



# Factors Associated with the Incidence of Stunting in Toddlers Aged 24 - 59 Months in the Working Area of the Oebobo Health Center, Kupang City

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**Abstract:** This study aims to identify the factors that can affect the incidence of stunting so it can reduce the incidence of stunting, especially in NTT Province. The type of research that will be used is analytic observational with a cross-sectional research design, which looks for the relationship between the independent variables, namely Low Birth Weight (LBW), exclusive breastfeeding, complementary feeding, maternal education, and economic status, with the dependent variable being stunting in toddlers at a certain time. The study was conducted at the Integrated Healthcare Center, located in the working area of the Oebobo Health Center from 2020 to 2021 with a sample of 98 children under five. The sample was selected by consecutive sampling. The research material used was a validated questionnaire and height measurements using a stature meter. Then read the results according to the growth curve according to WHO. The data analysis used is the Spearman correlation test. Based on the 98 samples studied, there were 22 toddlers (22.4%) experiencing stunting and 19 toddlers (19.4%) experiencing severe stunting. From the bivariate analysis, it was found that there was a significant relationship between economic status and stunting ( $p = 0.030$ ). Then there was no significant relationship between LBW ( $p = 0.434$ ), exclusive breastfeeding ( $p = 0.059$ ), complementary foods ( $p = 0.059$ ), maternal education ( $p = 0.098$ ) with the incidence of stunting. In toddlers aged 24–59 months, there is a significant relationship between economic status and stunting, meaning that the lower the economic status of the family, the incidence of stunting will increase.

**Keywords:** Complementary feeding; Exclusive breastfeeding; Low birth weight; Stunting; Toddler

## Introduction

Toddlers are a group that is vulnerable to malnutrition, one of which is stunting. Stunting is a long-term nutritional disorder and can result in impaired mental development and decreased achievement in school (WHO, 2010; World Health Organization, 2015). To assess stunting can be assessed according to WHO in 2005, namely height-for-age  $< -2$  SD (WHO, 2010).

Based on the Basic Health Research results in 2018, the prevalence of toddlers aged 0-59 months who were

stunted was 30.8% (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2019). The prevalence of stunting in 2018 decreased compared to previous years, namely in 2013 at 37.2%, in 2010 (35.6%) and 2007 (36.8%) (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2013)

Maternal education is one of the factors that influence the occurrence of stunting (Abuya et al., 2012; Handayani et al., 2017; Utami et al., 2019). This can be seen from the results of RISKESDAS 2018 where mothers who are not in school and do not graduate from

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elementary school have toddlers with a higher prevalence of stunting than mothers who go to school. Likewise, with income in the family. Families who do not work or work with insufficient income, the prevalence of stunting is higher (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2019) Stunting is also associated with non-exclusive breastfeeding and early complementary feeding, as well as low birth weight babies (De Onis & Branca, 2016; Paudel et al., 2012; Permadi et al., 2016; WHO, 2014)

East Nusa Tenggara (known with NTT) is one of the provinces in Indonesia that needs special attention regarding the problem of stunting. NTT Province ranked second in the very short category with a percentage of 16%, and ranked first in the short category with a percentage of 26.7% based on the results of RISKESDAS 2018.2 Meanwhile, in 2010 and 2013 NTT Province ranked first in the prevalence of the highest incidence of stunting nationally (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2010, 2013). This is one of the main problems that needs to be considered not only by the NTT government but also by the central government. Therefore, it is necessary to examine the factors that can influence the incidence of stunting in NTT.

The results of Ni'mah & Nadhiroh (2015) research show that there is a relationship between birth length of toddlers, exclusive breastfeeding history, family income, maternal education and maternal nutritional knowledge on the incidence of stunting in toddlers. Integrated and multisectoral programs are needed to increase family income, maternal education, maternal nutritional knowledge and exclusive breastfeeding to reduce the incidence of stunting.

The results of the analysis conducted by Aridiyah et al. (2015) show that the factors that influence the occurrence of stunting in children under five years of age in rural and urban areas are maternal education, family income, maternal knowledge about nutrition, exclusive breastfeeding, age of complementary feeding, zinc and iron adequacy levels, history of infectious diseases and genetic factors. However, maternal employment status, number of family members, immunization status, energy adequacy level, and LBW status did not affect the occurrence of stunting. (Nshimiyiryo et al., 2019; Shine et al., 2017)

Kusumawati et al. (2018) findings showed that 70.7% of children were stunted. Bivariate analysis showed a strong correlation between the incidence of stunting in newborns and infant birth weight, maternal employment status, and average parental income. The most important risk factor among these factors was newborn birth weight (World Health Organization, 2014). In other words, when the sex of the child, family size, education level of the father and mother,

occupational position of the mother, and average income of the parents were taken into account, children born with low birth weight had a 3.12 times greater risk of being stunted compared to children born with normal weight. The purpose of this study is to identify the factors that can affect the incidence of stunting so it can reduce the incidence of stunting, especially in NTT Province.

## Method

The type of research that will be used is observational with an analytic cross-sectional research design, which is looking for the relationship of the independent variables, namely LBW, exclusive breastfeeding, complementary feeding, maternal education and economic status with the dependent variable, namely stunting in toddlers at a certain time. This study was conducted at the posyandu in the working area of Puskesmas Oebobo Kupang City. This research was conducted from 2020 to 2021, considering the covid pandemic so that many toddler posyandu were closed, the research was adjusted to the service schedule.

The population in this study were toddlers aged 24 months to 59 months. The selection was consecutive sampling, namely the selection of samples by determining subjects who met the research criteria. The sample size needed in examining the risk factors for stunting is using the Taro Yamane and Slovin formulas (Formula 1):

$$n = \frac{N}{N \times d^2 + 1} \quad (1)$$

n = number of samples

N = Total population. The number of under-fives in the oebobo puskesmas working area is 4,152.

d<sup>2</sup> = precision (set at 10% with 95% confidence level)

$$n = \frac{N}{N \times d^2 + 1} = \frac{4152}{4152 \times (0,1)^2 + 1}$$

## Result and Discussion

The results of the study are in the form of univariate analysis of the independent variables (LBW, exclusive breastfeeding, complementary feeding, mother's education, economic status) and the dependent variable (stunting) and bivariate analysis (the relationship between the independent variables and stunting) using the Spearman test.

*Univariate Analysis*  
*Distribution of Independent Variables*

**Table 1.** Distribution of Independent Variables

Characteristics	Frequency	
	Total	Percent
Baby's Weight at Birth		
BBLR	7	7.1
BBL normal	91	92.9
Breastfeeding		
Exclusive breastfeeding	89	90.8
Non-exclusive breastfeeding	9	9.2
Timing of complementary feeding		
Complementary feeding ≥6 months	67	68.4
Complementary feeding <6 months	31	31.6
Mother's Education		
Not in school	1	1.0
Elementary School	11	11.2
Junior High School	8	8.2
Senior High School	52	53.0
Bachelor Degree	26	26.6
Economic Status		
Very low income (Quintiles 1)	20	20.4
Low income (Quintiles 2)	25	25.5
Moderate income (Quintiles 3)	18	18.4
Middle to upper income (Quintiles 4)	21	21.4
High income (Quintiles 5)	14	14.3

Based on the independent variable data, the weight of the baby at birth is categorized into 2, namely LBW and normal LBW. The number of samples with low birth weight (LBW) was 7 people (7.1%) and normal LBW was 91 people (92.9%). Breastfeeding variables were categorized into 2, namely exclusive breastfeeding and non-exclusive breastfeeding. The number of samples who were exclusively breastfed was 89 people (90.8%) while the number of samples who were non-exclusively breastfed was 9 people (9.2%).

The complementary feeding variable was categorized into 2, namely complementary feeding ≥6 months and complementary feeding <6 months. For those who breastfed ≥6 months were 67 people (68.4%) and breastfeeding <6 months were 31 people (31.6%). In the mother's education variable, 1 respondent was found to be out of school (1%), for elementary school 11 people (11.2%), junior high school 8 people (8.2%), high school 52 people (53%) and college graduates as many as 26 people (26.6%). In the economic status variable, categorized into 5 quintiles, namely quintile 1 with very low income is 20 people (20.4%), quintile 2 with low income is 25 people (25.5%), quintile 3 with moderate income is 18 people (18.4%), quintile 4 with middle to upper income is 21 people (21.4%) and quintile 5 with high income is 14 people (14.3%).

*Distribution of dependent variables*

**Table 2.** Distribution of dependent variables

Height Criteria by Age	Total	Frequency
		Percent
High	3	3.1
Normal	54	55.1
Short ( <i>stunting</i> )	22	22.4
Very Short ( <i>severe stunting</i> )	19	19.4

Based on the table of height according to age, the number of samples included in the high criteria was 3 people (3.1%), normal criteria were 54 people (55.1%), stunting criteria were 22 people (22.4%) and severe stunting criteria were 9 people (19.4%).

*Bivariate Analysis*

Bivariate analysis in this study correlates toddlers who are stunted with LBW, breastfeeding, complementary feeding, maternal education and economic status.

**Table 3.** LBW, breastfeeding, complementary feeding, mother's education and economic status on stunting

			Stunting
Spearman's rho	BBLR	Correlation	0.017
		Coefficient	0.434
		Sig. (1-tailed)	98
		N	
	Exclusive breastfeeding	Correlation	0.159
		Coefficient	0.059
		Sig. (1-tailed)	98
		N	
	Complementary feeding	Correlation	0.159
		Coefficient	0.059
		Sig. (1-tailed)	98
		N	
	Mother's Education	Correlation	-0.132
		Coefficient	0.098
		Sig. (1-tailed)	98
		N	
	Economic Status	Correlation	-0.190
		Coefficient	0.030
		Sig. (1-tailed)	98
		N	

Based on the results of the Spearman test, it was found that there was a significant relationship between economic status and stunting with the calculation results smaller than 0.05, namely 0.03 although the relationship was very weak with a correlation coefficient of -0.190, meaning that the lower the economic status of a family, the higher the incidence of stunting. While other independent variables such as LBW, exclusive breastfeeding, complementary feeding and maternal

education the calculation results are greater than 0.05 so it is considered that there is no meaningful relationship.

Stunting is a problem that is still one of the health problems, especially in NTT Province where it still ranks first in Indonesia based on data from RISKESDAS in 2018. (Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI, 2019)

The purpose of this study is to reduce stunting rates by examining what factors can cause stunting. For this reason, a study was conducted on toddlers aged 24 months - 59 months at the posyandu in the Oebobo Health Center working area. The research was conducted using a validated questionnaire. The questionnaire was conducted by interviewing the parents of toddlers. Before the interview using the questionnaire, toddlers measured their height using a stature meter.

Based on data collection and data processing using SPSS, there was a significant result between economic status and stunting with a significance value of 0.03 (less than 0.05). These results are in accordance with research in Mexico which examined children aged 6 - 23 months who were affected by stunting in urban and rural areas, and found that in rural areas the risk of stunting was higher for fathers who worked as farmers while in urban areas the risk of stunting occurred in fathers having unstable jobs. The work of the father affects the family's income and economic status so that it is closely related to stunting. (Reyes et al., 2004) Less or unstable income will affect the food consumed by toddlers less varied and less nutritious so that it greatly affects the occurrence of stunting. For other independent variables such as LBW, exclusive breastfeeding, complementary feeding and maternal education, there was no significant relationship with a significance value of more than 0.05.

The relationship between LBW and stunting has a significance value of 0.434, which means there is no significant relationship between variables. This is not in accordance with research conducted by Aryastami et al that babies born with LBW have a greater chance of experiencing stunting. (Aryastami et al., 2017) The absence of a significant relationship between LBW and stunting can also be caused by the effect of birth weight on stunting is greatest at the age of 6 months and then decreases until the age of 2 years. If in the first 6 months toddlers can pursue growth, there is a chance that toddlers can grow to normal height and avoid stunting at a later age. (Aini et al., 2018)

Exclusive breastfeeding and stunting have a significance value of 0.059, meaning there is no significant relationship. The results obtained are not in accordance with research conducted by Lestari et al that exclusive breastfeeding has an important factor in reducing the incidence of stunting. Exclusive breastfeeding can reduce the prevalence of stunting in

children under five years of age. (Lestari et al., 2018; Rollins et al., 2016)

In the variable of early complementary feeding with stunting, it has a significance value of 0.059, meaning that there is no significant relationship between variables. This result is not in accordance with research conducted by Fikadu et al, who in their research stated that an earlier time in introducing children to complementary foods will affect their nutritional status because of their immature digestive and immune systems and affect stunting. (Fikadu et al., 2014; Kumar & Singh, 2015)

From this study, non-exclusive breastfeeding and early complementary feeding did not have significant results, this is because if toddlers already get adequate nutritional intake every day, they have the opportunity to avoid stunting.

Maternal education and stunting also did not have meaningful results with a significance value of 0.098. The results of this study differ from research conducted by Rahayu et al that maternal education has a significant relationship with stunting. The level of education, especially the mother's education level, affects health status. This is related to her role in the formation of children's eating habits, because it is the mother who prepares food from organizing menus, shopping, cooking, preparing food, and distributing food. In addition, mothers who have an education  $\geq$  junior high school tend to be better at parenting and better at choosing the type of food for their children. This is because mothers with education  $\geq$  junior high school have a greater opportunity to access information about children's nutritional status and health so that their knowledge increases. Then the information is practiced in the process of child care which will have an impact on the nutritional status and better health of children. (Rahayu & Khairiyati, 2014) In this study, only 1 mother did not attend school and 11 had elementary school education, while 86 mothers continued their education to junior high school level and so on, so this is one of the causes of the results that are not meaningful between variables because there are still many mothers of toddlers studied who have higher education.

## Conclusion

Based on the results of research on factors affecting stunting in toddlers in the Oebobo Health Center working area, it can be concluded that there is a significant relationship between economic status and stunting, meaning that the lower the economic status of the family, the incidence of stunting will increase. Then there is no significant relationship between LBW and stunting. This is because toddlers can still pursue growth in the first 6 months so that they have the opportunity to

have normal height, there is no significant relationship between non-exclusive breastfeeding and early complementary feeding with stunting because toddlers already get adequate nutritional intake every day, and there is no significant relationship between maternal education and stunting because in this study most mothers have a high education.

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#### Author Contributions

Herlince Wehelmina Amalo: conceptualization, writing-original draft preparation, methodology, formal analysis, investigation, visualization; Irene Davidz: writing - review and editing, supervision, validation, and resources.

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#### Conflicts of Interest

The authors declare no conflict of interest.

#### References

- Abuya, B. A., Ciera, J., & Kimani-Murage, E. (2012). Effect of mother's education on child's nutritional status in the slums of Nairobi. *BMC Pediatrics*, 12(1), 1-10. <https://doi.org/10.1186/1471-2431-12-80>
- Aini, E. N., Nugraheni, S. A., & Pradigdo, S. F. (2018). Faktor yang mempengaruhi stunting pada balita usia 24-59 bulan di Puskesmas Cepu Kabupaten Blora. *Jurnal Kesehatan Masyarakat (Undip)*, 6(5), 454-461. <https://doi.org/https://doi.org/10.14710/jkm.v6i5.22070>
- Aridiyah, F. O., Rohmawati, N., & Ririanty, M. (2015). Faktor-faktor yang Mempengaruhi Kejadian Stunting pada Anak Balita di Wilayah Pedesaan dan Perkotaan (The Factors Affecting Stunting on Toddlers in Rural and Urban Areas). *Pustaka Kesehatan*, 3(1), 163-170. Retrieved from <https://jurnal.unej.ac.id/index.php/jpk/article/view/2520>
- Aryastami, N. K., Shankar, A., Kusumawardani, N., Besral, B., Jahari, A. B., & Achadi, E. (2017). Low birth weight was the most dominant predictor associated with stunting among children aged 12-23 months in Indonesia. *BMC Nutrition*, 3(1), 1-6. <https://bmcnutr.biomedcentral.com/articles/10.1186/s40795-017-0130-x>
- Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. (2010). *Riset Kesehatan Dasar*.
- Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. (2013). *Riset Kesehatan Dasar*.
- Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. (2019). *Riset Kesehatan Dasar*.
- De Onis, M., & Branca, F. (2016). Childhood stunting: a global perspective. *Maternal & Child Nutrition*, 12, 12-26. <https://doi.org/10.1111/mcn.12231>
- Fikadu, T., Assegid, S., & Dube, L. (2014). Factors associated with stunting among children of age 24 to 59 months in Meskan district, Gurage Zone, South Ethiopia: a case-control study. *Bmc Public Health*, 14(1), 1-7. <https://doi.org/https://doi.org/10.1186/1471-2458-14-800>
- Handayani, F., Siagian, A., & Aritonang, E. Y. (2017). Mother's education as A determinant of stunting among children of age 24 to 59 months in North Sumatera province of Indonesia. *IOSR Journal of Humanities and Social Science*, 22(06), 58-64. <http://dx.doi.org/10.9790/0837-2206095864>
- Kumar, A., & Singh, V. K. (2015). A Study of Exclusive Breastfeeding and its impact on Nutritional Status of Child in EAG States. *Journal of Statistics Applications & Probability*, 4(3), 435.
- Kusumawati, M. R. D., Marina, R., & Wuryaningsih, C. E. (2018). Low Birth Weight As the Predictors of Stunting in Children under Five Years in Teluknaga Sub District Province of Banten 2015. *KnE Life Sciences*, 284-293. <https://doi.org/https://doi.org/10.18502/cls.v4i10.3731>
- Lestari, E. D., Hasanah, F., & Nugroho, N. A. (2018). Correlation between non-exclusive breastfeeding and low birth weight to stunting in children. *Paediatrica Indonesiana*, 58(3), 123-127. <https://doi.org/https://doi.org/10.14238/pi58.3.2018.123-7>
- Ni'mah, K., & Nadhiroh, S. R. (2015). Faktor yang berhubungan dengan kejadian stunting pada balita. *Media Gizi Indonesia*, 10(1), 13-19. Retrieved from <http://repository.unair.ac.id/id/eprint/125307>
- Nshimiyiryo, A., Hedt-Gauthier, B., Mutaganzwa, C., Kirk, C. M., Beck, K., Ndayisaba, A., Mubiligi, J., Kateera, F., & El-Khatib, Z. (2019). Risk factors for stunting among children under five years: a cross-sectional population-based study in Rwanda using the 2015 Demographic and Health Survey. *BMC Public Health*, 19(1), 1-10. <https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-6504-z>

- Paudel, R., Pradhan, B., Wagle, R. R., Pahari, D. P., & Onta, S. R. (2012). Risk factors for stunting among children: a community based case control study in Nepal. *Kathmandu University Medical Journal*, 10(3), 18-24.  
<https://doi.org/https://doi.org/10.3126/kumj.v10i3.8012>
- Permadi, M. R., Hanim, D., Kusnandar, K., & Indarto, D. (2016). Early breastfeeding initiation and exclusive breastfeeding as risk factors of stunting children 6-24 months-old. *Nutrition and Food Research*, 39(1), 9-14.  
<https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-019-6504-z>
- Rahayu, A., & Khairiyati, L. (2014). Risiko pendidikan ibu terhadap kejadian stunting pada anak 6-23 bulan. *Nutrition and Food Research*, 37(2), 129-136.  
<https://dx.doi.org/10.22435/pgm.v37i2.4016.129-136>
- Reyes, H., Pérez-Cuevas, R., Sandoval, A., Castillo, R., Santos, J. I., Doubova, S. V., & Gutiérrez, G. (2004). The family as a determinant of stunting in children living in conditions of extreme poverty: a case-control study. *BMC Public Health*, 4(1), 1-10.  
<https://doi.org/https://doi.org/10.1186/1471-2458-4-57>
- Rollins, N. C., Bhandari, N., Hajeebhoy, N., Horton, S., Lutter, C. K., Martines, J. C., Piwoz, E. G., Richter, L. M., & Victora, C. G. (2016). Why invest, and what it will take to improve breastfeeding practices? *The Lancet*, 387(10017), 491-504.  
[https://doi.org/10.1016/S0140-6736\(15\)01044-2](https://doi.org/10.1016/S0140-6736(15)01044-2)
- Shine, S., Tadesse, F., Shiferaw, Z., Mideksa, L., & Seifu, W. (2017). Prevalence and associated factors of stunting among 6-59 months children in pastoral community of Korahay Zone, Somali Regional State, Ethiopia 2016. *J Nutr Disorders Ther*, 7(208), 2161.  
<http://dx.doi.org/10.4172/2161-0509.1000208>
- Utami, R. A., Setiawan, A., & Fitriyani, P. (2019). Identifying causal risk factors for stunting in children under five years of age in South Jakarta, Indonesia. *Enfermeria Clinica*, 29, 606-611.  
<https://doi.org/10.1016/j.enfcli.2019.04.093>
- WHO. (2010). *Nutrition Landscape Information System (NLIS) Country Profile Indicators: Interpretation Guide* (pp. 1-2). WHO.
- WHO, U. (2014). Global nutrition targets 2025: breastfeeding policy brief (WHO/NMH/NHD14.7). Geneva: World Health Organization.
- World Health Organization. (2014). *Global nutrition targets 2025: low birth weight policy brief*. World Health Organization.
- World Health Organization. (2015). Stunted growth and development framework. Geneva: World Health

Organization, 4.