil O. Hubungan Status Kek Ibu Hamil dan BBLR Dengan Kejadian Stunting Pada Balita Di Puskesmas Tawiri Kota Ambon. J Kesehat Terpadu (Integrated Heal Journal). 2018;9(2):1–7. doi:10.32695/JKT.V2I9.12
22. Amin MA, Sari I, Marwidah, Amin MA, Pasau N. Relationship Of Chronic Energy Deficiency During Pregnancy With Stunting In Toddlers Aged 6-60 Months. Life Birth. 2022;1(4):20–7. doi: https://doi.org/10.37362/jlb.v6i1.803
23. WHO. WHA Global Nutrion Targets 2025: Stunting Policy Brief. 2014.
24. Apriani SS, Lestari R, Widayati E, Suryani Y, Angga P K. Risk Factors For The Occurrence of Low Birth Weight Based on Nutritional Status of Pregnant Women With Upper Arm Circumference. J Midwifery. 2021;6(1):58. doi: https://doi.org/10.25077/jom.6.1.58-65. 2021
25. Aobama PJ, Purwito D. Determinan Stunting Pada Balita Di Wilayah Kerja Puskesmas Klampok 2 Kabupaten Banjarnegara. J Keperawatan Muhammadiyah. 2020;2(9):185–95.
26. Batiro B, Demissie T, Halala Y, Anjulo AA. Determinants of stunting among children aged 6-59 months at Kindo Didaye woreda, Wolaita Zone, Southern Ethiopia: Unmatched case control study. PLoS One. 2017;12(12):1–15. doi: 10.1371/journal.pone.0189106.
27. Usman S, Salma WO, Asriati A. Determinants of Stunting Incidence in Children Under Five Years of Age at the Rumbia Health Center, Indonesia. J Client-centered Nurs Care. 2021;7(4):295–302. doi: 10.32598/JCCNC.7.4.387.1
28. Hadi H, Fatimatasari F, Irwanti W, Kusuma C, Alfiana RD, Ischaq Nabil Asshiddiqi M, et

al. Exclusive breastfeeding protects young children from stunting in a low-income population: A study from eastern indonesia. Nutrients. 2021;13(12):1–14. doi: 10.3390/nu13124264