

**DETERMINANTS OF STUNTING AMONG CHILDREN AGED 12–59 MONTHS****Dahliansyah** ✉, **Desi, Ayu Rafiony, Nopriantini, Ismi Trihardiani**

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Abstract

Background : Stunting is a manifestation of chronic malnutrition in children under five and has long-term consequences for physical growth, cognitive development, economic productivity, and the risk of non-communicable diseases in adulthood. Although the prevalence of stunting in Indonesia has shown a declining trend, it remains above the national target of less than 14%. Landak Regency is one of the areas with a relatively high prevalence of stunting in West Kalimantan Province. This study aimed to analyze the determinants of stunting among children aged 12–59 months in Landak Regency. **Methods :** A cross-sectional study design was used, involving 214 children aged 12–59 months. Data were collected in 2024 and analyzed descriptively and bivariate to assess the associations between risk factors and stunting. The variables examined included birth history, breastfeeding practices, child health status, deworming medication, and utilization of health services. **Results :** The results showed that most children had received basic health services, including complete immunization (96.7%), vitamin A supplementation (88.3%), and exclusive breastfeeding (92.1%). Bivariate analysis showed that deworming ($p = 0.02$) and exclusive breastfeeding ($p = 0.04$) were significantly associated with stunting. Children who did not receive exclusive breastfeeding and deworming had a higher proportion of stunting than those who received these interventions. Birth weight, birth length, early initiation of breastfeeding, history of illness, and frequency of health-post visits were not significantly associated with stunting. **Conclusions:** The findings emphasize the importance of exclusive breastfeeding practices and disease-prevention interventions, particularly deworming, as part of efforts to reduce stunting in Landak Regency.

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Email: dahlian_syah_gz@yahoo.co.id**1. INTRODUCTION**

Stunting is a condition of impaired growth that reflects chronic malnutrition in children under five. It is characterized by a height-for-age measurement below -2 standard deviations from the World Health Organization (WHO) growth standard (Ministry of Health of the Republic of Indonesia, 2020). Stunting is an indicator of poor long-term nutritional status and has substantial effects on children's physical and cognitive development ([Permana et al., 2025](#)). According to recent reports, approximately 22.3% of children under five globally are affected by stunting, making it a major public health problem in many developing countries (World Bank, 2023).

In Indonesia, although the prevalence of stunting has shown a declining trend, recent data indicate that it remains above the national target of less than 14% ([Hermawati et al., 2024](#)). According to the 2023 Basic Health Research (Riskesdas), the prevalence of stunting in Indonesia was estimated at 19.4%, with substantial differences across regions. In West Kalimantan, the prevalence of stunting was estimated at 25% in 2024, with a projected decline to 22% in 2025. In Landak Regency, the prevalence was estimated to be higher, at approximately 28% in 2024, with an expected decline to 24% in 2025 (West Kalimantan

Health Office, 2024).

Based on scientific evidence on the causes of stunting in Indonesia, several significant risk factors have frequently been identified, including inadequate maternal education, low birth weight (LBW), failure to practice exclusive breastfeeding, a history of infectious diseases, inadequate sanitation, and poor household socioeconomic conditions. Research indicates that children born with LBW (<2,500 g) have a higher likelihood of experiencing stunting (Ariani, 2020; Aryastami et al., 2017). Findings from a multilevel study in Indonesia showed that individual, household, and environmental factors collectively contribute to the incidence of stunting (Mulyaningsih et al., 2021). These factors include household crowding, access to adequate antenatal care, and healthy feeding practices (Titaley et al., 2019).

The consequences of stunting extend beyond impaired child growth and may include reduced economic productivity in adulthood, impaired brain development, and an increased risk of non-communicable diseases (Wijekumar et al., 2023). Therefore, research into the determinants of stunting in specific areas such as Landak Regency is important for identifying factors that should be prioritized in intervention efforts. This study aimed to explore socioeconomic conditions, feeding practices, and children's health histories to provide evidence that may support more effective policies for addressing stunting.

2. METHOD

This study used a cross-sectional design. A total of 214 children aged 12–59 months were selected using random sampling. The inclusion criteria were children aged 12–59 months who lived in Landak Regency, West Kalimantan Province; had a mother or primary caregiver who was willing to participate and provide informed consent; and were able to undergo anthropometric assessment with complete data for the study variables. The study was conducted in Landak Regency. Data were obtained through anthropometric measurements and interviews with mothers of the children. The independent variables included deworming medication, birth weight, birth length (based on the Maternal and Child Health Book), early initiation of breastfeeding, exclusive breastfeeding, history of illness, and frequency of health-post visits. The dependent variable was stunting, measured using the height-for-age (HAZ/TB-U) indicator. Data were analyzed using univariate and bivariate analyses with the chi-square test. The study received ethical approval No. 032/KEPK-PK.PKP/VIII/D/2024 from the Health Research Ethics Committee of Poltekkes Kemenkes Pontianak.

3. RESULTS AND DISCUSSION

Univariate analysis was performed in Table 1 to describe the distribution of children's characteristics, birth history, feeding practices, and utilization of basic health services. Bivariate analysis using the chi-square test was subsequently performed in Table 2 to assess the associations between various risk factors and stunting. The results are presented in the tables below.

Table 1. Characteristics of Children Aged 12–59 Months in Landak Regency, 2024

Variable	Frequency	Percentage (%)
Vitamin A supplementation		
Yes	189	88.3
No	25	11.7
Immunization		
Yes	207	96.7
No	7	3.3
Deworming medication		
Yes	135	63.1
No	79	36.9
Birth weight		
< 2,500 g	28	13.1
≥ 2,500 g	186	86.9
Birth length		
< 48 cm	110	51.4
≥ 48 cm	104	48.6
Early initiation of breastfeeding		
Yes	177	82.7
No	37	17.3
Exclusive breastfeeding		

Exclusive	197	92.1
Not exclusive	17	7.9
Child illness		
Ill	139	65.0
Not ill	75	35.0
Frequency of health-post visits		
< 8 times	85	39.7
≥ 8 times	129	60.3
Total	214	100.0

Source: Primary data, 2024

Table 1 shows the characteristics of children aged 12–59 months in Landak Regency in 2024. Regarding basic health services, most children had received vitamin A supplementation (189 children; 88.3%). Immunization coverage was very high, with 96.7% of children having received complete immunization. Regarding disease-prevention interventions, 63.1% of children had received deworming medication. In terms of birth history, most children had a birth weight $\geq 2,500$ g (86.9%). Regarding birth length, the proportion of children with a birth length < 48 cm (51.4%) was slightly higher than that of children with a birth length ≥ 48 cm (48.6%). In terms of early feeding practices, most children received early initiation of breastfeeding (82.7%), and 92.1% received exclusive breastfeeding, indicating relatively good breastfeeding practices in the study area. Regarding health status, 65% of children were reported to have experienced illness during the specified period. Participation in health-post activities showed that 60.3% of children attended the health post ≥ 8 times. These findings indicate that although basic health-service coverage was relatively good, a group of children remained at risk because of limited utilization of health services.

Table 2. Cross-Tabulation of the Characteristics of Respondents' Toddlers Aged 12–59 Months and the Incidence of Stunting in Landak Regency in 2024

Variables	Normal		Stunting		Total		p-Value
	n	%	n	%	n	%	
Received Deworming Medication							
- Yes	105	77,8	30	22,2	135	100	0,02
- No	68	86,1	11	13,9	79	100	
Birth Weight							
- < 2500 gram	23	82,2	5	17,9	28	100	0,98
- ≥ 2500 gram	150	80,7	36	19,4	186	100	
Birth Length							
- < 48 cm	89	80,9	21	19,1	110	100	0,11
- ≥ 48 cm	84	80,8	20	19,2	104	100	
Early Initiation of Breastfeeding (EIBF)	144	81,4	33	18,6	177	100	0,75
- Yes	29	78,4	8	21,6	37	100	
- No							
Exclusive Breastfeeding	161	81,7	36	18,3	197	100	0,04
- Exclusive	12	70,6	5	29,4	17	100	
- Non-exclusive							
History of Illness	109	78,4	30	21,6	139	100	0,15
- Sick	64	85,3	11	14,7	75	100	
- Not sick							
- Frequency of Posyandu Visits	68	80	17	20	85	100	0,67
- < 8 visits	105	81,4	24	18,6	129	100	
- ≥ 8 visits							

Based on Table 2, the proportion of stunting was higher among children who received deworming medication (22.2%) than among those who did not receive deworming medication (13.9%). Statistical analysis showed a significant association between deworming and stunting ($p = 0.02$). This finding indicates that deworming was associated with stunting among children. For birth weight, the proportion of stunting was 17.9% among children with LBW ($< 2,500$ g) and 19.4% among children with a birth weight $\geq 2,500$ g; however, the association was not statistically significant ($p = 0.98$). Regarding birth length, the proportion of stunting was similar among children with a birth length < 48 cm (19.1%) and ≥ 48 cm (19.2%), consistent with the finding of no statistically significant association ($p = 0.11$). For early initiation of breastfeeding, the proportion of stunting was higher among children who did not receive early initiation of breastfeeding (21.6%) than among those who did (18.6%), but the association was not statistically

significant ($p = 0.75$).

Exclusive breastfeeding was significantly associated with stunting ($p = 0.04$). Children who did not receive exclusive breastfeeding had a higher proportion of stunting (29.4%) than those who received exclusive breastfeeding (18.3%). This finding indicates that exclusive breastfeeding practices play an important role in stunting prevention.

Regarding child health status, the proportion of stunting was higher among children who had been ill (21.6%) than among those who had not been ill (14.7%); however, the association was not statistically significant ($p = 0.15$). Similarly, the frequency of health-post visits was not significantly associated with stunting, although the proportion of stunting was slightly higher among children who attended the health post < 8 times (20.0%) than among those who attended ≥ 8 times (18.6%) ($p = 0.67$).

a. Role of Deworming in Stunting Prevention

The study in Landak Regency found a significant association between deworming and stunting ($p = 0.02$). Children who received deworming medication had a lower proportion of stunting. This finding is consistent with the theory that helminth infections can cause nutrient malabsorption, which may ultimately contribute to chronic growth impairment ([Sunarpo et al., 2023](#); [Bawono et al., 2025](#)).

Although deworming was significantly associated with stunting in this study, the observed proportion of stunting was higher among children who had received deworming medication than among those who had not. This finding should be interpreted cautiously because the cross-sectional design does not establish a temporal or causal relationship between deworming and stunting. One possible explanation is that children who had received deworming medication may have been those who were already considered vulnerable to nutritional or infectious problems and therefore more likely to receive health interventions. In addition, the effect of deworming on nutritional status may depend on the intensity of helminth infection, frequency of treatment, sanitation conditions, dietary adequacy, and other environmental factors. Therefore, the significant association observed in this study should not be interpreted as evidence that deworming increases the risk of stunting. Rather, the finding highlights the need to integrate deworming with improvements in sanitation, dietary intake, infection prevention, and other nutrition-specific and nutrition-sensitive interventions ([Hodges et al., 2022](#)).

These findings are supported by [Mulyaningsih et al. \(2021\)](#), who reported that factors beyond personal characteristics, including environmental health interventions and prevention of infectious diseases, are important determinants of children's nutritional status in Indonesia. Parasitic infections such as helminthiasis can exacerbate anemia and undernutrition, which are important contributors to stunting ([Pratiwi, 2015](#); [Hafidz et al., 2023](#)).

b. Influence of Exclusive Breastfeeding and Early Initiation of Breastfeeding

This study found a significant association between exclusive breastfeeding and stunting ($p = 0.04$). Children who did not receive exclusive breastfeeding had a higher proportion of stunting (29.4%). This finding reinforces evidence that optimal nutrition during the first 1,000 days of life is a key determinant of linear growth.

This finding is consistent with [Titaley et al. \(2019\)](#), who used Riskesdas data and showed that inappropriate infant and young child feeding practices, including failure to provide exclusive breastfeeding, are major risk factors for stunting among children under two years of age in Indonesia. In addition, [Aryastami et al. \(2017\)](#) emphasized that although early initiation of breastfeeding is important, continued exclusive breastfeeding provides greater protection against growth impairment. Although early initiation of breastfeeding was not statistically significant in this study ($p = 0.75$), the data trend showed a higher proportion of stunting among children who did not receive early initiation of breastfeeding, indicating the importance of this early practice in supporting infant immune function.

The significant association between exclusive breastfeeding and stunting also needs to be interpreted within the broader context of infant and young child feeding. Exclusive breastfeeding during the first six months provides important nutritional and protective benefits; however, after approximately six months, breast milk alone is no longer sufficient to meet the increasing energy and nutrient requirements of growing children. Appropriate complementary feeding, including adequate dietary diversity, meal frequency, nutrient density, food safety, and responsive feeding, therefore becomes essential for continued growth and development. The World Health Organization recommends introducing complementary foods at six months while continuing breastfeeding, with increasing food variety and feeding frequency as children grow. Consequently, among children aged 12–59 months, the relationship between early exclusive breastfeeding and current stunting may also be influenced by subsequent feeding practices and household dietary conditions. Future studies should therefore examine complementary feeding practices and dietary diversity together with breastfeeding history to provide a more comprehensive explanation of stunting risk ([WHO, 2023](#)).

c. Birth Weight and Birth Length History

The study found that birth weight and birth length were not significantly associated with stunting ($p > 0.05$). This finding is noteworthy because LBW is theoretically associated with subsequent stunting. However, in the context of children's health in Landak Regency in 2024, postnatal nutritional factors, such as exclusive breastfeeding, may have been more influential in determining current nutritional status.

These results differ from [Aryastami et al. \(2017\)](#), who reported that low birth weight was the most dominant predictor of stunting among children aged 12–23 months in Indonesia. The lack of statistical significance in this study may be attributable to relatively adequate nutritional intake after birth or to other environmental factors that may have had a stronger influence. [Rahman \(2025\)](#) also suggested that postnatal nutritional interventions, including cognitive stimulation and adequate micronutrient intake, may help mitigate the risks associated with suboptimal birth conditions.

d. Utilization of Health Services (Health Posts) and Child Health Status

The frequency of health-post visits and child health status were not significantly associated with stunting in this sample. Nevertheless, univariate analysis showed that immunization coverage (96.7%) and vitamin A supplementation (88.3%) in Landak Regency were very high.

These findings indicate that access to basic health services was generally good; however, the quality of daily dietary intake at home may have been a more influential factor. [Tiwi et al. \(2025\)](#) emphasized that health education for pregnant women and parents regarding stunting prevention at the community level, such as through family-planning villages, is important to ensure that health services are accompanied by improvements in parenting practices and dietary behaviors at home.

e. Long-Term Cognitive Impacts

The results showed that deworming and exclusive breastfeeding were significantly associated with stunting among children aged 12–59 months in Landak Regency ($p < 0.05$). These findings suggest that deworming and exclusive breastfeeding may contribute to reducing stunting among children. These interventions may influence not only physical growth but also long-term brain development and cognitive function. [Wijeakumar et al. \(2023\)](#) reported that stunting in infancy was associated with atypical activation of brain networks involved in working memory and attention. Therefore, successful stunting prevention through deworming and exclusive breastfeeding may contribute substantially to human resource quality and the demographic dividend in the future. In addition, [Permana and Rohita \(2024\)](#) reported that stunting negatively affects cognitive development, learning ability, and human resource quality in later life. Accordingly, increasing appropriate deworming coverage and sustaining exclusive breastfeeding practices are important strategies for accelerating stunting reduction and improving the quality of future generations.

4. CONCLUSION

Based on the findings of this study on the determinants of stunting among children aged 12–59 months in Landak Regency, basic health-service coverage among children was generally good, as indicated by the high proportions of children receiving complete immunization, vitamin A supplementation, and exclusive breastfeeding. Nevertheless, stunting remained prevalent and was associated with certain factors. The analysis showed that exclusive breastfeeding and deworming were significantly associated with stunting among children. The proportion of stunting was higher among children who did not receive exclusive breastfeeding or deworming than among those who received both interventions. In contrast, birth weight, birth length, early initiation of breastfeeding, history of illness, and frequency of health-post visits were not significantly associated with stunting.

These findings emphasize that strengthening specific nutrition interventions, particularly the promotion and support of exclusive breastfeeding and disease-prevention programs through deworming, is important for reducing stunting in Landak Regency. The quality and continuity of basic health services should continue to be optimized to support sustainable stunting prevention.

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