

## The relationship between birth weight and exclusive breastfeeding on the height of toddlers aged 1-5 years in Mekanderejo village, Kedungpring district, Lamongan regency

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### Abstract

**Background:** The occurrence of stunting or height that is not appropriate for age in children under five is a health issue that needs attention in Indonesia. Stunting can cause growth failure, delays in cognitive and motor development, metabolic disorders, and reduced intellectual capacity. This study aims to analyze the relationship between birth weight and exclusive breastfeeding with the height of children aged 1-5 years in Mekanderejo Village.

**Methods:** This type of research is an observational analytic study with a cross-sectional design. Data collection was conducted using primary data through questionnaires containing the characteristics of mothers and children and secondary data from the respondents' MCH books. Data analysis used the Chi-Square test.

**Results:** The results of the study showed that there were still 8 (10.96%) children born with low birth weight, 28 (38.36%) children with a history of not being exclusively breastfed, and 6 (8.22%) children with very short height. The bivariate Chi-Square test results showed a p-value of 0.035 (<0.05), indicating a significant relationship between birth weight and child height, and a p-value of 0.047 (<0.05), indicating a significant relationship between exclusive breastfeeding and child height.

**Conclusion:** These data indicate a relationship between birth weight and exclusive breastfeeding with the height of children aged 1-5 years in Mekanderejo Village.

**Keywords:** Birth Weight; Exclusive Breastfeeding; Height; Children

### 1. Introduction

The incidence of stunting, or inadequate height for age in children under five, is a health problem that requires serious attention in Indonesia. According to Kemenko PMK, the government has designated stunting as a national priority issue in the 2020-2024 National Medium-Term Development Plan (RPJMN), with a target to reduce the prevalence significantly from 24.4% in 2021 to 14% by 2024 [1].

According to the Ministry of Health (Kemenkes) in 2020, anthropometric measurements using the height-for-age (H/A) or length-for-age (L/A) indicators can assess an individual's growth in height or length based on their age. These indicators are used to identify children who have experienced prolonged and severe malnutrition. Normally, height and

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length increase with age. If a child's nutritional status is assessed with a Z-score below -2 SD (classified as short) or below -3 SD (classified as very short), the child is considered stunted [2].

Lamongan Regency is among the 100 priority regencies/cities for stunting intervention in East Java (TNP2K, 2022). In 2022, the East Java Provincial Communication and Informatics Office reported that the stunting prevalence in Lamongan Regency was 27.05%. However, based on the weighing month measurement results in 2023, the number of stunted children in Lamongan Regency drastically decreased by 9.4%. In 2023, data from the Kedungpring Community Health Center revealed that 208 out of 1,565 children under five, or 13.2%, were classified as stunted. One of the villages with a significant stunting issue is Mekanderejo Village, which recorded the second-highest stunting prevalence in the Kedungpring Community Health Center area. The prevalence in this village increased from 8 children, or 5%, in 2023 to 19 children, or 12%, in 2024 out of 156 children under five.

In the short term, stunting leads to growth failure, delays in cognitive and motor development, suboptimal physical growth, and metabolic disorders. In the long term, stunting reduces intellectual capacity. It causes permanent structural and functional damage to the nerves and brain cells, resulting in decreased learning ability during school age, which ultimately affects productivity in adulthood. The factors causing stunting are categorized into basic, mediating, and proximal factors. Basic factors include economic conditions, maternal knowledge of nutrition, and maternal education levels. Mediating factors involve family size, maternal height, paternal height, maternal age, parenting practices, and the number of children the mother has. Proximal factors include exclusive breastfeeding, the child's age, and low birth weight (LBW) [3].

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## 2. Material and methods

The type of research conducted was analytical observational research with a cross-sectional design. The sample size for this study was calculated using the formula by Lameshow, resulting in a total of 73 participants. The sampling method used was consecutive sampling, where participants who met the inclusion criteria were selected over a specific period until the required sample size was achieved. The respondents in this study consisted of 73 individuals who were part of the sample unit and met the inclusion criteria, namely mothers with children under five years old who were regularly monitored for weight and height, with the children aged 1-5 years in November 2024. The instrument used for data collection was a questionnaire distributed offline. The data processing techniques included editing, coding, and tabulating. The data analysis method utilized bivariate analysis with the Chi-Square test to examine the relationship between birth weight and exclusive breastfeeding on the height of children under five.

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## 3. Results and discussion

The following are the results of the research presented in the frequency distribution and the results of the Chi-Square statistical test analysis, which are shown in the table below.

**Table 1** Frequency Distribution of Birth Weight in Children Aged 1-5 Years in Mekanderejo Village

Birth Weight	N	%
<2500 gram	8	10,9
2500-3999 gram	83	86,3
≥4000 gram	2	2,7
Total	73	100

Table 1 shows the frequency distribution of birth weight in children aged 1-5 years in Mekanderejo Village, with the majority falling within the normal birth weight group of 2500-3999 grams, consisting of 63 respondents (86.3%). The low birth weight category (<2500 grams) includes 8 respondents (10.9%), while the overweight birth weight category (≥4000 grams) includes 2 respondents (2.7%).

**Table 2** Frequency Distribution of Exclusive Breastfeeding in Children Aged 1-5 Years in Mekanderejo Village

Breastfeeding	N	%
Exclusive	45	61,6
Non Exclusive	28	38,3
Total	73	100

Table 2 shows the frequency distribution of exclusive breastfeeding in children aged 1-5 years in Mekanderejo Village. More than half (61.6%) of children aged 1-5 years were exclusively breastfed, while nearly half (38.3%) of children in this age group were not exclusively breastfed.

**Table 3** Frequency Distribution of Height in Children Aged 1-5 Years in Mekanderejo Village

Height	N	%
Very short (<-3 SD)	6	8,2
Short (-3 SD)	1	1,3
Normal (-2 SD until 2 SD)	66	90,4
Total	73	100

Table 3 shows the frequency distribution of height in children aged 1-5 years in Mekanderejo Village. The majority (90.4%) of children have normal height, while (8.2%) of children have very short height and (1.3%) of children have short height.

**Table 4** Relationship Between Birth Weight and Height of Children Aged 1-5 Years in Mekanderejo Village

Birth Weight	Height						Total		P Value
	Normal		Short		Very Short		N	%	
	N	%	N	%	N	%			
<2500 gr	5	62,5	0	0	3	37,5	8	100	0,035
2500-3999 gr	59	93,6	1	1,5	3	4,7	63	100	
≥4000 gr	2	100	0	0	0	0	2	100	
Total	66	85,3	1	0,5	6	14,0	73	100	

Table 4, it shows that children with a history of low birth weight have (37.5%) who are very short in height. Among children with normal birth weight, only a small portion (1.5%) have short height and (4.7%) have very short height. The bivariate analysis using the Chi-Square statistical test resulted in a p-value of 0.035 (<0.05), indicating a significant relationship between birth weight and the height of children.

Based on the results of the chi-square test, there is a significant relationship between birth weight and the height of children aged 1-5 years in Mekanderejo Village, Kedungpring District, Lamongan Regency in 2024. The p-value is 0.035 (<0.05). Adequate nutrition during pregnancy can prevent low birth weight babies, thereby reducing the risk of short/very short height, or what is referred to as stunting in children. The occurrence of stunting or short/very short height can be seen when the nutrition needed by the child is inadequate, and there is an incidence of infection during the first 1,000 days of life.

This study is in line with Cinta, who stated that infants with normal birth weight have better growth compared to those born with low birth weight. Low birth weight infants are more likely to experience digestive tract issues, as their digestive system is not fully functional, leading to poor fat absorption and protein digestion, which results in inadequate nutritional reserves in the infant's body [4].

This study is also consistent with Ulfa, who found a relationship between birth weight and the occurrence of stunting in children under five in the working area of Tanjung Harapan Health Center, Ulok Kupai District, North Bengkulu Regency in 2021, as proven by a chi-square statistical test with a p-value of 0.000 ( $<0.05$ ). Children born prematurely are 3.84 times more likely to experience stunting compared to those born at term, as growth in preterm infants is delayed due to the short gestational age, which disrupts fetal growth and development [5].

This study also supports Julia's findings, which showed a relationship between birth weight and stunting in children under five at the Tambak Wedi Health Center in Surabaya with a significant correlation. This can occur due to two processes that determine fetal growth: the duration of pregnancy and the rate of fetal growth. The study found that 60% of stunted children had a birth weight of  $<2500$  grams, while 40% had a birth weight of  $>2500$  grams [6].

**Table 5** Relationship Between Exclusive Breastfeeding and Height of Children Aged 1-5 Years in Mekanderejo Village

Breastfeeding	Height						Total		P Value
	Normal		Short		Very Short		N	%	
	N	%	N	%	N	%			
Exclusive	43	95,5	1	2,2	1	2,2	45	100	0,047
Non Exclusive	23	82,1	0	0	5	17,8	28	100	
Total	66	88,8	1	1,1	6	10,0	73	100	

Table 5, it shows that children who did not receive exclusive breastfeeding have (17.8%) who are very short in height. Among children who were exclusively breastfed, only a small portion (2.2%) had short/very short height. The bivariate analysis using the Chi-Square statistical test resulted in a p-value of 0.047 ( $<0.05$ ), indicating a significant relationship between exclusive breastfeeding and the height of children.

Based on the chi-square test, the p-value is 0.047 ( $<0.05$ ), indicating a significant relationship between exclusive breastfeeding and the height of children aged 1-5 years in Mekanderejo Village, Kedungpring District, Lamongan Regency in 2024. According to existing theories and research findings, exclusive breastfeeding can reduce the risk of short/very short height because breast milk contains antibodies and high levels of calcium, which are optimally absorbed, particularly aiding bone growth. Exclusive breastfeeding for newborns, starting from 0 to 6 months of age without any additional food or drinks, can help prevent stunting or short/very short height in [7].

This study is consistent with Haeratut, who stated that there is a relationship between exclusive breastfeeding and the occurrence of stunting in children aged 24-36 months at Sembalum Health Center. Exclusive breastfeeding provides various benefits for both mother and baby, as breast milk is the best natural food for babies, cost-effective, easy to digest, and contains an ideal composition of nutrients suited to the baby's needs. It supports growth, particularly height, as calcium in breast milk is more efficiently absorbed compared to formula milk [8].

This study also aligns with Eka, who stated that a history of exclusive breastfeeding has a significant relationship with stunting in children. Stunting, which indicates impaired growth in height, is more likely to occur in children who did not receive exclusive breastfeeding during the first 6 months of life. This study highlights the role of exclusive breastfeeding in supporting optimal height growth by providing balanced nutrition and protection from infections that may hinder growth [9].

The findings of this study are consistent with research conducted by Husna, which was conducted in Arongan Village, Kuala Pesisir District, Nagan Raya Regency. The study found a relationship between exclusive breastfeeding and stunting, as evidenced by a p-value of 0.000 ( $<0.05$ ) [10].

#### 4. Conclusion

The conclusion from the relationship between birth weight and exclusive breastfeeding on the height of children indicates that both factors significantly affect children's growth in height. Based on the research results, there is a significant relationship between birth weight and height, where infants with low birth weight are at a higher risk of

growth disturbances, including short or very short height (stunting). Furthermore, exclusive breastfeeding also proves to have a positive impact on height, as children who receive exclusive breastfeeding are less likely to experience stunting compared to those who do not receive exclusive breastfeeding. This highlights the importance of optimal nutrition from pregnancy and exclusive breastfeeding to support healthy physical growth in children, particularly in achieving an ideal height.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The author declared no potential conflicts of interest.

### *Statement of ethical approval*

The study was approved by the ethics committee of health research of the faculty of medicine, Airlangga University (164/EC/KEPK/FKUA/2024).

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