

Determinants Factors of Stunting among Children Under Five in Timor-Leste: Evidence from Ermera, Viqueque, and Oe-Cusse

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ABSTRACT:

Stunting remains a serious public health problem in Timor-Leste, particularly among children under five years of age. This study aimed to analyze factors associated with stunting among children under five in the Ermera, Viqueque, and Oe-Cusse districts in 2025. This research used an analytic observational design with a cross-sectional approach. The study involved 421 children under five selected using multistage cluster sampling and systematic random sampling. Data were collected through structured interviews with mothers or caregivers using questionnaires and anthropometric measurements. Stunting status was determined based on height-for-age (HAZ) with a Z-score < -2 SD according to WHO standards. The dependent variable was stunting, while independent variables included infectious diseases, family income, maternal knowledge, culture, and exclusive breastfeeding. Data were analyzed using univariate and multivariate analyses with binary logistic regression at a significance level of $p < 0.05$.

The results indicated that the prevalence of stunting among children under five years of age was 49.9%. Multivariate logistic regression analysis revealed that infectious diseases ($p = 0.019$; OR = 6.642), family income ($p < 0.001$; OR = 34.224), maternal knowledge ($p = 0.001$; OR = 19.796), culture ($p = 0.018$; OR = 6.269), and exclusive breastfeeding ($p = 0.008$; OR = 8.986) were significantly associated with stunting. Among these variables, family income was identified as the most dominant factor influencing stunting.

In conclusion, stunting among children under five in the study areas is influenced by socioeconomic, health, behavioral, and cultural factors. Therefore, multisectoral interventions focusing on

of the Creative Commons Attribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).	improving family economic conditions, maternal nutrition knowledge, infectious disease prevention, and promotion of exclusive breastfeeding are essential to reduce the prevalence of stunting in Timor-Leste. Keywords: Stunting, maternal knowledge, family income, culture, infectious diseases, and exclusive breastfeeding.
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INTRODUCTION

Stunting is a serious public health problem worldwide, particularly in children under five. Stunting is defined as a condition of impaired growth due to chronic malnutrition, characterized by a child's height being lower than the standard for their age based on the height-for-age (HAZ) with a Z-score of less than -2 standard deviations according to WHO standards. This condition generally occurs due to prolonged nutritional deficiencies, from pregnancy through the first two years of a child's life. Globally, approximately 22.3% of children under five years of age were affected by stunting in 2022, indicating that this problem remains a major challenge in efforts to improve child health in various developing countries (WHO, 2023).

Stunting not only affects a child's physical growth but also has long-term consequences for cognitive development, immune function, and productivity in adulthood. Children who experience stunting are at risk of reduced learning ability, increased susceptibility to disease, and the potential for developing chronic illnesses later in life. Therefore, stunting is not only an individual health issue but also a barrier to human resource development and a country's economic growth (WHO, 2023).

In Southeast Asia, stunting remains a significant nutritional problem, despite a decline in prevalence over the past few decades. One country with a very high prevalence of stunting is Timor-Leste. According to the Global Nutrition Report, approximately 46.7% of children under five in Timor-Leste suffer from stunting, a figure significantly higher than the Southeast Asian regional average of 21.8% (Global Nutrition Report, 2023). This situation indicates that stunting

remains a public health problem that requires serious attention from various development sectors.

Several districts in Timor-Leste show a higher prevalence of stunting than the national average. UNICEF data from 2023 shows that Ermera district had a stunting prevalence of 63.4%, followed by Oe-Cusse at 57.1% and Viqueque at 48.2%. These figures are higher than the national prevalence, which ranges from 45.4% to 47.1%. The high prevalence of stunting in these regions indicates a geographic disparity in child nutrition and the need for more targeted and contextual interventions tailored to the socioeconomic and cultural conditions of the local community.

Stunting is a multifactorial condition influenced by the interaction of various biological, socioeconomic, environmental, and parenting behaviors. Various studies have shown that factors such as family socioeconomic status, maternal education and knowledge, child feeding practices, and child health conditions are significantly associated with stunting. Previous studies have shown that low-income families are at higher risk of having stunted children due to limitations in meeting nutritional needs and access to health services (Islam et al., 2025). Furthermore, maternal knowledge about nutrition and childcare also plays a crucial role in determining feeding patterns and utilization of child health services (Ramadhan et al., 2024).

Child health factors are also important determinants of stunting. Children who frequently experience infectious diseases such as diarrhea and acute respiratory infections are at higher risk of growth disorders because infections can interfere with nutrient absorption and increase the body's energy needs (Das et al., 2024). Furthermore, the practice of exclusive breastfeeding in the first six months of life has been shown to play a crucial role

in supporting optimal child growth because breast milk contains complete nutrients and immunological components that protect infants from infectious diseases (Ode Novi Angreni et al., 2024). Sociocultural factors in society can also influence child feeding practices and parenting patterns, which ultimately impact children's nutritional status (Raman et al., 2024).

Stunting is widely understood through the conceptual framework of child malnutrition proposed by UNICEF, which explains that child nutritional status is influenced by a hierarchy of determinants consisting of immediate, underlying, and basic causes. Immediate causes include inadequate dietary intake and infectious diseases that directly affect a child's nutritional status. Underlying causes include household food insecurity, inadequate childcare practices, limited access to health services, and poor environmental sanitation. Meanwhile, basic causes relate to broader socioeconomic, political, and cultural conditions that influence household resources and caregiving capacity. This conceptual framework emphasizes that stunting is a complex and multifactorial condition resulting from interactions among biological, socioeconomic, environmental, and behavioral factors (UNICEF, 2020).

Although various studies have identified the determinants of stunting in various developing countries, most previous studies have focused on health or socioeconomic factors in isolation. Furthermore, most studies were conducted in other countries, such as Indonesia, Ethiopia, and several other Asian countries, resulting in limited empirical evidence on the determinants of stunting within the socioeconomic and cultural context of Timor-Leste. Research simultaneously analyzing the influence of family socioeconomic factors, maternal knowledge, cultural practices, infectious diseases, and exclusive breastfeeding on stunting incidence at the district level in Timor-Leste is still very limited.

Based on these conditions, a research gap exists due to the lack of studies that comprehensively analyze the determinants of stunting, including socioeconomic factors, health, parenting behaviors, and culture within the local context of Timor-Leste, particularly in districts with

a high stunting prevalence, such as Ermera, Viqueque, and Oe-Cusse.

Therefore, the novelty of this research lies in the comprehensive analysis of the influence of family socioeconomic factors, maternal knowledge, cultural practices, infectious diseases, and exclusive breastfeeding on stunting in children under five in three districts with a high stunting prevalence in Timor-Leste, analyzed simultaneously using a binary logistic regression approach. This research is expected to provide more contextual scientific evidence regarding the determinants of stunting in Timor-Leste and serve as a basis for formulating more effective health policies to reduce stunting prevalence.

Against this background, this study aims to analyze factors associated with stunting in children under five years of age in the districts of Ermera, Viqueque, and Oe-Cusse by 2025.

METHOD

This study used an analytical observational design with a cross-sectional approach conducted in 2025 in three districts in Timor-Leste, namely Ermera, Viqueque, and Oe-Cusse. The study sample consisted of 421 children under five selected using multistage cluster sampling and systematic random sampling from households with children under five years old. Data were collected through structured interviews with mothers or caregivers using standardized questionnaires and anthropometric measurements to determine stunting status based on the height-for-age (H/A) index with a Z-score < -2 SD according to WHO standards. The dependent variable was the incidence of stunting, while the independent variables included infectious diseases, family income, maternal knowledge, culture, and exclusive breastfeeding. Data were analyzed using SPSS through univariate, bivariate, and multivariate analyses employing binary logistic regression with a significance level of $p < 0.05$. This study received ethical approval from the INSPITL.

RESULT

This study involved 421 children from three municipalities: Viqueque, Oe-cusse, and Ermera. Univariate analysis was performed to describe the

frequency distribution of maternal and child characteristics, as well as each study variable. Furthermore, multivariate analysis was performed

to identify the relationships and influences between the study variables, as presented in the following table.

Table 1
Respondents' characteristics (sociodemographics)

Frequency distribution of maternal characteristics	Municipality							
	Viqueque		Oe-cusse		Ermera		Total	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>n</i>	%
Mother's Age								
17-26 years	16	3.8	82	19.5	223	53	321	76.2
27-36 years	32	7.6	1	0.2	29	6.9	62	14.7
37-47 years	16	3.8	1	0.2	18	4.3	35	8.3
>47 years	3	0.0	0.0	0.0	0.0	0.0	3	0.7
Maternal educational level								
Not in School	8	1.9	7	1.7	7	1.7	22	5.2
Elementary School	6	1.4	1	0.2	11	2.6	18	4.3
Junior High School	12	2.9	15	3.6	33	7.8	60	14.3
High School	19	4.5	59	14	218	51.8	296	70.3
College Student	5	1.2	0	0.0	1	0.2	6	1.4
D3	0	0.0	1	0.2	0	0.0	1	0.2
Bachelor's Degree	17	4	1	0.2	0	0.0	18	4.3
Maternal occupation								
Farmers	35	8.3	6	1.4	16	3.8	57	13.5
Civil Servants	11	2.6	2	0.5	3	0.7	16	3.8
Traders	19	4.5	74	17.6	108	25.7	201	47.7
Housewives	2	0.5	2	0.5	140	33.3	144	34.2
NGO Employees	0	0.0	0	0.0	3	0.7	3	0.7
Paternal occupation								
Not Working	14	3.3	22	5.2	45	10.7	81	19.2
Farmer/Grower	7	1.7	11	2.6	36	8.6	54	12.8
Trader	7	1.7	9	2.1	46	10.9	62	14.7
Civil Servant	10	2.4	8	1.9	33	7.8	51	12.1
Private Employee	5	1.2	13	3.1	42	10	60	14.3
Unemployed	15	3.6	9	2.1	41	9.7	65	15.4
Other	9	2.1	12	2.9	27	6.4	48	11.4
Number of family members								
1-2 children	21	5	45	10.7	135	32.1	201	47.7
3-4 children	22	5.2	26	6.2	100	23.8	148	35.2
5-6 children	11	2.6	11	2.6	28	6.7	50	11.9
>6 children	13	3.1	2	0.5	7	1.7	22	5.2
Total	67	15.9	84	20	270	64.1	421	100

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 1, the sociodemographic characteristics of respondents with a total of 421 respondents from three municipalities (Viqueque, Oecusse, and Ermera), it can be explained that the majority of mothers are in the 17–26 age group, as

many as 321 people (76.2%). Based on education level, the majority of mothers have a high school education, as many as 296 people (70.3%). Viewed from the mother's occupation, the majority work as traders, as many as 201 people (47.7%). In terms of

the father's occupation, the majority are unemployed, as many as 81 people (19.2%). Meanwhile, based on the number of family members, the majority of families have 1–2 children, as many as 201 families (47.7%). In

general, the characteristics of respondents show a dominance of young mothers with secondary education, occupation as traders, and a relatively small number of children.

Table 2

Distribution of Respondent Characteristics Based on Gender, Child Age, Body Mass Index, and Stunting Incidence (n = 421)

Frequency distribution of child characteristics	Municipality							
	Viqueque		Oe-cusse		Ermera		Total	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>n</i>	%
Child Sex								
Boy	34	8.1	42	10	117	27.8	193	45.8
Girl	33	7.8	42	10	153	36.3	228	54.2
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Child Age								
0-12 months	19	4.5	15	3.6	54	12.8	88	20.9
13-24 months	9	2.1	9	2.1	28	6.7	46	10.9
25-36 months	13	3.1	18	4.3	54	12.8	85	20.2
37-48 months	10	2.4	17	4	54	12.8	81	19.2
49-60 months	16	3.8	25	5.9	80	19	121	28.7
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Body Mass Index								
Underweight	34	8.1	51	12.1	169	40.1	254	60.3
Overweight	3	0.7	2	0.5	6	1.4	11	2.6
Normal	30	7.1	31	7.4	95	22.6	156	37.1
<i>Total</i>	67	15.9	84	20	270	64.1	421	100

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 2, this study involved 421 children from three municipalities, namely Viqueque, Oecusse, and Ermera. The majority of respondents were girls (228 children) (54.2%), while 193 were boys (45.8%). Based on the age of the children, the largest age group was 49–60 months (121 children) (28.7%), while the smallest was 13–24 months (46 children) (10.9%). Judging from the

Body Mass Index (BMI), the majority of children were underweight (254 children) (60.3%), followed by normal nutritional status (156 children) (37.1%), and overweight (11 children) (2.6%). These results indicate that the majority of children in the study were underweight, indicating nutritional problems among children in the study area.

Table 3

Distribution of Toddler Characteristics by Gender, Child Age, Body Mass Index, and Stunting Incidence (n = 421)

Toddler Characteristics	Municipality							
	Viqueque		Oe-cusse		Ermera		Total	
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%	<i>n</i>	%
stunting incidence								
Normal	35	8.3	38	9	138	32.8	211	50.1
Stunting	32	7.6	46	10.9	132	31.4	210	49.9

<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Infectious Diseases								
High Risk	28	6.7	26	6.2	76	18.1	130	30.9
Moderate Risk	15	3.6	38	9	147	34.9	200	47.5
Low Risk	24	5.7	20	4.8	47	11.2	91	21.6
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Family Income								
Low Income	24	5.7	39	9.3	103	24.5	166	39.4
Moderate Income	15	3.6	13	3.1	52	12.4	80	19
High Income	28	6.7	32	7.6	115	27.3	175	41.6
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Maternal Knowledge								
Poor	25	5.9	43	10.2	124	29.5	192	45.6
Sufficient	10	2.4	6	1.4	43	10.2	59	14
Good	32	7.6	35	8.3	103	24.5	170	40.4
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Culture								
Strong Influence	28	6.7	39	9.3	121	28.7	188	44.7
Moderate Influence	8	1.9	6	1.4	38	9	52	12.4
No Influence	31	7.4	39	9.3	111	26.4	181	43
<i>Total</i>	67	15.9	84	20	270	64.1	421	100
Exclusive Breastfeeding								
Not Exclusive Breastfeeding	27	6.4	45	10.7	132	31.4	204	48.5
Less Than Optimal	7	1.7	1	0.2	36	8.6	44	10.5
Exclusive Breastfeeding	33	7.8	38	9	102	24.2	173	41.1
<i>Total</i>	67	15.9	84	20	270	64.1	421	100

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 3, the distribution of toddler characteristics in three districts (Viqueque, Oecusse, and Ermera) with a total sample of 421 respondents. Based on stunting incidence, the number of children under five in the normal category was 211 children (50.1%), while 210 children (49.9%) experienced stunting. In the infectious disease variable, the majority of respondents were in the medium risk category (200 respondents (47.5%)), followed by high risk (130 respondents (30.9%)) and low risk (91 respondents (21.6%)). Viewed from family income, the majority of respondents were in the high-income category (175 respondents (41.6%)), followed by low income (166 respondents (39.4%)), and medium income (80 respondents (19.0%)). Based on maternal knowledge, most mothers had poor knowledge (192 respondents (45.6%)), followed by good knowledge (170 respondents (40.4%)), and sufficient knowledge (59 respondents (14.0%)). In the cultural variable, the majority of respondents were in the cultural category with a

strong influence of 188 respondents (44.7%), followed by no cultural influence of 181 respondents (43%), and moderate influence of 52 respondents (12.4%).

Table 4
Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13.834	7	.054

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 4, the results of the Hosmer and Lemeshow Test show a significance value (Sig.) of 0.054. Because the significance value is greater than 0.05 ($p > 0.05$), it can be concluded that the logistic regression model used is appropriate (fit) for the research data.

Table 5
Omnibus Test of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	478.812	10	.000
	Block	478.812	10	.000
	Model	478.812	10	.000

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 5, the results of the Omnibus Test of Model Coefficients show a Sig. value of 0.000 ($p < 0.05$). This indicates that the overall logistic regression model is significant, indicating that the independent variables jointly influence the dependent variable, and the model is suitable for further analysis.

Table 6
Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	104.816 ^a	.679	.906

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 6, the Model Summary results show a Nagelkerke R^2 value of 0.906, meaning that 90.6% of the variation in the dependent variable can be explained by the independent variables in the model, while 9.4% is influenced by factors outside the research model. This indicates that the model has very strong explanatory power.

Table 7
Multivariate Analysis

Independent Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Infectious Diseases	1,893	0.806	5.523	1	0.019	6.642	1.369	32.215
Family Income	3.533	0.843	17.578	1	0.000	34.224	6.562	178.488
Maternal Knowledge	2.985	0.864	11.947	1	0.001	19.796	3.642	107.603
Culture	1,836	0.775	5.616	1	0.018	6.269	1.374	28.609
Exclusive Breastfeeding	2.196	0.824	7.095	1	0.008	8.986	1,786	45.205

Source: Research Results in Viqueque, Oecusse, and Ermera, 2025.

Based on Table 7, the results of the binary logistic regression analysis showed that several independent variables had a significant relationship with the incidence of stunting. The infectious disease variable had a significant effect on the incidence of stunting ($p = 0.019$), with an Odds Ratio (OR) value of 6.642 (95% CI: 1.369–32.215). The family income variable also showed a very significant effect ($p < 0.001$), with an OR = 34.224 (95% CI: 6.562–178.488). In addition, maternal knowledge was significantly related to the incidence of stunting ($p = 0.001$) with an OR = 19.796 (95% CI: 3.642–107.603). The cultural variable also showed a significant relationship ($p = 0.018$) with an OR = 6.269 (95% CI: 1.374–28.609). Meanwhile, exclusive breastfeeding also significantly influenced the incidence of stunting ($p = 0.008$) with an OR of

8.986 (95% CI: 1.786–45.205). Overall, the analysis showed that family income was the most dominant factor influencing the incidence of stunting, having the highest odds ratio compared to other variables.

DISCUSSION

The results of this study demonstrate that several factors are significantly associated with stunting among children under five years of age in Ermera, Viqueque, and Oe-Cusse districts of Timor-Leste. The multivariate logistic regression analysis revealed that infectious diseases, family income, maternal knowledge, cultural practices, and exclusive breastfeeding were significant determinants of stunting. Among these variables, family income emerged as the most dominant factor influencing stunting. These findings confirm that

stunting is a multifactorial condition influenced by the complex interaction of biological, socioeconomic, behavioral, and environmental factors.

The Impact of Infectious Diseases on Stunting

The findings of this study indicate that infectious diseases were significantly associated with the incidence of stunting ($p = 0.019$; $OR = 6.642$). This result suggests that children who experience a high risk of infectious diseases are approximately 6.6 times more likely to develop stunting compared with children with a lower risk of infection. These findings highlight the important role of child health conditions in influencing linear growth.

Biologically, infectious diseases can interfere with child growth through several mechanisms. During infection, the body requires additional energy to fight pathogens, which may reduce the energy available for growth processes. Furthermore, infections often lead to decreased appetite, impaired nutrient absorption in the intestine, and increased metabolic demands. Recurrent infections can also trigger chronic inflammation, which affects protein metabolism and growth hormone regulation, ultimately inhibiting normal growth in children (Carvalho et al., 2025).

These findings are consistent with previous studies. Carvalho et al. (2025) reported that intestinal infections and undernutrition are closely related and can impair intestinal function and nutrient absorption in children. Similarly, Gizaw et al. (2022) found that repeated infections such as diarrhea and intestinal parasites significantly increased the risk of stunting among children aged 24–59 months. Another study by Das et al. (2024) also reported that exposure to enteric pathogens can negatively affect children's growth through disruption of gut health and nutrient utilization.

The implications of these findings suggest that stunting prevention strategies should not only focus on improving nutritional intake but also on reducing the burden of infectious diseases among children. Public health interventions such as improving environmental sanitation, increasing access to clean water, strengthening immunization coverage, and promoting hygiene practices are

essential components in reducing the risk of stunting.

The Influence of Family Income on Stunting

This study found that family income was the most dominant factor associated with stunting ($p < 0.001$; $OR = 34.224$). This indicates that children from low-income families have a significantly higher risk of experiencing stunting compared with children from higher-income households. The strong association between family income and stunting reflects the critical role of household socioeconomic conditions in determining child nutritional status.

Theoretically, family income affects the household's ability to provide adequate and nutritious food, access health services, and maintain proper sanitation and living conditions. Families with limited financial resources may struggle to meet children's nutritional requirements, leading to chronic malnutrition and impaired growth. In addition, low-income households may have limited access to health services and health information, which further increases the risk of poor child health outcomes.

These findings are consistent with previous research. Islam et al. (2025) demonstrated that household food insecurity and low socioeconomic status are major determinants of child malnutrition and stunting in many developing countries. Similarly, Siregar et al. (2024) reported that socioeconomic factors, particularly household income, significantly influence the risk of stunting among children under five in Indonesia. Other studies have also shown that poverty affects food availability, dietary diversity, and childcare practices, which collectively influence children's nutritional status.

The policy implications of these findings suggest that stunting prevention programs should incorporate economic empowerment strategies for vulnerable families. Government programs aimed at improving household income, strengthening food security, and expanding social protection programs may contribute significantly to reducing the prevalence of stunting.

The Influence of Maternal Knowledge on Stunting

The results of this study indicate that maternal knowledge was significantly associated with stunting ($p = 0.001$; $OR = 19.796$). This finding suggests that children whose mothers have poor knowledge of nutrition and childcare practices are substantially more likely to experience stunting than children whose mothers possess adequate knowledge.

Maternal knowledge plays a fundamental role in shaping child feeding practices, healthcare utilization, and growth monitoring. Mothers who have adequate knowledge of nutrition are more likely to practice appropriate feeding behaviors, including providing balanced diets, exclusive breastfeeding, and appropriate complementary feeding. Conversely, limited knowledge regarding child nutrition may lead to inappropriate feeding practices, insufficient dietary diversity, and delayed healthcare seeking, all of which increase the risk of chronic malnutrition (Haryanti et al., 2024).

These findings align with previous studies. Ramadhan et al. (2024) reported that maternal knowledge significantly influences nutritional care practices and is strongly associated with stunting among children. Similarly, Haryanti et al. (2024) found that mothers with better knowledge of child nutrition and nurturing care practices were more likely to adopt healthy feeding behaviors and preventive health practices.

Therefore, improving maternal knowledge should be a key component of stunting prevention programs. Community-based nutrition education, maternal counseling services, and the strengthening of primary healthcare programs such as maternal and child health services are essential strategies for improving child nutrition outcomes.

The Influence of Culture on Stunting

Cultural factors were also found to be significantly associated with stunting in this study ($p = 0.018$; $OR = 6.269$). This indicates that cultural beliefs and traditional practices within communities may influence childcare practices, dietary behaviors, and health-seeking patterns, ultimately affecting children's nutritional status.

In many traditional societies, cultural norms may shape beliefs about food consumption, dietary restrictions, and child feeding practices. For example, some cultural traditions may restrict pregnant women or young children from consuming certain nutritious foods due to traditional beliefs or taboos. Such dietary restrictions can contribute to inadequate nutrient intake and increase the risk of malnutrition and growth disorders.

Previous research supports these findings. Raman et al. (2024) reported that cultural beliefs and traditions play a significant role in shaping early childhood nutrition practices. Similarly, Karlsson (2022) and Fufa (2022) highlighted that sociocultural factors influence feeding practices and childcare behaviors, which may contribute to the persistence of stunting in many developing countries.

Therefore, interventions aimed at reducing stunting should adopt culturally sensitive approaches. Health promotion programs should incorporate community engagement and culturally appropriate communication strategies to encourage behavioral changes related to child nutrition and healthcare practices.

The Effect of Exclusive Breastfeeding on Stunting

This study also found that exclusive breastfeeding was significantly associated with the incidence of stunting ($p = 0.008$; $OR = 8.986$). Children who were not exclusively breastfed were approximately nine times more likely to experience stunting than those who received exclusive breastfeeding during the first six months of life.

Exclusive breastfeeding plays a crucial role in supporting optimal infant growth and development. Breast milk contains essential nutrients, antibodies, and bioactive components that support immune function and protect infants from infections. In addition, breastfeeding promotes healthy gut development and improves nutrient absorption during early life.

These findings are consistent with previous studies. Angreni et al. (2024) reported that exclusive breastfeeding significantly reduces the risk of

stunting by ensuring adequate nutrient intake during the critical early stages of growth. Similarly, Sumarah and Hernayanti (2025) found that children who were not exclusively breastfed had a significantly higher risk of stunting compared with those who received exclusive breastfeeding.

Therefore, strengthening breastfeeding promotion programs should be a key priority in stunting prevention strategies. Health systems should provide lactation counseling, strengthen maternal support programs, and encourage community awareness regarding the importance of exclusive breastfeeding during the first six months of life.

Dominant Research Findings

Logistic regression analysis results showed that family income was the most dominant factor associated with stunting, with an Odds Ratio (OR) of 34.224 ($p < 0.001$). This means that children from low-income families are approximately 34 times more likely to experience stunting than children from high-income families. Other factors with significant associations included maternal knowledge (OR = 19.796), exclusive breastfeeding (OR = 8.986), infectious diseases (OR = 6.642), and culture (OR = 6.269). These findings indicate that family socioeconomic conditions, particularly income, are a major determinant of stunting among children under five in the study area.

Implications for Public Health Policy

Overall, the findings of this study highlight that stunting is influenced by multiple interacting determinants, including socioeconomic, behavioral, health, and cultural factors. Therefore, efforts to reduce stunting require a comprehensive and multisectoral approach. Strategies such as improving household economic conditions, strengthening maternal nutrition education, promoting exclusive breastfeeding, preventing infectious diseases, and addressing cultural barriers

related to child nutrition are essential for reducing the prevalence of stunting in Timor-Leste.

STUDY LIMITATIONS

This study has several limitations that should be considered when interpreting the findings. First, this research used a cross-sectional design, which limits the ability to establish causal relationships between the independent variables and stunting incidence. Second, the data related to maternal knowledge, cultural practices, and breastfeeding history were collected through interviews using questionnaires, which may be subject to recall bias or reporting bias. Third, the study was conducted only in three districts in Timor-Leste, namely Ermera, Viqueque, and Oe-Cusse; therefore, the findings may not fully represent the conditions in other regions of the country. Despite these limitations, this study provides important empirical evidence regarding the determinants of stunting in areas with a high prevalence of stunting in Timor-Leste.

CONCLUSION

Based on the results of a study of 421 children under five in the districts of Ermera, Viqueque, and Oe-Cusse, it was found that the prevalence of stunting was still high at 49.9%. The results of the logistic regression analysis showed that infectious diseases ($p = 0.019$; OR = 6.642), family income ($p < 0.001$; OR = 34.224), maternal knowledge ($p = 0.001$; OR = 19.796), culture ($p = 0.018$; OR = 6.269), and exclusive breastfeeding ($p = 0.008$; OR = 8.986) were significantly associated with the incidence of stunting. The most dominant factor was family income, so children from low-income families have a greater risk of experiencing stunting. These findings indicate that stunting is influenced by a combination of socioeconomic conditions, maternal knowledge, child health status, breastfeeding practices, and sociocultural factors within the community.

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