http://ejournal.seaninstitute.or.id/index.php/healt
Jurnal eduhealth, Volume 14, No 03, 2023
E-ISSN. 2808-4608

Determinant Analysis of Stunting Incidence in Toddlers in Lubuklinggau City

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ARTICLE INFO

Keywords:
Stunting incidents, determinants, toddlers.

ABSTRACT

WHO defines stunting in the Global Nutrition Targets 2025 as an irreversible growth disorder primarily driven by inadequate nutritional intake and infections that occur repeatedly in the first 1000 days of life. Reducing stunting rates is the primary goal of the six goals in the 2025 Global Nutrition Targets. Stunting is also a vital indicator of the second goal of sustainable development, namely, no hunger. As many as 149.2 million toddlers (22%) worldwide were stunted in 2020. Southeast Asia has as many as 10.8 million toddlers (13.9%). This study analyzes the determinants of toddler stunting in Lubuklinggau City in 2022. The method used is an analytic observational research design with a case-control approach. Data were collected using a questionnaire on 71 stunted respondents and 71 respondents who were not stunted through the Cluster Random Sampling technique. The population to be studied was divided into sub-populations (clusters). A sample was selected for each cluster by random sampling. The results of the bivariate analysis showed that the variables Gender, Low Birth Weight, History of Exclusive Breastfeeding, Maternal Age at Birth, Parents' Income, History of ANC, and History of Infectious Diseases had a significant relationship affecting the incidence of stunting in toddlers in Lubuklinggau City in 2022. The results of the multivariate analysis test also show that parents' income is the most dominant factor influencing toddler stunting incidence in Lubuklinggau City in 2022.

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1. INTRODUCTION

Stunting is defined by the World Health Organization (WHO) in its 2025 Global Nutrition Targets as an irreversible growth disorder that is primarily driven by inadequate nutritional intake and repeated infections in the first 1000 days of life. Reducing stunting rates is the primary goal of the six goals in the 2025 Global Nutrition Targets. Stunting is also a vital indicator of the second sustainable development goal: no hunger [1] .

The incidence of Stunting is usually not immediately recognized in toddlers. Generally, it will only appear after 1000 days of a toddler's birth, affecting his cognitive abilities and productivity for a reasonably long period. Stunting can be prevented through exclusive breastfeeding, eating nutritious food according to the body's needs, clean living habits, doing physical activity, which helps balance energy expenditure with the intake of nutrients into the body, and monitoring the growth and development of toddlers regularly [2].

The number of stunting in the world was 149 million children under five (21.9%) in 2018. Then it decreased to 144 million children under five (21.2%) in 2019. However, it again increased to 149.2 million children under five (22%) in 2020. The number of stunting on the Asian continent in 2019 was 78.2 million children under five. In Southeast Asia alone, there were 10.8 million toddlers (13.9%) [3].

The 2018 Basic Health Research (Riskesdas) conducted by the Health Research and Development Agency showed quite encouraging numbers regarding the problem of Stunting in Indonesia. The stunting rate in Indonesia fell from 37.2% in 2013 to 30.8% in 2018. Meanwhile,

based on the 2021 Indonesian Toddler Nutrition Status Study results, the prevalence of Stunting in Indonesia was 27.7% in 2019. Then in 2020 rose to 31.8%. Then in 2021, it will again decrease to 24.4%. However, this figure has yet to reach the target of reducing the stunting rate set by the Government as stated in the 2020-2024 RPJMN, namely to 14% in 2024 [4].

The prevalence of stunting in South Sumatra Province was 28.98% in 2019; in 2020, it was only 7.20% due to the Covid-19 pandemic, so many toddlers were not measured, then it was 24.8% in 2021. South Sumatra Provincial Government is targeting a reduction in the stunting rate to 14% by 2024. Of the 17 regencies/cities in South Sumatra, Lubuklinggau City occupies the 10th position with the highest Stunting in South Sumatra Province, with a prevalence of 22.8% [5].

The number of stunting in Lubuklinggau City in 2019 was that of the 21,995 toddlers measured. Four hundred seventy-seven toddlers were stunted. Then in 2020, of the 17,955 toddlers measured, 281 toddlers were stunted. This decrease occurred due to the decrease in the number of children under five measured due to the still very high cases of the spread of Covid-19 in Lubuklinggau. Then in 2021, of the 21,615 toddlers measured, 282 toddlers were stunted [6].

Gender is one of the factors associated with the incidence of Stunting. Toddlers with the male gender tend to be more at risk of experiencing Stunting compared with the female gender. This is by research conducted by Hamal et al. in 2021, which stated that toddlers with male sex tend to be at risk of experiencing Stunting by 1.15 times compared to the female sex with a p-value of 0.014 (<0.05), which means there is the relationship between gender and the incidence of Stunting. Women have more adipose tissue and less muscle tissue than men. Metabolically, muscle is more active than fat, so proportionally, the muscle will use higher energy than fat; thus, men and women with the same height, weight, and age have different body composition, so energy requirements and nutrition are also specific.

The mother's age giving birth is also related to the incidence of Stunting. Whereas mothers who give birth at the age of <20 years are 14 times more likely to have a stunted child than mothers who give birth at the age of >20 years, with a p-value of 0.000 (<0.05). At <20 years, the female reproductive organs are not functioning correctly, while reproductive decline occurs at the age of ≥35. Pregnancy ≥35 years have a risk of giving birth to a stunted child 2.74 times [8]. Mothers who give birth at a risky age are prone to giving birth to children with low birth weights. So birth weight is also related to the incidence of stunting in toddlers. Toddlers with low birth weight (LBW) have a greater risk of experiencing Stunting than toddlers with average birth weight. This is in line with research conducted by Ebtanasari in 2018. He stated that toddlers suffering from LBW had a 7.333 times greater risk of experiencing Stunting compared to toddlers with an average birth weight with a p-value of 0.00 (<0.05), which means that birth weight is related to the incidence of Stunting. A child with LBW will also experience growth deficits in adulthood [9].

The parental income level affects the family's ability to meet the nutritional needs of toddlers; socioeconomic conditions also affect the choice of complementary foods, the time of feeding them, and healthy living habits. This is by research conducted by Agustin and Rahmawati in 2021, which stated that parents with income less than the minimum wage are at risk of having stunted children with a p-value of 0.004 (<0.05), which means that parental income is related to Stunting. Other research also states a relationship between parental income and stunting in toddlers in Lubuklinggau City with an R calculated value of 0.696 (R calculated is greater than the R table value of 0.098) [10]. Children with high-income parents will find it very easy to access health facilities if they experience an illness or infection that occurs in the child. Hence, a history of infectious diseases such as diarrhea and acute upper respiratory infection (ARI) is also associated with the incidence of Stunting. In line with research conducted by Solin et al. in 2019, it was stated that there was a significant relationship between a history of infectious diseases and the incidence of Stunting in toddlers, with a p-value of 0.000 (<0.05) in toddlers who experienced diarrhea and a p-value of 0.001 (< 0.05) in toddlers who experience ARI. The body of a toddler affected by an infectious disease will affect the process of absorbing nutrients so that it can cause malnutrition and end in Stunting [11].

Parents with higher education will undoubtedly understand the importance of exclusive breastfeeding for babies. Hence, a history of exclusive breastfeeding is also a determining factor in the incidence of Stunting. Toddlers not given exclusive breastfeeding tend to be more at risk of Stunting

[12]. This is by research conducted by Sampe et al. in 2020; it was found that toddlers who were not given exclusive breastfeeding were 61 times more at risk of experiencing Stunting compared to toddlers who were given exclusive breastfeeding with a p-value of 0.000 (<0.05) which means breastfeeding exclusively related to the incidence of Stunting. Babies given exclusive breastfeeding also have a higher height and follow the growth curve than babies given formula milk with exclusive breastfeeding; babies can avoid the risk of Stunting [13].

A public health problem can be chronic if the prevalence is still more than 20. This means that globally, nationally, and regionally, Stunting is still a chronic disease. The determinants of stunting in toddlers need to be given special attention because they can cause delays in children's physical growth, mental development, and health status [14]. Until now, no research has been done on the determinants of stunting in toddlers in Lubuklinggau City. Therefore the authors are interested in researching "Determinants of Stunting Incidents in Toddlers in Lubuklinggau City in 2022".

2. METHODS

This type of research is analytic observational research because the objective of this research is to analyze the determinants of stunting in toddlers. This study uses a quantitative approach to test a theory, present a fact or describe statistics to show relationships between variables, develop concepts, develop understanding, or describe many things in research [15].

Based on the time of the research, this is a case-control study to find a relationship to how far the risk factors influence the occurrence of the disease.

This research was located in the Work Area of the Lubuklinggau City Health Service, which is spread over 10 Community Health Centers in Lubuklinggau City. The time of this research was carried out from February 2022 to June 2023.

3. RESULTS AND DISCUSSION

Results

Univariate analysis

In this study, univariate analysis was performed to obtain the frequency distribution of sex variables, low birth weight, history of exclusive breastfeeding, maternal age, parental income, parental education, history of ANC visits, and history of infectious diseases. The following are the results of the univariate analysis:

Gender

Table 1. Gender

No	Characteristics	Frequency (*f*)	Percentage (%)
1	Man	107	75.4
2	Woman	35	24.6
	Amount	142	100

Based on the table above, it can be seen that out of 142 respondents, there were 107 toddlers (75.4%) male and 35 toddlers (24.6%) female.

Low birth weight

Table 2. Low birth weight

No	Characteristics	Frequency (*f*)	Percentage (%)
1	LBW	72	50.7
2	Not LBW	70	49.3
	Amount	142	100

Based on the above table, it can be seen that out of 142 respondents, there were 72 people (50.7%) LBW toddlers and 70 people (49.3%) non-LBW toddlers.

History of exclusive breastfeeding

Table 3. History of exclusive breastfeeding

No	Characteristics	Frequency (*f*)	Percentage (%)
1	No	97	68.3
2	Yes	45	31.7
	Amount	142	100

Based on the table above, it can be seen that of the 142 respondents; there were 97 (68.3%) children under five were not exclusively breastfed, and 45 people (31.7%) under five were exclusively breastfed.

Maternal Age of Childbirth

Table 4. Maternal Age of Childbirth

No	Characteristics	Frequency (*f*)	Percentage (%)
1	risky	100	70.4
2	No Risk	42	29.6
	Amount	142	100

Based on the table above, it can be seen that out of 142 respondents, there were 100 people (70.4%) with at-risk maternal age and 42 people (29.6%) with non-risk maternal age.

Parents Income

Table 5. Parents' Income

No	Characteristics	Frequency (*f*)	Percentage (%)
1	Under UMK	86	60.6
2	Above UMK	56	39.4
	Amount	142	100

Based on the table above, it can be seen that out of 142 respondents, there were 86 people (60.6%) whose parents' income was below the UMK and 56 people (39.4%) whose parents' income was above the UMK.

Parent Education

Table 6. Parent Education

No	Characteristics	Frequency (*f*)	Percentage (%)
1	Base	61	43
2	Intermediate	71	50
3	Tall	10	7
	Amount	142	100

Based on the table above, it can be seen that out of 142 respondents, there were 67 people (43.0%) with primary education, 71 people (50.0%) with secondary education, and ten people (7.0%) with higher education.

ANC history

Table 7. ANC history

No	Characteristics	Frequency (*f*)	Percentage (%)
1	Not enough	103	72.5
2	Good	39	27.5
	Amount	142	100

Based on the table above, it can be seen that of the 142 respondents. There were 103 people

(72.5%) with less history of ANC and 39 people (27.5%) with a good history of ANC.

History of Infectious Diseases

Table 5. History of Infectious Diseases

No	Characteristics	Frequency (*f*)	Percentage(%)
1	Yes	118	83.1
2	No	24	16.9
	Amount	142	100

Based on the table above, it can be seen that of the 142 respondents, 118 people (83.1%) had a history of infectious diseases, and 24 people (16.9%) did not have a history of infectious diseases.

Bivariate Analysis

This study used bivariate analysis to look for significant relationships and differences in gender, low birth weight, history of exclusive breastfeeding, maternal age, parental income, parents' education, history of ANC visits, and history of infectious diseases to the incidence of Stunting. The following are the results of the bivariate analysis:

Gender Against Stunting Incidents

Table 6. Relationship of Gender to Stunting Incidents

Gender	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	N	%	N	%			
Man	60	84.5%	47	66.2%	107	75.4%	0.019	5,460	2,785
Woman	11	15.5%	24	33.8%	35	24.6%			
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting, there were 60 males and 11 females, while of the 71 respondents whose toddlers did not experience stunting, there were 47 males. -male and 24 people with female gender in Lubuklinggau City in 2022. The *Continuity Correction (Chi-Square) test* results were obtained at 5.460 with a (p) = 0.019 value. Because the p-value <0.05, there is a significant relationship between gender and the incidence of stunting in Lubuklinggau City in 2022. Judging from the Odds Ratio (OR) value, it is 2.785, meaning that toddler boys are at risk of experiencing Stunting by 2.785 times compared to toddlers Woman.

Low Birth Weight for Stunting

Table 7. The Relationship between Low Birth Weight and Stunting

Low birth weight	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	n	%	N	%			
LBW	43	60.6%	29	40.8%	72	50.7%			
Not LBW	28	39.4%	42	59.2%	70	49.3%	0.029	4,762	2,224
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting, there were 43 LBW and 28 non-LBW, while of the 71 respondents whose toddlers did not experience stunting, there were 29 LBW and 42 non-LBW in Lubuklinggau City in 2022 *Continuity Correction (Chi-Square)* test results obtained at 4.762 with a value (p) = 0.029. Because the p-value <0.05, there is a significant relationship between low birth weight and the incidence of stunting in Lubuklinggau City in 2022. Judging from the *Odds Ratio* (OR) value, it is 2.224, meaning that LBW toddlers are at risk of experiencing Stunting by 2.224 times compared to toddlers Not LBW.

History of Exclusive Breastfeeding Against Stunting

Table 8. Relationship between the history of exclusive breastfeeding and Stunting

History of exclusive breastfeeding	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	n	%	N	%			
No	55	77.5%	42	59.2%	97	68.3%			
Yes	16	22.5%	29	40.8%	45	31.7%	0.030	4,685	2,374
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting, 55 people were not exclusively breastfed, and 16 people were exclusively breastfed, while of the 71 respondents whose toddlers did not experience stunting, 42 people were not exclusively breastfed and 29 people who were exclusively breastfed in Lubuklinggau City in 2022. The *Continuity Correction (Chi-Square) test results* were obtained at 4.685 with a value (p) = 0.030. Because the p-value <0.05, there is a significant relationship between the history of exclusive breastfeeding and the incidence of stunting in Lubuklinggau City in 2022, seen from the *Odds Ratio* (OR) value. The OR value was 2.374, meaning infants not exclusively breastfed had a risk of experiencing Stunting by 2.374 times compared to exclusively breastfed toddlers.

Maternal Age of Childbirth Against Stunting Incidence

Table 9. Relationship between Maternal Age and Stunting Incidence

Maternal Age of Childbirth	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	n	%	N	%			
risky	56	62%	44	78.9%	100	70.4%			
No Risk	15	38%	27	21.1%	42	29.6%	0.043	4,091	2,291
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting; there were 56 people of maternal age at risk, and 15 people of maternal age were not at risk, while of the 71 respondents whose toddlers did not experience stunting, there were 44 people with maternal age, at risk giving birth and 27 people of non-risk maternal age in Ly in 2022. The *Continuity results Correction (Chi-Square) test results* were obtained at 4.091 with a value (p) = 0.043. Because the p-value <0.05, there is a significant relationship between the age of the mother giving birth and the incidence of stunting in Lubuklinggau City in 2022. Judging from the *Odds Ratio* (OR) value of 2.291, it means that mothers of childbearing age are at risk; their toddlers are at risk of experiencing stunting events of 2.291 times that of women at risk.

Parents' Income Against Stunting Incidents

Table 10. Relationship between Parents' Income and Stunting

Parents Income	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	n	%	N	%			
Under UMK	50	70.4%	36	50.7%	86	60.6%			
Above UMK	21	29.6%	35	49.3%	56	39.4%	0.026	4,983	2.315
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting, there were 55 people whose parents' income was below the UMK and 21 people whose parents' income was above the UMK, while of the 71 respondents whose toddlers did not experience stunting, there were 36 people with parental income below the UMK and 35 people with parental income above the UMK unity in 2022. The Continuiresults *ty Correction (Chi-Square) test results* were obtained at 4.983 with a value (p) = 0.026. Because the p-value <0.05, there is a significant

relationship between parents' income and the incidence of stunting in Lubuklinggau City in 2022. Judging from the *Odds Ratio* (OR) value obtained of 2.315, it means that for parents with income below the UMK, their toddlers are at risk of experiencing stunting 2.315 times that of parents with income above the UMK.

Parental Education Against Stunting Incidents

Table 11. The Relationship between Parents' Education and Stunting

Parent Education	Stunting events				Total		P Value	Chi-Square
	stunt		Normal					
	N	%	n	%	N	%		
Base	38	53.5%	23	32.4%	61	43.0%	0.015	8,429
Intermediate	31	43.7%	40	56.3%	71	50%		
Tall	2	2.8%	8	11.3%	10	7%		
Amount	71	100%	71	100%	142	100%		

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting; there were 38 parents with primary education, 31 with secondary education, and two with higher education. In comparison, out of 71 respondents whose toddlers did not experience stunting, there were 23 people with parents with primary education, 40 with parents with secondary education, and 8 with parents with higher education in Lubuklinggau City in 2022. The Pearson test (Chi-Square) results were 8.429 with a value (*p*) = 0.015. Because the p-value <0.05, there is a significant relationship between parents' education and the incidence of stunting in Lubuklinggau City in 2022.

ANC History of Stunting Incidents

Table 12. Relationship of ANC History to Stunting Incidents

ANC history	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal						
	n	%	n	%	N	%			
Not enough	58	81.7%	45	63.4%	103	72.5%	0.024	5,090	2,578
Good	13	18.3%	26	36.6%	39	27.5%			
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced Stunting, there were 58 people with a history of less ANC and 13 people with a history of good ANC, while of the 71 respondents whose toddlers did not experience stunting, there were 45 people with less history of ANC and 26 people with a good history of ANC in Lubuklinggau City in 2022. *The Continuity Correction (Chi-Square) test results* were obtained at 5.090 with a value (p) = 0.024. Because the p-value <0.05, there is a significant relationship between a history of ANC and the incidence of stunting in Lubuklinggau City in 2022. The *Odds Ratio* (OR) value was 2.578, meaning that toddlers with a history of ANC are less at risk of experiencing Stunting by 2.578 times compared to toddlers with a good history of ANC.

History of Infectious Diseases for Stunting

Table 13. Relationship of Infectious Diseases to Stunting Incidence

Infectious Diseases	Stunting events				Total		P Value	Chi-Square	Odds Ratio
	stunt		Normal				0.044	4,061	2,878
	n	%	N	%	N	%			
Yes	64	90.1%	54	76.1%	118	83.1%			
No	7	9.9%	17	23.9%	24	16.9%	0.044	4,061	2,878
Amount	71	100%	71	100%	142	100%			

Based on the table above, it can be seen that of the 71 respondents whose toddlers experienced

Stunting, 64 people had a history of infectious diseases. Seven people did not have a history of infectious diseases. In comparison, of the 71 respondents whose toddlers did not experience stunting, 54 people had a history of infectious diseases, and 17 had no history of infection in Lubuklinggau City in 2022. The *Continuity Correction (Chi-Square) test* results were obtained at 4.061 with a value (p) = 0.044. Because the p-value <0.05, there is a significant relationship between a history of infectious diseases and the incidence of stunting in Lubuklinggau City in 2022. The *Odds Ratio* (OR) value was 2.878, meaning that toddlers with a history of infectious diseases are at risk of experiencing Stunting by 2.878 times compared to children with no history of infectious diseases.

Multivariate Analysis

The multivariate analysis combines several dependent variables with one independent at the same time; the following are the results of the multivariate test analysis:

Omnibus Test

Table 14. Omnibus Tests

		Chi-square	df	Sig.
Step 1	step	37,171	8	.000
	blocks	37,171	8	.000
	Model	37,171	8	.000

the Omnibus Tests of Model Coefficient table is used to see the results of simultaneous testing of the effect of these independent variables. Based on the table above, the value of *Sig. The model* is 0.000. Ho is rejected because the value of p <0.05 means that all independent variables jointly affect the dependent variable.

Summary models

Table 15. Summary models

step	-2 log-likelihoods	Cox & Snell R Square	Nagelkerke R Square
1	159,683 [a]	.230	.307

From the table above, the model, by including eight independent variables, turned out to have a change in the parameter estimation (-2 log-likelihood) of 159.683. Suppose seen from the R-square value of 0.230 or 23.0% (Cox & Snell) and 0.307 or 30.7% (Nagelkerke). Thus it can be interpreted that with eight variables, namely gender, low birth weight, history of exclusive breastfeeding, maternal age, parental income, parental education, history of ANC, and history of infectious diseases, the incidence of Stunting can be explained as 30.7%. However, this interpretation is only the value of the approach as in the coefficient of determination (multiple linear regression). The remaining 100-30.7 = 69.3% is influenced by other variables not examined in this study.

Hosmer and Lemeshow Test

Table 16. Hosmer and Lemeshow Test

step	Chi-Square	Df	Sig.
1	9,819	8	.278

The table above is the *Chi-Square test* from *the Hosmer and Lemeshow Test*. However, modifications have been made to its application. The hypothesis is:
Ho = Model has sufficiently explained the data (Goodness of fit)
Ha = The model does not adequately explain the data

The resulting Chi-Square test results have a p-value of 0.278. Because the value of p> 0.05, Ho is accepted, meaning that the model has sufficiently explained the data (*goodness of fit*).

Table 17. Contingency Table for Hosmer and Lemeshow Test

Stunting = events	Incidence of Stunting =	Total

		Stunting Observed	Expected	Not Stunting Observed	Expected	
Step 1	1	10	9,579	1	1,421	11
	2	14	12,632	2	3,368	16
	3	11	10,201	3	3,799	14
	4	6	10.131	10	5,869	16
	5	9	7,860	5	6.140	14
	6	8	6,839	7	8,161	15
	7	4	5,502	10	8,498	14
	8	4	4,389	10	9,611	14
	9	2	2,582	12	11,418	14
	10	3	1,284	11	12,716	14

Table 18. Classification Table [a]

	Observed		predicted Stunting events stunt	Not Stunting	Percent Correct
Step 1	Stunting events	stunt	49	22	69.0
		Not Stunting	21	50	70.4
	Overall Percentage				69.7

Multivariate Analysis Results

Table 19. Variables in the Equation

Variables in the Equation							
Step 1 [a]	B	SE	Wald	df	Sig.	Exp (B)	95% CI for EXP(B) Lower	Upper
Gender	.872	.467	3,484	1	062	2,391	.957	5,973
Low birth weight	.976	.403	5,873	1	.015	2,654	1.205	5,846
History of exclusive breastfeeding	.529	.439	1,453	1	.228	1697	.718	4,009
Maternal Age of Childbirth	.750	.438	2,932	1	087	2.117	.897	4,997
Parents Income	1,023	.412	6.173	1	013	2,783	1,241	6,239
Parent Education	.796	.346	5.306	1	.021	2,218	1.126	4,367
ANC history	.489	.454	1.159	1	.282	1630	.670	3,967
History of Infectious Diseases	.634	.564	1,260	1	.262	1884	.623	5,696
Constant	-8,273	1627	25,867	1	.000	.000		

Based on the table above, the p-value for gender is 0.062, the p-value for low birth weight is 0.015, the p-value for the history of exclusive breastfeeding is 0.228, the p-value for maternal age is 0.087, the p-value for parental income is 0.013, the p-value for parents' education was 0.021, the p-value for the history of ANC was 0.282, and p-value for the history of infectious disease was 0.262. From these results, it can be seen that the variables of low birth weight, parental income, and parental education partially significantly influence the incidence of stunting in Lubuklinggau City in 2022 because a p-value <0.05 is obtained. The variable that most dominantly influences the incidence of Stunting is the parent's income variable because it has the lowest p-value. At the same time, more children become malnourished due to the deteriorating quality of their food, resulting in nutritional disorders in toddlers. Meanwhile, the other variables are gender and history of breastfeeding. Exclusively, the age of the mother giving birth, history of ANC, and history of infectious diseases

partially did not significantly affect the incidence of stunting in Lubuklinggau City in 2022 because a value of p>0.05 was obtained.

DISCUSSION

Relationship of Gender to Stunting Incidents

From the results of research that has been conducted, it is revealed that male toddlers are twice as likely to be stunted than female toddlers in Lubuklinggau City. This finding is consistent with research conducted by Tsani regarding the effect of gender and nutritional status on satiety on a high-fat diet. The study revealed differences in satiety levels between boys and girls, with girls tending to feel full more quickly than boys. This can affect a child's nutritional intake, potentially leading to a higher risk of obesity (overnutrition) in boys than girls. Therefore, even though men and women with the same height, weight, and age have different body compositions, their energy and nutritional needs also differ. Although gender does not affect the incidence of Stunting, the nutritional needs of boys and girls are relatively different [16].

The Relationship between Low Birth Weight and Stunting

From the results of the Bivariate Analysis, it shows that the value of p = (0.0029) and the OR value is 2.224, which means that there is a significant relationship between low birth weight and the incidence of Stunting; babies born with low birth weight are at risk of being affected by stunting two times higher than underweight toddlers. Average body weight in Lubuklinggau City, in line with research conducted by Yeyen Supriyanto, which showed that LBW was stated to be significantly related to the incidence of stunting as indicated by the results of statistical tests, obtained a p-value of 0.000 (p <0.05) and a significant odds ratio value of 6, 16. This shows that under-fives with low birth weight are 6.16 times more likely to be at risk of experiencing stunting in children, or the probability of respondents in the LBW category experiencing Stunting is 60.9% [17].

Relationship between the history of exclusive breastfeeding and Stunting

The results of the analysis show that the value of p = (0.030) has a significant relationship between a history of exclusive breastfeeding and the incidence of stunting in Lubuklinggau City in 2022; the difference is two times between those who are not and those who are given exclusive breastfeeding. This is in line with the research conducted by Mayang and Nanda in 2019, which revealed that 90.9% of all respondents who had given exclusive breastfeeding revealed that less than half, or 36.4%, experienced Stunting, and the remaining 63.6%, did not experience stunting. This shows that the history of exclusive breastfeeding significantly impacts the incidence of Stunting [18].

Relationship between Maternal Age and Stunting Incidence

The results of the analysis showed a value of p = 0.0043 and OR = 2.291, which indicated a significant relationship between the age of the mother giving birth and the incidence of Stunting, mothers who gave birth at a risky age, the risk of experiencing Stunting was two times greater than mothers who did not give birth, at risky age in the city of Lubuklinggau in 2022. In 2019 a similar study was conducted by Mira Sani et al. This revealed that the majority of respondents who were married at the age of under 20 years or more than 35 years were very at high risk of stunting in children because, at that age, the bodies of the mother and the child being conceived would compete to meet nutrition and nutrition so that this had an impact on the number the nutrients needed must be more than the ideal age (20-35 years) [19].

Relationship between Parents' Income and Stunting

The results of the analysis show a value of p = 0.026 with OR = 2.315, which indicates that there is a significant relationship between parental income and the incidence of stunting in toddlers; parents who earn below the UMK are affected twice as high as parents with income above the UMK.

According to previous research conducted in Semarang, a low-income level is a risk factor for Stunting. The economic status of parents as a risk factor for Stunting is caused by the economic level, which can affect the family's ability to meet the nutritional needs of toddlers, the choice of types of

food additives and the timing of feeding them, and healthy living habits [20].

This is because families with low economic status often choose animal and vegetable side dishes at affordable or cheap prices according to their abilities. Vegetables to be processed more often take vegetables available in rice fields or fields with limited plant variations so that the daily menu served is simple and does not vary. This condition causes food intake in toddlers to be less varied, so it can indirectly cause their nutritional intake to be less [21].

The Relationship between Parents' Education and Stunting

The analysis results show that the value of p = 0.015 indicates a significant relationship between the incidence of Stunting and parents' level of education. Parental education is the crucial factor that influences the incidence of Stunting in Indonesia. The higher the education level of the father and mother, the lower the risk of the child being stunted by up to 3-5%. [22].

Relationship of ANC History to Stunting Incidents

The analysis results showed a p-value = 0.024 and OR = 2.578, which indicated a significant relationship between ANC history and the incidence of stunting in Lubuklinggau City. The risk of stunting in pregnant women who do not attend Antenatal Care (ANC) services increases by 3.4 times. ANC visits have an essential role for pregnant women, not only in preparation for childbirth but also in monitoring the health of the mother and baby during pregnancy, as well as preventing risks and complications that can occur to the mother and fetus. [23].

According to the World Health Organization (WHO), Stunting can start from the nutritional condition of pregnant women, even before pregnancy, affecting fetal growth [24].

Correlation between History of Infectious Diseases and Incidence of Stunting

The analysis results showed a value of p = 0.044 and OR = 2.878, which indicated a significant relationship between a history of infectious diseases and the incidence of Stunting. Toddlers with a history of infectious diseases were at risk of being affected by stunting three times higher than toddlers who did not have a history of infection.

These findings support the results of other studies, which show that children who experience diarrhea in the first 24 months of life tend to have shorter heights by 1.5 times and risk stunting up to 7.46 times higher than children who have never had diarrhea. They are experiencing diarrhea [25]. Then the following study found that children who had experienced infectious diseases such as ISPA had a four times higher risk of experiencing Stunting compared to children who had never experienced infectious diseases [26].

Dominant Factors of Stunting in Toddlers

Variables Low Birth Weight, Parental Income, and Parental Education Parental income has a partially significant effect or relationship to the incidence of stunting in Lubuklinggau City in 2022 because it has a p-value <0.05. However, the parent income variable is the most dominant factor influencing the incidence of stunting in toddlers in Lubuklinggau City in 2022. It can be seen from the results of the multivariate test that the parent income variable has the lowest p-value, namely 0.013 (p <0.05) when compared to the weight variable. Low Birth and Parental Education. While the other variables, namely Gender, History of Exclusive Breastfeeding, Maternal Age, History of ANC, and History of Infectious Diseases, partially had no significant effect on the incidence of stunting in Lubuklinggau City in 2022 because a value of p> 0.05 was obtained.

The results of the multivariate test in this study are similar to the multivariate test in the research conducted by Sri Mulyati et al. regarding the analysis of risk factors for stunting in Pejaten Kramatwatu Village, Serang, Banten, in 2022. It was found that parental income is the most dominant factor affecting the incidence of stunting in toddlers with p = 0.000 (p> 0.05), and the Odds Ratio (OR) is 42,061 times [27].

This finding also aligns with the results of research conducted by Yanti, who concluded that the incidence of Stunting is related to low family income. This condition forces families to meet food needs by choosing low-nutrient foods as an alternative [28].

Economic capacity is one of the crucial factors that describe the purchasing power of the people for their needs, especially the need for adequate and safe food. The low availability of food threatens to reduce the consumption of diverse, nutritionally balanced, and safe foods at the household level. Low food availability can increase the risk of producing stunted children compared to good family food availability.

4. CONCLUSION

Most of the respondents were male, some of the respondents had low birth weight, more than half of the respondents did not have a history of exclusive breastfeeding, most of the respondents were at risk of maternal age, more than half of the respondents had parents' income below the UMK, some of the respondents were secondary education of parents, most of the respondents with a history of less ANC and almost all of the respondents had a history of infectious diseases.

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