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**FACTORS RELATED TO THE PREVALENCE OF
STUNTING IN CHILDREN UNDER FIVE IN NAIONI
VILLAGE, ALAK DISTRICT, KUPANG, EAST NUSA
TENGGARA**

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ABSTRACT

Background: Children under five are vulnerable to having malnutrition problems, including stunting. The Indonesian Nutrition Status Survey showed that the prevalence of stunting cases in children under five reached 21.6% in 2022, This number still far from national target below 14%. Naioni Community Health Center reported 8.6% children under five with in July 2019 and 12% toddlers with stunting in February 2020. Stunting in childhood with inadequate intervention can lead to cognitive and psychomotor impairment, as well as hinder productivity as an adult, leading to the low quality of a country's human resources. **Objective:** To identify the factors that influenced the prevalence of stunting at Naioni Village, Alak District, Kupang City, East Nusa Tenggara Province, including gender, history of chronic infections, maternal educational level, and family income. **Methods:** This study used consecutive sampling method with a total data of 226 toddlers: 113 stunted children and 113 children without stunting. The data resource was taken from health record of the Naioni Community Health Center and Naioni Village Office. Data was analyzed using chi square tests. **Results:** Children with a history of chronic infection were considerably more likely to experience stunting ($OR = 150.1$; 95% $CI: 54.3-415.0$; $p = 0.001$). A similar pattern was observed among children from families with income below the regional minimum wage ($OR = 17.4$; 95% $CI: 7.3-41.0$; $p = 0.001$) and among those whose mothers had low educational attainment ($OR = 153.9$; 95% $CI: 50.0-473.2$; $p = 0.001$). No significant association was found between child's gender and stunting ($p = 0.342$). **Conclusion:** Significant relationship found between stunting and chronic infection history, maternal educational level, family income in Naioni Community Health Center.

Keywords: stunting, chronic infection history, parental income, maternal educational level

INTRODUCTION

Stunting is a chronic nutritional disorder that negatively affects physical growth, cognitive development, and productivity in later life. It occurs when a child's height-for-age z-score falls below -2 standard deviations according to WHO Child Growth Standards (Akbar & Mursal, 2023; Soliman et al., 2021; WHO, 2019). Globally, stunting affects more than one-fifth of children under five years old, with the highest burden recorded in South Asia and Sub-Saharan Africa. Malnutrition contributes to nearly 45% of deaths among children under five, reflecting both biological and socioeconomic inequalities (Bappenas, 2019; Black et al., 2013).

In Indonesia, stunting remains a major public health problem despite gradual improvements in nutritional outcomes. According to the Indonesian Nutrition Status Survey (SSGI), the national prevalence decreased from 27.7% in 2019 to 21.6% in 2022 (Kemenkes RI, 2022; UNICEF et al., 2023). However, disparities between regions persist. East Nusa Tenggara (NTT) continues to record one of the highest prevalence rates in the country, reported at 51.7% in 2014, 42.6% in 2018, and 37.8% in 2021 (Bappenas, 2019; Kemenkes RI, 2021). The province's geographic isolation, low socioeconomic status, limited access to health services, and poor sanitation are among the contributing factors (Don Bosko et al., 2023).

Naioni Village, located in Alak District, Kupang City, represents a microcosm of this persistent public health challenge. Reports from the Naioni Community Health Center indicated that stunting cases among children under five increased from 8.6% in 2019 to 12% in 2020, reaching 196 cases in 2023. These data suggest that local-level determinants remain inadequately addressed, even as national stunting interventions such as *Gerakan Nasional Percepatan Perbaikan Gizi* (National Nutrition Improvement Movement) have been implemented.

Previous research shows that stunting is a multifactorial condition influenced by biological, environmental, and social factors (Agustin & Rahmawati, 2021; I Dewa Nyoman Supariasa & Heni Purwaningsih, 2019; Tanzil & Hafriani, 2021). Low family income limits access to adequate nutrition and healthcare, while low maternal education affects knowledge and behavior related to child feeding and hygiene (Alam et al., 2020; Thewes et al., 2018). Recurrent or chronic infections further exacerbate undernutrition by increasing energy expenditure and impairing nutrient absorption (Dian et al., 2021; Quamme & Iversen, 2022a; Sekarini, 2022).

This study integrates these theoretical and contextual perspectives to examine the factors associated with stunting among children under five in Naioni Village, Kupang City. The conceptual framework of this research connects socioeconomic variables (family income and maternal education) and biological factors (chronic infection) as interrelated determinants of stunting. Socioeconomic disadvantage is expected to limit dietary intake and healthcare access, while infection acts as a biological mechanism contributing to impaired linear growth. Understanding these relationships in a local context such as Naioni Village is critical for designing effective community-based interventions and supporting Indonesia's national stunting reduction targets.

METHOD

The research was a case-control type observational analytical study using health records. Data was collected from Naioni Community Health Center. The research began after obtaining an Ethical Clearance from the Health Research Ethics Commission of the

Faculty of Medicine, Duta Wacana Christian University. The research began in April 2024.

The data were obtained from the Naioni Health Center and the Village Office of Alak District. The target population was children under 5 years old in Naioni Village. The sampling method used was consecutive sampling (Thewes et al., 2018). Data was reviewed for completeness, internal consistency, and duplication. Records with missing values or implausible measurements were excluded before analysis to ensure data validity and accuracy.

Chronic infection was defined as a recorded history of prolonged or recurrent infections, such as diarrhea or respiratory illness lasting ≥ 14 days in the past year (Auliyah et al., 2023; Diyah Arini et al., 2020; Febianne Eldrian et al., 2023; Mahudeh et al., 2023). Maternal educational level was defined as the highest formal education completed by the mother, categorized as primary (no schooling or elementary), secondary (junior/senior high school), and higher (college/university) (Krisnana et al., 2020; Laksono et al., 2022; Susyani et al., 2022). Parental income was defined as the average monthly family income categorized relative to the Regional Minimum Wage (RMW) of Kupang City at the time of data collection—below RMW, equal to RMW, or above RMW (Agustin & Rahmawati, 2021; Kaloko et al., 2022).

Data were analyzed using the Chi-square test to evaluate associations between independent variables and stunting. The effect size was expressed as odds ratios (OR) with 95% confidence intervals (CI). Due to the nature of the secondary data, multivariate logistic regression was not conducted; however, the results were interpreted while acknowledging potential confounding effects. Statistical significance was defined as $p < 0.05$.

RESULT

Data from 226 children under five years old were analyzed, consisting of 113 stunted and 113 non-stunted participants. The univariate analysis described the distribution of sample characteristics, including gender, history of chronic infection, maternal education, and family income. Most participants were male (59.7%), and slightly more than half had a history of chronic infection (52.7%). A considerable proportion of mothers had only secondary-level education (42.5%), and more than half of the families (51.3%) earned below the regional minimum wage (RMW).

Children with a history of chronic infection were approximately 150 times more likely to be stunted compared to those without infection (OR = 150.1; 95% CI: 54.3–415.0). Those from families earning below the RMW were about 17 times more likely to experience stunting than those from higher-income families (OR = 17.4; 95% CI: 7.3–41.0). Likewise, children of mothers with low education had a 154-fold higher risk of stunting compared to those whose mothers had higher education (OR = 153.9; 95% CI: 50.0–473.2).

These results suggest a consistent pattern: socioeconomic disadvantage, limited maternal education, and recurrent infections are key contributors to stunting in Naioni Village. Gender differences, on the other hand, did not show a meaningful relationship with stunting prevalence.

Tabel 1. Univariate Analysis

Variables	Frequency	Percent (%)
Stunting Incidence		
Stunting	113	50
Not Stunting	113	50
Gender		
Male	135	59.7
Female	91	40.3
History of Chronic Infection		
Have Chronic Infection	119	52.7
Never	107	47.3
Parental Education Level		
Out of School	67	29.6
Elementary School (SD)	33	14.6
Secondary School (SMA/SMK)	96	42.5
College (Undergraduate)	30	13.3
Parental Income		
Below RMW	116	51.3
RMW equivalent	66	29.2
Above RMW	44	19.5
Total	226	100 %

Table 2. Bivariate Analysis

variables		Stunting	Not Stunting	Total	Chi-square Test Results
Gender	Boy	64	71	135	0.342
	Girl	49	42	91	
	Total	113	113	226	
History of Chronic Infection	Had Chronic Infection	107	12	119	0.001
	Never	6	101	107	
	Total	113	113	226	
Parental Income	Below RMW	97	19	116	0.001
	RMW equivalent	6	60	66	
	Above RMW	10	34	44	
	Total	113	113	226	
Mother's Education Level	No School	67	0	67	0.001
	Basic Level	29	4	33	
	Middle Level	14	82	96	
	College	3	27	30	
	Total	113	113	226	

DISCUSSION

Stunting in children is a chronic manifestation of nutritional deficiency that results from complex interactions between biological, environmental, and social determinants (Quamme & Iversen, 2022). In this study, three major factors—chronic infection, low maternal education, and low family income—were found to have a significant relationship with the incidence of stunting in Naioni Village.

The strong association between chronic infection and stunting ($OR = 150.1$; 95% $CI: 54.3–415.0$) indicates that recurrent illnesses contribute substantially to impaired growth. Frequent or prolonged infections increase energy expenditure, suppress appetite, and reduce nutrient absorption, leading to growth faltering (Auliyah et al., 2023; Diyah Arini et al., 2020; Mahudeh et al., 2023). Similar findings were reported by Arini et al. (2020) and Auliyah et al. (2023), who observed that toddlers experiencing repeated diarrhea or respiratory infections for more than two weeks were at higher risk of stunting. Chronic infections not only deplete nutritional reserves but also exacerbate inflammation and disrupt metabolic processes vital for growth (Febianne Eldrian et al., 2023; Lineleyan et al., 2021).

Children from families earning below the Regional Minimum Wage (RMW) were about 17 times more likely to be stunted than those from higher-income households ($OR = 17.4$; 95% $CI: 7.3–41.0$). Limited income affects food diversity, the ability to purchase nutrient-rich foods, and access to healthcare services (Agustin & Rahmawati, 2021; Delima Nopita & Vedjia Medhyna, 2019; Kaloko et al., 2022; Mariska et al., 2022; Rahma & Mutalazimah, 2022). Studies by Nopita and Medhyna (2019) and Mariska et al. (2022) support this pattern, showing that children from economically disadvantaged families have a higher likelihood of stunting. Poverty, therefore, functions as both a direct and indirect determinant—restricting dietary intake and amplifying vulnerability to disease.

Maternal education also showed a strong correlation with stunting ($OR = 153.9$; 95% $CI: 50.0–473.2$). Mothers with lower educational attainment may have limited understanding of balanced nutrition, childcare, and hygiene practices (Krisnana et al., 2020; Laksono et al., 2022; Susyani et al., 2022). Prior studies by Krisnana et al. (2020) and Laksono et al. (2022) demonstrated similar trends, emphasizing that maternal education below nine years is a key predictor of linear growth failure. Education influences not only knowledge but also decision-making autonomy, affecting how resources are allocated to meet a child's nutritional needs.

Although boys were slightly more affected than girls, the difference was not statistically significant ($p = 0.342$). This aligns with findings by Devi (2022) and Sekarini (2022), which suggest that gender-related biological differences may influence nutritional needs but are less determinant than socioeconomic and environmental factors.

This study contributes new insight into stunting determinants in the eastern Indonesian context, particularly in Naioni Village, where health disparities are shaped by intertwined socioeconomic and environmental challenges. While many national-level studies have identified similar factors, this research emphasizes how chronic infection, maternal education, and income inequality operate together within a small urban–rural transitional community.

To overcome the incidence of stunting, improving nutrition is a very important step. This effort aims to improve the coverage and quality of nutrition services for families and to improve the nutritional status of pregnant women, breastfeeding mothers, infants, and

toddlers. Community-specific interventions integrating infection prevention, maternal education, and household economic strengthening also play a role in addressing persistent nutritional inequality in East Nusa Tenggara. Nutrition plays a very significant role in growth and development throughout the human life cycle (Pingge et al., 2023)

This study used secondary data, which limited control over variable quality and completeness. Potential reporting bias may exist due to reliance on health center records, and some variables (e.g., infection history) may be subject to recall inaccuracies. Additionally, the analysis relied primarily on bivariate testing, as multivariate adjustment was not possible due to data constraints, which may leave residual confounding. Future studies using prospective primary data and multivariate models could provide a more comprehensive understanding of causal relationships.

CONCLUSION

This study identified several factors related to the prevalence of stunting among children under five in Naioni Village, Alak District, Kupang City. A significant relationship was observed between chronic infection, low maternal education, and low family income with the occurrence of stunting, while gender showed no significant association.

These findings suggest that stunting in Naioni Village arises from interconnected social and environmental conditions rather than a single cause. Interventions should therefore focus on strengthening infection prevention programs, maternal education initiatives, and household economic support, particularly for vulnerable families. Policymakers and local health authorities may use these insights to design community-based strategies that address the root determinants of malnutrition in East Nusa Tenggara.

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