

Determinants Analysis of Increasing Incidents of Stunting among Toddlers Aged 6-59 Months

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ABSTRACT

Stunting is a condition of failure to thrive in children under five (under five years) resulting from chronic malnutrition so that the child is too short for his age. High numbers stunting in Banten Province associated with many factors, including socioeconomic status, food intake, infections, maternal nutritional status, infectious diseases, micronutrient deficiencies and the environment. Suffering child stunting will be more susceptible to disease and as adults are at risk of developing degenerative diseases. This research aims to find out analysis determinants of the increase in the incidence of stunting in children aged 6-59 months in the working area of the Cibeber Community Health Center, Cilegon City in 2024. This type of research is quantitative with a cross-sectional design. Independent variables are income, history of exclusive breastfeeding, immunization history, history of pregnancy checks, knowledge and attitudes. Meanwhile the dependent variable is stunting in toddlers aged 6-59 months. The population of all mothers who have stunted toddlers in the working area of the Cibeber Health Center, Cilegon City in 2024. The total sample of 61 people was selected by simple random sampling—statistical test using test Chi square with 95% CI and logistic regression test. The results of statistical tests show that the variables history of exclusive breastfeeding, history of immunizations, and history of pregnancy checks do not have a significant relationship with an increase in the incidence of stunting ($p > 0.05$). In contrast, the variables income ($p = 0.000$; OR=8.584), knowledge ($p = 0.000$; OR=6.685) and attitude ($p = 0.001$; OR=4.254) have a significant relationship with an increase in the incidence of stunting.

Keywords: toddlers; determinants; stunting

INTRODUCTION

The Ministry of Health announced the results of the Indonesian Nutritional Status Survey (SSGI) at the BKKBN National Working Meeting on Wednesday (25/1), where the prevalence of stunting in Indonesia fell from 24.4% in 2021 to 21.6% in 2022. The prevalence of stunting in Banten Province has decreased from 38.9% to 20.0% (Kementerian Kesehatan RI, 2022). Based on the 2022 Indonesian Nutrition Status Study (SSGI) report, the prevalence of stunting in Banten Province is 24.5% higher than that of stunting nationally at 24.40%. Prevalence stunting the largest in Banten Province is Pandeglang Regency, namely 37.8%, followed by Lebak Regency (27.30%), Serang Regency (27.2%), Serang City (23.4%), Tangerang Regency (23.3 %), Cilegon City (20.6%), South Tangerang City (19.9%) and Tangerang City (15.3%) (Kementrian Kesehatan, 2021). Number stunting in Banten Province, according to WHO is a high-level public health problem because it is based on a value cut-off prevalence of 20-30%. The national prevalence target for stunting in Indonesia in 2024 is 14% (Peraturan Presiden, 2021).

The direct causes of stunting are associated with nutritional deficiencies and infectious diseases. Indirect causes relate to household-level food supplies, knowledge, parenting patterns, health services, and environmental sanitation hygiene (Ardiana et al., 2021a; Ardiana et al., 2021b). The leading causes of stunting are poverty, low education, lack of food availability, and job opportunities. The root of the problem of stunting is an economic and political crisis (Rusliani et al., 2022; Ardiana et al., 2019). Previous studies explain that the cause of stunting is multifactorial (Yanti et al., 2020). Age is a risk factor for stunting (Kang et al., 2018; Sarma et al., 2017). The childhood phase is generally characterized by rapid growth in the first year and decreases in subsequent years (Achadi et al., 2020). Gender is also a risk factor for the occurrence of stunting toddlers in rural communities of Rajasthan, India, and percentage stunting tends to occur more frequently in boys than girls in 35 Sub-Saharan African (SSA) countries (Yaya et al., 2022). Based on the report on the

results of nutritional status monitoring (PSG) carried out in Cilegon City, data was obtained that the Cibeber Community Health Center had several stunting which was relatively high in the last two years (2023 - 2024), as many as 140 toddlers in 2024 only decreased to 138 toddlers and is still the highest ranking in Cilegon City (Dinkes Cilegon, 2024).

The efforts made to prevent and overcome nutritional problems include stunting in the Cibeber Health Center Work Area, namely by providing *Posyandu* activities, pregnancy checks, and immunizations, providing additional food for pregnant women with KEK and underweight toddlers, family planning (KB) services, providing blood supplement tablets for young women and pregnant women, giving worm medicine, classes for pregnant women, nutrition awareness family activities (*kadarzi*), management of nutritional cases, counseling regarding exclusive breastfeeding and the four gold food standards as well as the introduction of supplementary feeding at *posyandu* while in 2019 the health service carried out preventive convergence activities stunting together across sectors. So, this research aims to analyze the determinants of the increase in the incidence of stunting in toddlers aged 6-59 months in the Cibeber Health Center working area in 2024.

METHOD

This type of research is quantitative, with the design used in this research cross-sectional by analyzing factors associated with an increase in the incidence of stunting. The population in this study were all mothers with toddlers stunting in the working area of the Cibeber Community Health Center, Cilegon City, in 2024. The sampling technique in this study was simple random sampling with a total sample of 61 people. The research was conducted from February to July 2024 in the Cibeber Community Health Center, Cilegon City, 2024 working area. Data collection techniques were carried out by measuring the height of toddlers, interviews, and data collection tools, namely questionnaires filled out by respondents.

RESULT

Univariate Analysis

This primary data was collected through questionnaires conducted on 61 respondents. This univariate data consists of income, history of exclusive breastfeeding, history of immunization, history of pregnancy checks, knowledge, and attitudes as independent variables and stunting as the dependent variable. The following is a univariate statistical test analysis.

Table 1. Frequency Distribution Analysis of Determinants of Increased Stunting Incidents in Toddlers 6-59 Years in the Cibeber Health Center Area, Cilegon City, 2024

Variable	Frequency	Percentage
Independent Variable		
Income		
Low < Rp. 2,727,812	44	72.1
High > Rp. 2,727,812	17	27.9
History of Exclusive Breastfeeding		
No	17	27.9
Yes	44	72.1
Immunization History		
Incomplete	31	50.8
Complete	30	49.2
Examination History Pregnancy		
It is not in accordance with	32	52.5
In accordance	29	47.5
Knowledge		
Not Good	49	80.3
Good	12	19.7
Attitude		
Negative	37	60.7
Positive	24	39.3
Dependent Variable		
Stunting		
Very Short	43	70.5
Short	18	29.5

Based on the table above on the independent variables of the 61 respondents, most low-income respondents were 44 (72.1%) respondents, based on their history of exclusive breastfeeding, most respondents had 44 (72.1%) respondents, while based on their immunization history some respondents had an incomplete history of 31 (31). 50.8%) respondents, based on history of pregnancy checks. Some respondents had an inappropriate history—as many as 32 (52.5%), based on knowledge. Most respondents had insufficient knowledge, as many as 49 (80.3%) respondents. Based on attitudes, most respondents had negative attitudes, as many as 37 (60.7%). Meanwhile, in the dependent variable based on stunting status, most respondents experienced stunting with a very short z score.

Bivariate Analysis

In the bivariate analysis, the test used is the chi-square test with $p < 0.05$. The factors examined in the research that are related to the increased incidence of stunting in toddlers aged 6-59 months can be seen in the following table.

Table 2. The Relationship Between Income and Increased Stunting Incidents in Toddlers 6-59 Months in the Working Area of the Cibeber Health Center, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
Income									
Low	37	84.1%	7	15.9%	44	100%	0.000	9.690	2.690-34.903
High	6	35.3%	11	64.7%	17	100%			
Amount	26		42		68				

The table above explains the bivariate analysis results, namely the parental income variable on the increase in the incidence of stunting. These results show that most toddlers who experience stunting have low parental income (84.1%), while most toddlers who do not experience stunting have high parental income (64.7%). Based on the results of statistical tests, values obtained with a p-value of 0.000, which means there is a significant relationship between parental income and an increase in the incidence of stunting, with an OR value of 9.690 and is in the average value range (CI 95%) 2.690-34.903.

Table 3. Relationship Between History of Exclusive Breastfeeding and Increased Incidence of Stunting in Toddlers 6-59 Months in the Working Area of Cibeber Health Center, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
History of Exclusive Breastfeeding									
No	15	88.2%	2	11.8%	17	100%	0.059	4.286	0.867-21.188
Yes	28	63.6%	16	36.4%	44	100%			
Amount	43		18		61				

The table above explains the bivariate analysis results, namely the variable history of exclusive breastfeeding on the increase in the incidence of stunting. These results show that most toddlers who experience stunting do not receive exclusive breast milk (88.2%), while a small proportion of toddlers who do not experience stunting receive exclusive breast milk (36.4%). Based on the results of statistical tests, values obtained a p-value of 0.059, which means there is no significant relationship between a history of exclusive breastfeeding and an increase in the incidence of stunting, with an OR value of 4.286 and in the average value range (CI 95%) 0.867-21.188.

Table 4. Relationship Between Immunization History and Increased Incidence of Stunting in Toddlers 6-59 Months in the Cibeber Health Center Working Area, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
Immunization History									
Incomplete	25	80.6%	6	19.4%	31	100%	0.077	2.778	0.878-8.792
Complete	18	60%	12	40%	30	100%			
Amount	43		18		61				

The table above explains the bivariate analysis results, namely the variable history of toddler immunization on the increase in the incidence of stunting. These results show that most toddlers who experience stunting have an incomplete immunization history (80.6%), while a small proportion of toddlers who do not experience stunting have a complete immunization history (40%). Based on the results of statistical tests, values are obtained p value amounting to 0.077, which means there is no significant relationship between the history of toddler immunization and an increase in the incidence of stunting, with an OR value of 2.778 and is in the average value range (CI 95%) 0.878-8.792.

Table 5. Relationship Between Pregnancy Examination History and Increased Incidence of Stunting in Toddlers 6-59 Months in the Cibeber Health Center Working Area, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
Pregnancy Examination History									
Not proper	25	78.1%	7	21.9%	32	100%	0.170	2.183	0.709-6.721
Proper	18	62.1%	11	37.9%	29	100%			
Amount	43		18		61				

The table above explains the bivariate analysis results, namely the variable history of pregnancy checks on the increase in the incidence of stunting. Based on these results, it shows that most toddlers who experience stunting have a history of inappropriate pregnancy checks (78.1%), while a small proportion of toddlers who do not experience stunting have a history of appropriate pregnancy checks (37.9%). Based on the results of statistical tests, values are obtained p value amounting to 0.170, which means there is no significant relationship between a history of pregnancy checks and an increase in the incidence of stunting, with an OR value of 2.183 and is in the average value range (CI 95%) 0.709-6.721

Table 6. Relationship Between Mothers' Knowledge and Increased Stunting Incidents in Toddlers 6-59 Months in the Working Area of Cibeber Health Center, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
Knowledge									
Not enough	40	81.6%	9	18.4%	49	100%	0.000	13.333	2.995-59.362
Good	3	25%	9	75%	12	100%			
Amount	43		18		61				

The table above explains the bivariate analysis results, namely the variable maternal knowledge regarding the increase in the incidence of stunting. Based on these results show that most toddlers who experience stunting have poor maternal knowledge (81.6%). In comparison, most toddlers who do not experience stunting have good maternal knowledge (75%). Based on the results of statistical tests, values are obtained p-value equal to 0,000, which means there is a meaningful relationship between the mother's knowledge and the increase in stunting, with an OR value of 13.333 and is in the average value range (CI 95 %) 2.955-59.362.

Table 6. The Relationship Between Mother's Attitudes and Increased Stunting Incidents in Toddlers 6-59 Months in the Working Area of Cibeber Health Center, Cilegon City in 2024

Variable	Stunting						p-value	OR	CI 95%
	Yes		No		Total				
	n	%	n	%	N	%			
Attitude									
Negative	32	86.5%	5	13.5%	37	100%	0.001	7.564	2.193-26.089
Positive	5	45.8%	13	54.2%	24	100%			
Amount	43		18		61				

The table above explains the bivariate analysis results, namely the mother's attitude variable towards increasing the incidence of stunting. These results show that most toddlers who experience stunting have negative maternal attitudes (86.5%), while most toddlers who do not experience stunting have positive maternal attitudes (54.2%). Based on the results of statistical tests, values are obtained p value amounting to 0.001, which means that there is a significant relationship between the mother's attitude and the increase in the incidence of stunting, with an OR value of 7.564 and is in the average value range (CI 95 %) of 2.193-26.089.

Multivariate Analysis

Variables included in the multivariate analysis are variables with a p-value <0.25 in bivariate selection. The following are the multivariate candidate variables.

Table 7. Multivariate Candidate Variables

Variable	p-value
Income	0.000
History of exclusive breastfeeding	0.059
Immunization History	0.077
Pregnancy Examination History	0.170
Knowledge	0.000
Attitude	0.001

Based on the conditions obtained, all variables qualify as covariate variables. In multivariate modeling, variables with a p-value > 0.1 are removed from the model one by one, starting with the variable with the largest p-value.

Table 8. First Multivariate Modeling

Variable	B	p-value	Exp B
Income	1.870	0.019	6.491
History of exclusive breastfeeding	0.738	0.504	2.093
Immunization History	0.923	0.257	2.518
Pregnancy Examination History	0.241	0.782	1.273
Knowledge	1.354	0.138	3.874
Attitude	1.440	0.062	4.222
Constant = 3.072			

Table 9. Second Multivariate Modeling

Variable	B	p-value	Exp B
Income	1.905	0.016	6.721
History of exclusive breastfeeding	0.875	0.380	2.398
Immunization History	0.998	0.194	2.714
Knowledge	1.303	0.143	3.682
Attitude	1.459	0.057	4.303
Constant = 3.102			

Table 10. Third Multivariate Modeling

Variable	B	p-value	Exp B
Income	1.974	0.012	7.197
Immunization History	0.944	0.211	2.569
Knowledge	1.357	0.126	3.884
Attitude	1.448	0.057	4.254
Constant = 2.294			

Table 11. Fourth Multivariate Modeling

Variable	B	p-value	Exp B
Income	1.825	0.003	8.584
Knowledge	1.525	0.007	6.685
Attitude	1.386	0.016	4.254
Constant = 1.734			

From the fourth multivariate modeling analysis, the resulting logistic equation is as follows:

$$\text{Logit } p(\text{Stunting}) = 1.734 + (1.825 \cdot \text{Income}) + (1.525 \cdot \text{Knowledge}) + (1.386 \cdot \text{Attitude})$$

The multivariate analysis shows that the variables significantly related to the increase in the incidence of stunting are the mother's income, knowledge, and attitude. The results of the OR analysis of income were found to be 8,584. This can be interpreted to mean that those with low income are at risk of increasing the incidence of stunting 8,584 times compared to those with high income after controlling for other variables. The OR of knowledge is 6.685. This can mean that poor knowledge is at risk of increasing the incidence of stunting 6.685 times compared to good knowledge after controlling for other variables. The OR for attitude is 4.254. This can mean that a negative attitude is at risk of increasing the incidence of stunting 4.254 times compared to a positive attitude after being controlled for other variables. The independent variable that has the greatest influence on increasing the incidence of stunting is the variable that has the largest OR. The greater the OR of an independent variable, the greater its influence on the dependent variable. Thus, in this study, the variable that has the greatest influence on the increase in the incidence of stunting is income.

DISCUSSION

The Relationship Between Parental Income and Increased Stunting Incidents

The results of the univariate analysis show that most respondents have low incomes. Meanwhile, the bivariate analysis results statistically show that income has a significant relationship with the increase in the incidence of stunting, as shown by the p-value of 0.000 and (CI 95%) 2.690-34.903.

The results of this research are in line with research conducted by Sakti et al. (2018) about Risk Factors of Stunting Cases in Children Aged 24-59 Months in the Slums of Makassar City, where research results show that family income is at risk of influencing stunting.

The results of this research also support the theory that low income causes households not to have the purchasing power for nutritious food for their toddlers, especially sources of animal protein such as fish, chicken, meat, eggs, and fruit to support the growth of toddlers. Animal protein is the best protein and has a complete amino acid composition for the growth process (Achadi et al., 2020)

According to researchers, economic factors play an important role in determining health status, where if someone has a high economy or income, they will usually have good education and knowledge. Apart from that, knowledge is the basis for a person to differentiate between what is good and what is not good, of course, a lifestyle such as Eating habits will be different, and this cannot be separated from the purchasing power of nutritious food in everyday life.

Poverty is one of the factors causing stunting because it affects the condition of family food insecurity and parenting patterns and is related to environmental hygiene and sanitation conditions (UNICEF 1990 in (Achadi et al., 2020).

The Relationship Between History of Exclusive Breastfeeding and Increased Stunting Events

The results of the univariate analysis show that most respondents exclusively breastfeed. Meanwhile, the results of bivariate analysis statistically show that a history of exclusive breastfeeding does not have a significant relationship with the increase in the incidence of stunting, as shown by a p-value of 0.059 and (CI 95%) 0.867-21.188.

The results of this research are in line with research conducted by (Setiawan et al., 2018) regarding Factors Associated with the incidents of Stunting in Children Aged 24-59 Months in the Andalas Health Center Working Area, East Padang District, Padang City, in 2018, where the research results show that there is no significant relationship between exclusive breastfeeding status and the incidence of stunting.

According to researchers, exclusive breast milk is very important for babies up to 6 months without giving food or other drinks. Apart from being rich in nutrients, the content of breast milk is also suitable for the baby's digestion so that the immunity of babies who receive breast milk is better. Still, several conditions can cause the baby to If they don't get exclusive breast milk, such as breast milk that doesn't come out or sucks in, this can be replaced with formula milk of various brands and types on the market. But the best nutrition for babies is breast milk.

This is because stunting is not only determined by the status of exclusive breastfeeding but is also influenced by other factors such as the quality of Complementary Food for Breast Milk (MP-ASI), the adequacy of nutritional intake given to children every day, and the health status of the baby (Hindrawati N & Rusdiarti R, 2018)

The Relationship Between Immunization History and Increased Stunting Incidents

The results of univariate analysis show that some of the respondents had an incomplete immunization history. Meanwhile, the bivariate analysis results statistically show that immunization history does not have a significant relationship with the increase in the incidence of stunting as indicated by the p-value of 0.077 and (CI 95%) 0.878-8.792.

The results of this research are in line with research conducted by (Sutriyawan et al., 2020) Regarding the Relationship between Immunization Status and History of Infectious Diseases with the Incident of Stunting in Toddlers: Retrospective Study, where the results of the research show that there is no significant relationship between immunization status and the incidence of stunting in toddlers.

Even though a toddler's immunization is complete, it does not mean they are free from stunting because several other factors can cause stunting. Several factors cause stunting, including knowledge, exclusive breastfeeding, poor sanitation because there are no latrines, stagnant water channels, open rubbish bins, an unclean environment, parental education, parental employment, parental income, the child's gender, Low Birth Weight (LBW), birth length of toddlers and mothers who rarely wash their hands using clean water and soap (Sutriyawan et al., 2020).

According to researchers, immunization is to maintain toddlers' immunity into adulthood. Complete basic immunization is a mandatory immunization that must be given to toddlers. If toddlers are not immunized from infancy, they can be easily attacked by infectious diseases, have poor appetite, and impaired absorption of nutrients, which will increase their nutritional needs. The need for macro and micronutrients is very high in toddlers' first 2 years of life to support the rapid growth phase (Sutriyawan et al., 2020).

The Relationship Between Pregnancy Examination History and Increased Stunting Incidents

Results of univariate analysis show that most respondents had a history of inappropriate pregnancy checks. Meanwhile, the results of bivariate analysis statistically show that a history of pregnancy checks does not have a significant relationship with the increase in the incidence of stunting as indicated by the p-value of 0.170 and (CI 95%) 0.709-6.721.

The results of this research are in line with research conducted by Ramadhini et al. (2021) regarding the Relationship between Antenatal Care and the Incidence of Stunting in Toddlers Aged 0-24 Months in the Seberang Padang Health Center Working Area in 2019, where the results of the study showed that there was no significant relationship between Antenatal care visits and the incidence of stunting.

ANC is divided into quality and quantity. The quantity of ANC is the number of times the mother visits during pregnancy, while the quality of ANC is the examination of what the mother has done during visits to the health center (Ramadhini et al., 2021).

According to researchers, education and intervention are needed for pregnant women regarding stunting prevention from the start of pregnancy. This activity can reduce stunting rates in the area. With a good maternal understanding, salt consumption behavior during pregnancy can be reduced. Puskesmas also needs to carry out door-to-door activities to check pregnancy for pregnant women in the area. Because there are still pregnant women who lack access during pregnancy. Pregnancy checks need to be carried out to optimize the mental and physical health of the mother and baby (Heryanto, 2021)

The Relationship Between Maternal Knowledge and Increased Stunting Incidents

The results of the univariate analysis show that most respondents have insufficient knowledge. Meanwhile, the bivariate analysis results statistically show that knowledge has a significant relationship with increasing the incidence of stunting, as shown by a p-value of 0.000 and (CI 95%) 2.955-59.362.

The results of this research are in line with research conducted by Septmarini et al. (2019) concerning the Relationship between Knowledge and Responsive Feeding Attitudes and Stunting Incidents in Infants Aged 6-24 Months in the Bandarharjo Community Health Center Working Area, Semarang. The research results show a significant relationship between knowledge and the incidence of stunting.

The research results support the theory of the causes of stunting, which states that low maternal knowledge affects the mother's ability to understand the nutrition and health messages given, resulting in the mother not having good, healthy nutrition behavior. Mothers with medium-high education will improve their child-rearing patterns and have a better role in family decision-making regarding children's health and nutrition (EL Achadi et al., 2020).

Knowledge and awareness about child nutrition are very important for toddlers to ensure adequate and appropriate feeding and childcare practices, so parental education is important. Education will influence a person's knowledge, attitudes, and behavior. Low maternal education is related to parenting patterns, childcare, selection, and food presentation to children and influences the mother's ability to absorb the nutritional and health information obtained (Kurniyawan et al., 2023).

Parenting patterns related to toddlers' health and diet in the first years of life have an important role in children's development at a later age. Parenting patterns also differ in each family, influenced by various supporting factors such as the mother's educational background, the number of children in the family, the mother's nutritional status, the mother's occupation, and so on. The level of knowledge influences food consumption patterns, namely, how to select food ingredients in terms of quality and quantity (Apriluana & Fikawati, 2018)

The Relationship Between Maternal Attitudes and Increased Stunting Incidences

The results of the univariate analysis show that most respondents have a negative attitude. Meanwhile, the bivariate analysis results statistically show that the mother's attitude has a significant relationship with the increase in the incidence of stunting, as shown by a p-value of 0.001 and (CI 95%) 2.193-26.089.

The results of this research are in line with research conducted by (Septamarini et al., 2019) regarding the Relationship between Knowledge and Responsive Feeding Attitudes and Stunting Incidents in Infants Aged 6-24 Months in the Bandarharjo Health Center Working Area, Semarang. The research results show a significant relationship between attitudes and the incidence of stunting.

According to research by Intan Rahma, the mother's attitude is related to good feeding practices, which can be seen from good responsiveness, thereby increasing the child's interest and appetite. Sufficient knowledge without attitude. Sufficient knowledge and attitudes are needed to meet children's nutritional needs and recommendations through feeding practices to achieve optimal nutritional status.

CONCLUSION

This study concludes a significant relationship between income, knowledge, and attitudes and increased stunting in toddlers aged 6-59 months in the Cibeber Community Health Center working area in 2024. However, there is no significant relationship between a history of exclusive breastfeeding, immunization history, and pregnancy check-ups; the most dominant variable in this study is the income variable.

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