



Maternal Characteristics and Feeding Practices and Its Relationships with the Incidence of Toddlers Stunting in Dompu, West Nusa Tenggara, Indonesia

Raisa Namira¹, Ahmad Syaury^{1,2}, Ani Margawati^{1,2}, Diana Nur Afifah^{*1,2,3}

¹Department of Nutrition Science, Faculty of Medicine, Universitas Diponegoro, Jl. Prof. Mr Sunario, Tembalang, Semarang 50275, Indonesia

²Center of Nutrition Research (CENURE) Jl. Prof. Mr Sunario, Tembalang, Semarang 50275, Indonesia

³SDGs Center, Universitas Diponegoro, Jl. Prof. Sudarto, Tembalang, Semarang 50275, Province of Central Java, Indonesia

*Corresponding author: d.nurafifah.dna@fk.undip.ac.id

Article Info

Keywords:

toddlers, stunting, maternal characteristics, feeding practice.

Received:

11 November 2025

Accepted:

2 June 2026

Published:

30 June 2026

Abstract. This research aims to determine the relationship of maternal characteristics and feeding practices on the stunting incidence in toddlers. It was conducted using a retrospective observational method with a case-control design. A quantitative and qualitative approach was also implemented. The population used was toddlers aged 1-3 years in West Dompu Public Health Center. Furthermore, purposive sampling was used to select the 46 respondents in each group. Data were collected using questionnaires, in-depth interviews, and observations. Meanwhile, the analysis was conducted through the univariate, bivariate, multivariate, and qualitative methods. The results of the qualitative analysis showed that the eating habits of some of the toddlers could lead to stunting. These findings were supported by quantitative results showing that inadequate nutrient intake significantly increased stunting risk, with energy adequacy as the strongest predictor (OR = 16.89). These habits were the consumption of less diverse food types, intake of food that do not meet nutritional standards, and the belief in certain foods. Inappropriate parenting and irregular eating patterns were also found to increase the incidence of stunting. However, inadequate energy was the most dominant causative factor.

DOI: 10.14710/jsp.0.30034

1. Introduction

One of the consequences of chronic malnutrition in children is stunting, which reflects impaired linear growth due to prolonged inadequate nutrient intake¹. Stunting is a condition where toddlers are shorter than the average height for their age. It could occur

due to a prolonged inadequate intake of nutrients and from infectious diseases. The condition is irreversible and occurs in children less than two years of age².

A toddler is classified as stunted when the height-for-age Z-score (HAZ) is between -3 and <-2 SD, and severely stunted when it is <-3 SD, the child is categorized as very short and severely stunted³. The HAZ indicator itself shows the presence of chronic nutritional problems due to long-standing conditions³. Based on Riskesdas 2018, the prevalence of stunting was 30.8%, which decreased to 21.6% according to the 2022 Indonesian Nutritional Status Survey (SSGI)⁴.

One of the provinces in Indonesia with a high incidence of the condition is West Nusa Tenggara (NTB). Where in 2016, there was a prevalence of 29.9%, while in 2017, it increased to 37.2%⁵. Based on the data recap of the weighing week in September 2018 at 5 health centers in Dompus, it was discovered that there were 675 stunted toddlers out of a total of 2,400, which is 28.13%. Furthermore, Bakajaya Village was found to have the highest number of cases at 117 or 51.77%⁶.

The research from Ricardo in Bhutta 2013 stated that stunting in toddlers contributed to 1.5 million (15%) toddler deaths in the world, as well as caused 55 million children to lose their healthy life every year⁶. According to UNICEF, there are direct and indirect causes of nutritional problems in children. Inadequate food intake and infectious diseases are direct causes, while food security, maternal parenting, as well as health and environmental services are indirect causes.

One of the important determinant factors of nutritional status of toddlers is the mother. Based on several researches, it was discovered that maternal characteristics and feeding practices are related to the incidence of stunting in toddlers. Previous studies conducted in the Andalas Public Health Center, Padang Timur District, Padang City, showed that maternal characteristics in the form of education and family income had a significant relationship with the incidence of stunting⁷. Other research related to maternal characteristics such as age were also carried out in several areas, including the work area of the Citeras Health Center⁸, The nutritional status of pregnant mothers in the working area of the Bontoa Health Center, Maros was also studied⁹. Another research was carried out at the Wonosari Hospital related to a history of anemia in pregnant women.

Previously, research has been carried out related to eating patterns in toddlers. Research in Kejawan Putih Tambak Village, Surabaya, stated that there are differences in the level of energy and protein adequacy in stunted and non-stunted toddlers¹⁰. Mothers of children aged 6-24 months in the Penanggalan Sub-district, Subussalam City also stated that non-exclusive breastfeeding and early complementary feeding are risk factors for stunting¹¹.

Based on the explanation above, Dompus is one of the areas that have a high incidence of stunting. However, limited studies have been conducted on the causative factors of stunting in Dompus Regency. This research was conducted to investigate the relationship between maternal characteristics and feeding practices on the incidence of stunting in toddlers aged 1-3 years in the Dompus area, West Nusa Tenggara, Indonesia.

2. Methodology

2.1. Design, Location, and Time

This research used a retrospective observational method with a case-control design as well as a quantitative and qualitative approach. This aimed to analyze the risk factors of stunting among toddlers aged 1-3 years related to maternal characteristics and feeding

practices by grouping the respondents into two groups, namely stunted (case) and non-stunted toddlers (control). These two samples were taken in the same area, and a qualitative descriptive method was used to obtain in-depth information related to the eating pattern of the toddlers.

The independent variables in this research were maternal characteristics such as education, family income, parity, age, illness during pregnancy, and nutritional status. Another variable is feeding practices, and it includes the history of exclusive breastfeeding and timing of complementary feeding. The variable of history of maternal illness during pregnancy is focused on the history of anemia experienced by the mother. Meanwhile, the history of nutritional status is seen based on the value of the Upper Arm Circumference of the child to determine the presence, as well as absence of CED (Chronic Energy Deficiency).

The dependent variable used was the incidence of stunting in toddlers aged 1-3 years. Confounding variables were also taken in the form of Birth Body Weight (BBW), Birth Body Length (BBL), adequacy of energy intake, and adequacy of protein intake. Finally, this research was conducted for 4 months (September-December) in Bakajaya Village in the work area of West Dompu Public Health Center, Indonesia. This research was approved by the Health Research Ethics Committee (KEPK) University of Mataram No. 238/UNI8.F7/ETIK/2019.

2.2. Sampling

The target population was all toddlers in Dompu Regency, while the population was all toddlers aged 1-3 years in the West Dompu Public Health Center. Furthermore, the informants used were mothers, cadres, village elders, and local village midwives. The following is the formula and calculation of the sample size according to Lemeshow and W Hosmer Jr, 1997 quoted in¹². The sample size was determined based on the case-control formula as follows.

$$n1 = n2 = \frac{(Z\alpha \sqrt{2PQ} + Z\beta \sqrt{P1Q1+P2Q2})^2}{(P1-P2)^2} \quad (1)$$

Based on this formula, the number of samples in this research was.

$$n1 = n2 = \frac{(1.96 \sqrt{2 \times 0.417 \times 0.582} + 0.842 \sqrt{(0.585 \times 0.415) + (0.25 \times 0.75)})^2}{(0.585 - 0.25)^2} \quad (2)$$

$$n1 = n2 = 40.7 \text{ rounding to } 41.$$

Description

n = minimum number of samples in one group (case/control)

Zα = default value based on α found (α=0.05) □ 1.960

Zβ = default value based on the specified β (β = 0.80) □ 0.842

P1 = known proportion of exposure in the case group (0.585)

P2 = known proportion of exposure in the control group (0.25)

P = ½ x (P1+P2) = ½ x (0.585 + 0.255) = 0.417

$$Q = 1 - P = 0.582$$

$$OR \text{ (Odd Ratio)} = (4.24)(13)$$

Therefore, the minimum sample size in this research was 41 samples for each case and control group. The sample size correction formula for the anticipated dropouts is.

$$n' = \frac{n}{(1-f)} = \frac{41}{(1-0.1)} = 46 \text{ samples} \quad (3)$$

Description

n' = estimated minimum sample size with drop out proportion

n = minimum sample size calculated

f = estimated drop out proportion $\pm 10\%$ of the minimum sample size

The comparison between the case and control groups was 1:1. Furthermore, the minimum sample size was 46 for the case and control groups, with a total of 92 samples. For the qualitative analysis, 10 or 10% of the total respondents were selected as samples. The sample was selected using the purposive sampling method for the case group. Furthermore, the respondents for the control group were selected according to age and gender. Sampling was then carried out by separating the case and control groups based on predetermined matching, inclusion, and exclusion criteria. The number of samples was then divided to obtain the required number.

For the 10 respondents and several selected informants, in-depth interviews related to their eating patterns were conducted. Furthermore, those who met the criteria and were willing to participate were given an informed consent form. The research procedures were explained to them.

The inclusion criteria in this research include, toddlers aged 1-3 years and mothers who have the Maternal and Child Health (MCH) handbook, those domiciled in the work area of the West Dompou Health Center, toddlers who have not suffered from chronic infectious diseases such as tuberculosis, pneumonia, congenital diseases, ARI, measles and other chronic infections such as prolonged diarrhea in the last 2 months, those who have the same access to health services, mothers of children under five who are willing to have their children become research samples by filling out an informed consent form, toddlers with a BH/Age z-score of < -2 SD according to the WHO growth standard for the case group, and -2 SD up to 2 SD for the control group. Meanwhile, the exclusion criteria were respondents who changed their domicile and resigned from the research.

2.3. Data Collection

This research used both primary and secondary data. Furthermore, the respondents' characteristics were obtained using a questionnaire and the MCH handbook. Data on feeding practices such as Breast Feeding and Complementary Feeding, as well as anthropometric data on height and weight were also obtained. Food intake was then assessed using SQ-FFQ (Semi-Quantitative Food Frequency). Finally qualitative analysis was carried out through in-depth interviews and observations. Both were conducted to gain an overview of the parenting pattern of feeding toddlers in Dompou Regency.

2.4. Data Analysis

The data were analyzed univariately for description purposes and then through bivariate analysis using statistical software (e.g., SPSS), with appropriate statistical tests applied. This analysis was used to ascertain the relationship between variables and the magnitude of risk with the chi-square test. This test was used to analyze the effect of maternal characteristics and feeding practices on the incidence of stunting in toddlers aged 1-3 years old. When this test is not sufficient, the Fisher exact test or Mann-Whitney test was used with a significance value of $p < 0.05$. Multivariate analysis was also carried out to determine which risk factors had the most influence on the dependent variable using the Logistics Regression test. This is because this variable had a nominal scale with 2 categories which significance value was $p < 0.05$. Data analysis was carried out using the qualitative method. Qualitative data analysis was conducted using thematic analysis, including data transcription, open coding, categorization, and the identification of themes to interpret participants' responses from in-depth interviews and observations.

3. Results and Discussion

This research was conducted on 92 toddlers in the working area of Bakajaya Village, West Dompu Public Health Center, Dompu Regency. Furthermore, qualitative analysis was carried out to obtain in-depth information about the description of the feeding pattern for the toddlers.

This research shows that maternal characteristics such as a history of anemia, BBL, as well as adequate energy and protein intake, have a significant relationship to the incidence of stunting. Meanwhile, the factors of maternal education, family income, parity, maternal age during pregnancy, history of maternal nutritional status, and BBL did not have a significant relationship with the incidence of stunting in toddlers. It was also showed that the practice of feeding in the form of exclusive breastfeeding and the timing of giving complementary foods did not have a significant relationship with the incidence of stunting.

This study shows that maternal characteristics such as a history of anemia, birth weight, and adequate energy and protein intake were significantly associated with the incidence of stunting. Maternal anemia may contribute to impaired fetal growth and low nutrient reserves, which can affect child growth in early life¹⁴. Similarly, inadequate energy and protein intake plays a crucial role in limiting optimal growth, as these nutrients are essential for tissue development and linear growth¹⁵.

In contrast, maternal education, family income, parity, maternal age during pregnancy, and maternal nutritional status history were not significantly associated with stunting in this study. This finding may be influenced by relatively homogeneous socioeconomic conditions among respondents or the presence of other more dominant factors such as dietary intake¹⁶. Previous studies have shown inconsistent results regarding these variables, suggesting that their effects may vary depending on the study setting and population characteristics¹⁷.

Furthermore, feeding practices such as exclusive breastfeeding and the timing of complementary feeding were not significantly associated with stunting. This may be due to variations in the quality and quantity of complementary foods provided, which were not fully captured in this study. Although these practices are generally considered important, their impact may depend on overall dietary adequacy and caregiving practices¹⁸.

Table 1: Characteristics of respondents and the relationship of various variables with the stunting incidents

	Variable	Case		Control		P value
		N	%	N	%	
1	Gender					
	– Male	24	52.2%	19	41.3%	-
	– Female	22	47.8%	27	58.7%	
2	Education					
	– High	30	65.2%	33	71.7%	0.654 ^a
	– Low	16	34.7%	13	28.2%	
3	Family Income					
	– High ($\geq 1.250.000$)	2	4.3%	4	8.7%	0.677 ^a
	– Low ($< 1.250.000$)	44	95.6%	42	91.3%	
4	Parity					
	– No risk	44	95.6%	43	93.5%	1.000 ^a
	– At risk	2	4.3%	3	6.5%	
5	Mother's age at pregnancy					
	– No risk	33	71.7%	36	78.3%	0.630 ^a
	– At risk	13	28.3%	10	21.7%	
6	History of maternal nutritional status					
	– No Chronic Energy Deficiency (CED)	28	60.8%	37	80.4%	0.067 ^a
	– CED	18	39.1%	9	19.6%	
7	History of maternal anemia during pregnancy					
	– No	1	2.2%	9	19.6%	0.019 ^{ad}
	– Yes	45	97.8%	37	80.4%	
8	Exclusive breastfeeding history					
	– Yes	34	73.9%	33	71.7%	1.000 ^a
	– No	12	26.1%	13	28.3%	
9	Complementary Feeding Time					
	– Exactly 6 months	36	78.3%	37	80.4%	1.000 ^a
	– Inappropriate (< 6 or > 6 months)	10	21.7%	9	19.6%	
10	Birth Body Weight ^c					
	– NBBW	43	93.5%	42	91.3%	1.000 ^a
	– LBBW	3	6.5%	4	8.7%	
11	Birth Body Length ^c					
	– NBBL	20	43.5%	33	71.7%	0.011 ^{ad}
	– LBBL	26	56.5%	13	28.2%	
12	Adequate Energy					0.000 ^{bd}

Variable	Case		Control		P value
	N	%	N	%	
Intake ^c	9	19.6%	41	89.1%	
– Adequate	37	80.4%	5	10.8%	
– Inadequate					
13 Adequate Protein Intake ^c	10	21.7%	33	71.7%	0.000 ^{bd}
– Adequate	36	78.3%	13	28.3%	
– Inadequate					

^aChi-square test, ^bMann-Whitney, ^cConfounding Variables, ^dSignificance <0.05

The results of the multivariate analysis showed that adequate energy intake was the most significant determinant factor for the incidence of stunting can be seen in Table 2.

Table 2: Results of multiple logistics regression analysis on the most influential risk factors for stunting

No	Variable	<i>p</i>	Odd Ratio (95%CI)
1	History of maternal nutritional status (MUAC/Mid-Upper Arm Circumference)	0.078	1 4.309 (0.847 – 21922)
	– No CED		
	– CED		
2	History of maternal anemia	0.979	1 1.033 (0.094 – 11.403)
	– No		
	– Yes		
3	Birth Body Length	0.078	1 3.443 (0.870 – 13.634)
	– NBBL		
	– LBBL		
4	Adequate Energy Intake ¹	0.000	1 16.891 (3.750 – 76.077)
	– Adequate		
	– Inadequate		
5	Adequate Protein Intake ¹	0.002	1 10.140 (2.329 – 44.149)
	– Adequate		
	– Inadequate		

OR = 1 (reference), ¹Adapted to the characteristics of the mother, the practice of breastfeeding and complementary feeding

Therefore, toddlers with sufficient energy intake tend not to experience stunting by 16.89 times compared to those with less intake (OR=16,891, CI=3,750 – 76,077). This is in line with Oktarina (2013), where toddlers with low energy intake had a 1.28 times risk of experiencing stunting compared to those with sufficient intake¹⁹. Previous research also showed that every 1% increase in the energy adequacy level will increase the z-score of BH/Age by 0.032 units²⁰.

Based on the semi-quantitative FFQ results of interviews with several mothers, it was discovered that on average, stunted children, ate less when compared to normal children. However, the type of food consumed by both groups were almost the same, including rice, side dishes, and vegetables. In the case group, some children preferred to

consume vegetable rice only and vegetable gravy, while in both groups they preferred snacks, implying they did not want to consume main meals. This is in accordance with, which stated that high snacking habits have an impact on children's energy intake and significantly affects nutrient intake²¹.

The age of 1-3 years is the early stage of a child's life and marked by growth spurts which affect the next period; hence, it is necessary to pay attention to the nutrient intake. The multivariate analysis also showed that the adequacy of protein intake had a significant effect on the incidence of stunting. Table 2 shows the multiple logistic regression analysis of the risk factors that mostly affect the incidence of stunting. In this case, toddlers with adequate protein intake tend not to experience stunting by 10.14 times compared to those with less protein intake (OR = 10.140, CI = 2.329 - 44.149). In line with this, adequate protein intake plays a crucial role in improving toddlers' nutritional status and reducing the risk of stunting²².

The most dominant variable related to the incidence of stunting is the adequacy of energy intake as it has the largest OR value of 16.89. This research has two confounding variables that affect stunting. This is in accordance with the research in Kejawan Putih Tambak Village, Mulyorejo Sub-district, Surabaya City. It stated that toddlers with inadequate protein adequacy levels had a 10.6 times greater risk of stunting compared to those with adequate protein adequacy levels²³. Furthermore, with each percentage increase in the protein adequacy level, there was an increase in the z-score for BH/Age by 0.024 units²⁰.

The semi-quantitative FFQ analysis showed that the average respondent in both the case and control groups still consumed types of animal protein such as fish, eggs, and chicken meat in various quantities. Compared to the control group, some of the case groups consumed more vegetable protein such as tofu and tempeh than animal protein. Besides, some children only like to eat rice with vegetable sauce or only vegetables. There needs to be a balance between the amount of vegetable and animal protein intake to achieve maximum protein intake. This is because animal protein is a complete type with high biological value, containing all types of essential amino acids in appropriate amounts for growth. These findings are supported by a research which stated that insufficient protein intake can inhibit growth rate¹⁰.

3.1. Eating Habits of Parents in Dompu Regency

The community in Dompu Regency has the same eating pattern as most other communities which is three main meals a day. However, there is a habit where some mothers serve breakfast in the form of porridge to their children because of the "Ngaha Kawiri" habit which is carried out every Friday. The "Ngaha Kawiri" habit, practiced every Friday, is a local tradition in which children are typically served porridge rather than a nutritionally balanced meal. This practice may influence stunting risk, as porridge generally has lower energy and protein density compared to complete meals, potentially leading to inadequate nutrient intake when consumed regularly²⁴. A complete meal in the form of rice, side dishes, and vegetables is usually given at lunch and in the afternoon. In this regency, the average food consumed was almost the same every day, including rice, with fish, chicken, or eggs, as well as tofu, tempeh, and clear or sour vegetables. Therefore, it is important for mothers to select foods that can meet the nutritional intake of children by selecting various types of food. The knowledge of mothers greatly affects the selection of food which then impacts the consumption and improvement of children's nutritional status. On the contrary, low knowledge affects children's eating patterns,

causing the inability of mothers to select and provide food to meet nutritional needs²⁵.

Referring to the eating habits of the Dompu community, the amount of staple food was usually more than the portion of side dishes and vegetables. In a house consisting of many family members, the side dishes and vegetables are divided according to the number of families. Therefore, the average family member will consume any food provided at home, regardless of the type and amount. When viewed from the pattern of feeding, the average respondent did not pay attention to the right portion and the nutritional balance of the food given. Knowledge and the ability to manage healthy food are needed for toddlers to meet the nutritional needs. It is advised that these children should be served a balanced diet, eat the right portion, not excessive, and in accordance with their age.

Based on the interviews with respondents, most mothers preferred to let their children pick the food they like, even when it is snacks. This is due to the belief that the important thing is that in a day, children have eaten rice, regardless of consuming more rice or snacks.

The "Doho kaboro weki" habit carried out by mothers could possibly affect the children's diet. The "Doho kaboro weki" habit is a local caregiving practice in which mothers tend to allow children to freely choose the foods they prefer, often resulting in a higher intake of snacks rather than nutritionally balanced meals. This behavior may increase the risk of stunting, as it can lead to insufficient intake of essential nutrients, especially energy and protein, which are critical for linear growth²⁶. However, from the results of interviews and observations, the mother's responsive feeding was not appropriate.

Responsive feeding is the ability to feed children actively and responsively, through age-appropriate feeding methods, promoting children to eat, feeding in a safe environment, using positive interactions, and responding to children's lack of appetite. Mothers with good education, specifically regarding child feeding will have a positive effect on children's nutritional status²⁷. There were 45.7% of children with relatively good parenting pattern and less stunting. Meanwhile, 90% of children with good parenting pattern had the required nutritional status and no stunting. This shows good parenting has a positive effect on the nutritional status of children.

Some breastfeeding mothers in Dompu still refer to their beliefs of not consuming sea fish because it causes breast milk to smell fishy. Meanwhile, the diet of mothers who give breast milk inappropriately has the potential to affect the growth and development of a child. This implies breastfeeding mothers should eat a balanced and varied diet. This is in line with Wardana (2018), which showed that maternal nutrient intake during breastfeeding is related to the composition of breast milk²⁸.

3.2. Research Strengths and Weaknesses

This research strength is using quantitative and qualitative approaches that can explore data sources through questionnaire interviews, in-depth interviews, and observations. A qualitative approach can help strengthen the results of quantitative research obtained. By using these two approaches, the risk factors for stunting and a description of the diet can be seen, specifically in Dompu Regency. The weakness of this research is that it uses two approaches, namely quantitative and qualitative. Therefore, it is necessary to have the skills to understand and master both approaches. Some respondents were difficult to find because at the time of data collection it was still the growing season, and they were rarely at home. Moreover, language barriers also

influenced the data collection process.

4. Conclusions

There is a significant relationship between a history of maternal anemia, birth length, as well as adequate energy and protein intake, with the incidence of stunting in toddlers aged 1-3 years in Dompu, West Nusa Tenggara, Indonesia. Furthermore, the adequacy of energy intake is the most dominant factor associated with the incidence of stunting. Eating habits, such as the consumption of diverse food types and nutrient deficient food, as well as, inappropriate parenting, and the belief in certain foods were also determined as a risk factor for stunting. There is a need for further actions toward the fulfilment of nutritional intake for toddlers to achieve maximum catch-up growth. Furthermore, proper parenting is needed to provide good eating patterns for toddlers to prevent stunting.

Acknowledgement

The authors would like to express their sincere gratitude to the local community members in Dompu, West Nusa Tenggara, Indonesia, for their valuable participation, cooperation, and support throughout the study. Their willingness to contribute their time and share information was essential to the successful completion of this research. The authors highly appreciate their kindness, hospitality, and commitment, which greatly facilitated the data collection process and enriched the quality of this study.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

Authors Contribution

R.N. contributed to data collection, data analysis, and manuscript drafting. **A.S.** contributed to study design, data interpretation, and manuscript revision. **A.M.** contributed to methodology development, supervision, and critical review of the manuscript. **D.N.A.** conceived and supervised the study, contributed to data interpretation, and finalized the manuscript. All authors have read and approved the final version of the manuscript.

References

1. Soliman A, Sanctis VD, Alaraj N, Ahmed S, Alyafei F, Hamed N. Early and Long-term Consequences of Nutritional Stunting: From Childhood to Adulthood. *Acta Biomedica*. 2021;92(1). doi: 10.23750/abm.v92i1.11346.
2. Humphries DL, Scott ME, Vermund SH. *Nutrition and Infectious Diseases: Shifting the Clinical Paradigm*. Humana Cham; 2020. doi: 10.1007/978-3-030-56913-6.
3. Survey IH. *2023 Indonesian Health Survey (SKI)*. Indonesian Health Development Policy Agency; 2023.

4. Tim Riskesdas. *National Basic Health Research Report (Riskesdas) 2018* [Internet]. Health Research and Development Agency; 2019. Available from: https://drive.google.com/file/d/1GHS6lCsSfhuIU_ZkUuKpWvI1mWJ1ZFPr/view
5. Office West Nusa Tenggara Province. *Health Profile of West Nusa Tenggara Province in 2017* [Internet]. West Nusa Tenggara Provincial Health Office; 2017. Available from: https://web-api.bps.go.id/download.php?f=9H4pNWvNJJevNKkjXCQHb0FJakraFZDY0JIY2FyZzhVcDNqd04rSll3U2hrZmVJcUJVZVVvRGlNY1NZNIhsUjh0R0EzSm5yeDFwSDBmeU91ekEzMTVwZXJJcGZXYVdLa0VtY3J0VmdMZGRGbnh2ZEIYeU8wY211ODFHbHpUQnVicXc0Tkp6YS81OHErc1hlVetZbzdSN3Mvd1gzS3RGeFkwQnJiMGNmQ0ZLaDFUZCtpQk9aT29EdGVoSXFoYlFQaWVRUWJHZExvbHNSU1Fvd0ZsMEFmYW02L0tXRnZOSWZWcUo2T0wyWGNEU1QyNVlucU4zYW5hdkhSM29pZFNKUzUxNIJGaVBTRmcvS3BpTDIvUWU5bENPS1hqBUJzMOI4NTZtYXFRT0=&_gl=1*acv635*_ga*MTk1NTg2MDUuMTc4MDYzOTcwNw.*_ga_XXT TVXWHDB*czE3ODA2Mzk3MDckbzEkZzAkdDE3ODA2Mzk3MDckajYwJGwwJGgw
6. Office DH. *Dompu Regency Stunting Data Based on Weighing Week Data for September 2018*. Dompu Health Office; 2018.
7. Setiawan E, Machmud R, Masrul M. Factors Associated with the Incidence of Stunting in Children Aged 24-59 Months in the Working Area of the Andalas Community Health Center, Padang Timur District, Padang City in 2018. *Jurnal Kesehatan Andalas*. 2018;7(2). doi: <https://doi.org/10.25077/jka.v7.i2.p275-284.2018>.
8. Sani M, Solehati E, Hendarwati S. The relationship between maternal age during pregnancy and stunting in toddlers aged 24-59 months. *Portal Jurnal Malahayati*. 2019;13(4).
9. Sukmawati, Hendrayati, Chaerunnimah, Nurhumaira. Maternal Nutritional Status During Pregnancy, Birth Weight of Infants with Stunting in Toddlers Aged 06-36 Months at Bontoa Community Health Center. *Media Gizi Pangan*. 2018;25(1). doi: <https://doi.org/10.32382/mgp.v25i1.55>.
10. Muniroh R. Differences in the level of nutritional adequacy and history of exclusive breastfeeding for stunted and non-stunted toddlers. *Media Gizi Indonesia*. 2016;11(1). doi: <https://doi.org/10.20473/mgi.v11i1.61-69>.
11. Zakiyah Z, Tiara A, Lestari F, Andriani R. Factors Related To Stunting In Preschool Children In Kindergarten, Bubon District, West Aceh Regency. *Science Midwifery*. 2022;10(2).
12. Riyanto S, Hatmawan AA. *Metode Riset Penelitian Kuantitatif: Penelitian di Bidang Manajemen, Teknik, Pendidikan dan Eksperimen* [Internet]. Deepublish Publisher;

2020. Available from:
<https://repository.deepublish.com/media/publications/593264-metode-riset-penelitian-kuantitatif-pene-35197ac2.pdf>

13. Meilyasari F, Isnawati M. Risk factors for stunting in children aged 12 months in Purwokerto Village, Patebon Sub-District, Kendal District. *Journal of Nutrition College*. 2014;3(2). doi: 10.14710/jnc.v3i2.5437.
14. Xiong T, Wu Y, Hu J, Xu S, Li Y, Kong B, et al. Associations between High Protein Intake, Linear Growth, and Stunting in Children and Adolescents: A Cross-Sectional Study. *Nutrients*. 2023;15(22):. doi: 10.3390/nu15224821
15. Widjajaa NA, Hamidaa A, Purnomoa MT, Satjadibrataa A, Saria PP, Handinib LS, et al. Effect of high-calorie formula on weight, height increment, IGF-1 and TLC in growth faltering children: A quasi-experimental study. *Heliyon*. 2024;10(7). doi: 10.1016/j.heliyon.2024.e28834.
16. Yayaa S, Oladimejic O, Odusina EK, Bishwajita G. Household structure, maternal characteristics and children's stunting in sub-Saharan Africa: evidence from 35 countries. *International Health*. 2022;14:381-389. doi: 10.1093/inthealth/ihz105.
17. Yuristi M, Kusdalinah K, Yuliantini E. Intake of Protein and Calcium and Serum Albumin of Stunted Elementary School Children in Bengkulu. In: *Proceedings of the 1st International Conference on Inter-professional Health Collaboration (ICIHC 2018)*; 2019. doi: 10.2991/icihc-18.2019.49.
18. Yanti GN, Yustina I, Primasari A, Rochadi RK. Effectiveness of Rebon Shrimp in Preventing Dental Caries among Elementary School Children in Bagan Serdang Village. *Journal of International Dental and Medical Research*. 2022;15(4).
19. Oktarina Z, Sudiarti T. Risk factors of stunting among children (24—59 months) in Sumatera. *Indonesian Journal of Nutrition and Food*. 2013;8(3). doi: 10.25182/jgp.2013.8.3.177-180.
20. Solihin RDM, Anwar F, Sukandar D. Relationship between nutritional status, cognitive development, and motor development in preschool children. *The Journal Nutrition and Food Research*. 2013;36(1).
21. Nuryani N, Rahmawati R. Snacking habits are related to the nutritional status of school children in Gorontalo District. *The Indonesian Journal of Nutrition*. 2018;6(2):114-122. doi: <https://doi.org/10.14710/jgi.6.2.114-122>.
22. Endrinikapoulos A, Afifah DN, Mexitalia M, Andoyo R, Hatimah I, Nuryanto N. Study of the importance of protein needs for catch-up growth in Indonesian stunted children: a narrative review. *Sage Journals*. 2023;11. doi: 10.1177/20503121231165562.

23. Damayanti S, Bintoro VP, Setiani BE. The Effect of Adding Wheat Flour, Bran and Red Beans on The Physical Properties of Cookies. *Journal of Nutrition College*. 2020;9(3). doi: 10.14710/jnc.v9i3.27046.
24. Sudarti Y, Ardi RFP, Sukarni S. The Expression of Women in Kilo Village, Dompu, Through Photography. *Jurnal Serupaku*. 2022;1(1):28-36.
25. Fandir A, Syam A, Hadju V, Thaha AR, Asfar M, Wahiduddin W. Effects of Giving Pumpkin Seed Biscuits (*C. Moschata D.*) on Underweight and Stunting Toddlers Age 12-59 Months in Banggai Regency, Central Sulawesi. *NeutroQuantology*. 2022;20(8):55-61. doi: 10.14704/nq.2022.20.8.NQ44006.
26. Hermawan D, Kurniasari D, Sandayanti V, Sari N, Listyaningsih E. Relationships of deworming drug consumption and animal protein intake with stunting. *Parasite Epidemiology and Control*. 2023;23. doi: 10.1016/j.parepi.2023.e00326.
27. Abdullah VI, Isir M, Pongoh A, Egam A, Mallongi A. Supplementary Feeding Development of Koya Powder Based on Rebon Shrimp (*Mysis Relicta*) towards Changes in Blood Biochemistry of Pregnant Women as Risk Factor of Linier Growth Disturbance (Stunting). *Medico Legal Update*. 2020;20(4). doi: 10.37506/mlu.v20i4.2165.
28. Wardana RK, Widyastuti N, Pramono A. The relationship between macronutrient intake and nutritional status of breastfeeding mothers with macronutrient content in breast milk (ASI) in Bandarharjo sub-district, Semarang. *Journal Nutrition College*. 2018;7(3). doi: 10.14710/jnc.v7i3.22269.



©2026. The Author(s). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution-Share Alike 4.0 (CC BY-SA) International License (<http://creativecommons.org/licenses/by-sa/4.0>)