



Determinants of stunting among under-fives aged 24–59 months in the villages of Labuan Ratu Kampung, Banjar Ketapang, and Gunung Labuhan

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ABSTRAK

Latar Belakang: Stunting masih menjadi masalah kesehatan masyarakat yang berdampak terhadap pertumbuhan fisik, perkembangan kognitif, serta kualitas sumber daya manusia di masa mendatang. Kejadian stunting dipengaruhi oleh berbagai faktor. Prevalensi stunting di Indonesia 21,5% dan Kabupaten Lampung Utara memiliki prevalensi yang lebih tinggi sebesar 23,5% pada tahun 2023.

Tujuan: Penelitian ini bertujuan menganalisis hubungan riwayat pemberian asi eksklusif, jumlah anggota keluarga dan pendapatan keluarga dengan kejadian stunting pada balita di Desa Labuhan Ratu Kampung, Desa Banjar Ketapang, dan Desa Gunung Labuhan, Kabupaten Lampung Utara.

Metode: Penelitian ini merupakan penelitian kuantitatif dengan desain observasional analitik menggunakan pendekatan cross-sectional. Penelitian dilaksanakan pada November 2024 sampai dengan Januari 2025 terhadap 65 balita yang dipilih menggunakan teknik cluster random sampling. Data dikumpulkan melalui kuesioner dan pengukuran antropometri, kemudian dianalisis menggunakan uji Gamma dengan tingkat kemaknaan 95% ($\alpha=0,05$).

Hasil: Tiga peserta (2,2%) memenuhi klasifikasi operasional ≥ 126 mg/dL, 48 peserta (35,3%) memiliki glukosa 100–125 mg/dL, dan 85 peserta (62,5%) memiliki glukosa <100 mg/dL. Aktivitas fisik berhubungan dengan klasifikasi operasional ($p=0,042$) dan berbeda antara tiga kategori glukosa ($p=0,005$), sedangkan pengetahuan tidak berhubungan secara signifikan ($p=0,459$). Sebanyak 35 balita (53,8%) mengalami stunting. Hasil analisis menunjukkan terdapat hubungan antara riwayat pemberian ASI eksklusif ($p=0,01$; Gamma=0,53), jumlah anggota keluarga ($p=0,04$; Gamma=-0,50) dan pendapatan keluarga ($p=0,01$; Gamma=-1,00) dengan kejadian stunting. Proporsi stunting lebih tinggi pada balita yang tidak memperoleh ASI eksklusif dan berasal dari keluarga dengan jumlah anggota lebih dari empat orang.

Kesimpulan: Riwayat pemberian ASI eksklusif, jumlah anggota rumah tangga, dan pendapatan rumah tangga merupakan faktor-faktor yang berhubungan dengan status stunting pada balita. Upaya pencegahan stunting perlu dilaksanakan melalui pendekatan terpadu yang mendorong pemberian ASI eksklusif dan pemantauan pertumbuhan secara berkala, sembari mempertimbangkan pendapatan rumah tangga dan jumlah anggota keluarga dalam upaya memenuhi kebutuhan gizi anak.

KATA KUNCI: ASI eksklusif; balita; jumlah anggota keluarga; pendapatan keluarga; stunting

ABSTRACT

Background: Stunting remains a public health issue that impacts physical growth, cognitive development, and the future quality of human resources. The occurrence of stunting is influenced by various factors. The national prevalence of stunting in Indonesia is 21.5%, while North Lampung Regency recorded a higher prevalence of 23.5% in 2023.

Objectives: This study aims to analyze the relationship between the history of exclusive breastfeeding, family size, and family income and the incidence of stunting among children under five in Labuhan Ratu Kampung, Banjar Ketapang, and Gunung Labuhan villages, North Lampung Regency.

Methods: This study is a quantitative, analytic observational study employing a cross-sectional design. It was conducted from November 2024 to January 2025, involving 65 children under five years of age selected via cluster random sampling. Data were collected through questionnaires and anthropometric measurements and subsequently analyzed using the Gamma test at a 95% significance level ($\alpha=0.05$).

Results: A total of 35 under-fives (53.8%) were stunted. The results showed significant associations between exclusive breastfeeding history ($p=0.01$; Gamma=0.53), household size ($p=0.04$; Gamma=-0.50), and household income ($p=0.01$; Gamma=-1.00) and stunting status. The proportion of stunting was higher among under-fives who were not exclusively breastfed and who came from families with more than four members.

Conclusions: Exclusive breastfeeding, household size, and income are associated with stunting in under-fives. Prevention should promote exclusive breastfeeding and growth monitoring while considering household resources and family size.

KEYWORDS: exclusive breastfeeding; household income ; number of family members; stunting; under-fives

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INTRODUCTION

Linear growth in early childhood is a key indicator of healthy growth because it is linked to the risk of morbidity and mortality, noncommunicable diseases, learning ability, productivity, and cognitive, language, and sensorimotor development (1,2). Children are particularly at risk of malnutrition; therefore, optimizing nutrition from an early age, including during the first 1000 days of life (HPK), is crucial for ensuring long-term quality of life (1).

Malnutrition encompasses deficiencies, excesses, or imbalances in nutrient intake. Stunting is a form of chronic malnutrition characterized by height-for-age <-2 SD according to WHO standards. It is influenced by socioeconomic conditions, maternal nutrition, feeding practices, infections, and inadequate care. Its effects become apparent after age 2 and persist into adulthood (1,2).

Globally, the prevalence of stunting among children under five in 2022 reached 22.3%, while in Southeast Asia it stood at 30.1% (3). In Indonesia, the prevalence of stunting decreased from 21.6% in 2022 to 21.5% in 2023. Lampung

Province has a prevalence of 14.9%, while North Lampung Regency has a higher rate of 23.5% (4,5,6). Although these figures show a decline, the prevalence indicates that stunting remains a public health issue requiring sustained attention. The prevalence rates in Indonesia and North Lampung also remain above the WHO threshold of 20% (7). According to 2023 data from the North Lampung Regency Health Office, the Ketapang Community Health Center is one of the areas with a high prevalence of stunting, ranking second at 6.1%. Within the Ketapang Community Health Center's service area, there are variations in stunting prevalence among villages. The three villages with the highest stunting prevalence in this service area are Labuhan Ratu Kampung Village (13.63%), Gunung Labuhan (12.96%), and Banjar Ketapang (10.52%) (7).

Stunting can hinder physical and cognitive development, reduce educational attainment and productivity, and increase the risk of chronic diseases in adulthood. Malnutrition also increases vulnerability to disease and death and reinforces the cycle of poverty and health problems (1,2).

Exclusive breastfeeding is a critical intervention to support children's growth and development, involving the initiation of breastfeeding within the first hour after birth and the exclusion of any other food or drink until 6 months of age. Breast milk supports children's brain development, cognitive function, and immune system (8). Failure to practice exclusive breastfeeding can increase the risk of stunting, partly due to limited knowledge and the influence of cultural practices (9). Several studies have demonstrated a link between exclusive breastfeeding and stunting status. A meta-analysis conducted by Simbolan and Putri (2024) found that exclusive breastfeeding was associated with a reduced risk of stunting among infants, while Wibowo and Rustiawan (2025) found that infants not exclusively breastfed were at risk of stunting in both urban and rural areas. These findings are supported by a systematic review by Suciati and Munir (2024), which demonstrates the effectiveness of exclusive breastfeeding in preventing stunting (10,11,12).

The number of family members can affect the fulfillment of children's nutritional needs. The larger the family, the greater the household's needs; thus, economic constraints can increase the risk of food insecurity and stunting. UNICEF notes that household size influences children's nutritional status through food security, parenting practices, and access to health services (13). Furthermore, a systematic review by Cahyani and Nurfita (2025) shows that 75% of studies found a

link between family income and stunting (14). Family income is a socioeconomic determinant that influences the ability to provide nutritious food, health care, sanitation, and children's basic needs. Limited income can reduce access to nutritious food and health care, thereby increasing the risk of stunting among toddlers (15,16).

Evidence regarding factors associated with stunting in children aged 24–59 months within the working area of the Ketapang Community Health Center, specifically in Kampung Labuan Ratu, Banjar Ketapang, and Gunung Labuhan, remains limited. Therefore, this study aims to identify the factors associated with stunting among children under five in these three villages.

MATERIALS AND METHODS

This study is a quantitative study with an analytical observational design using a cross-sectional approach. This approach was used to determine the association between independent and dependent variables measured at the same time. The study was conducted from November 2024 to January 2025 in the villages of Labuhan Ratu Kampung, Banjar Ketapang, and Gunung Labuhan, North Lampung Regency. The population for this study comprised all under-fives in the three villages, totalling 132 under-fives. The study included 65 respondents selected using an accidental sampling technique (Figure 1). The respondents were recruited based on their availability and eligibility during the study period.

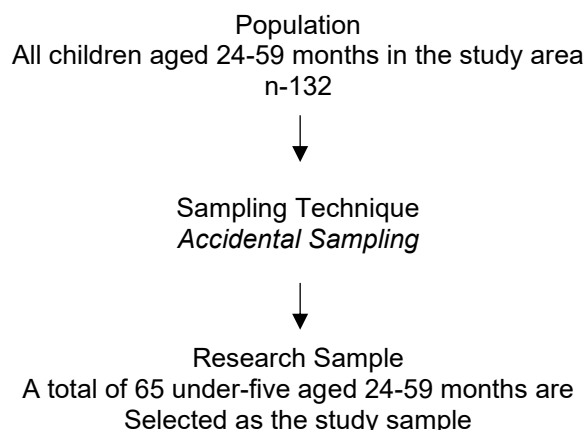


Figure 1. Sample calculation

The dependent Variable in this study was the stunting status (Stunting: z-scores ranging from -3 SD to <-2 SD; Normal: z-scores ranging from -2 SD to +3 SD). The height of infants aged 24–59 months was measured using a OneMed microtoise with a precision of 0.1 cm and a range of 200 cm. The independent variables in this study included history of exclusive breastfeeding (Non-exclusive breastfeeding: consumption of food or fluids other than breast milk (including plain water and honey) from before the age of 6 months; and Exclusive breastfeeding: consumption of breast milk only for 6 months), family size (small: ≤ 4 members and large: > 4 members), and household income (low: $\leq$ Rp 2,716,496.33 and

adequate: $>$ Rp 2,716,496.33), with the income limit based on the 2024 North Lampung Regency Minimum Wage (UMK), as established by the 2023 Decision of the Governor of Lampung. These three variables were measured using a structured questionnaire completed via interviews. Univariate analysis was presented using frequency distributions, whilst bivariate analysis utilised the gamma association test.

RESULTS AND DISCUSSIONS

The frequency distributions of stunting, the father's occupation, history of exclusive breastfeeding, number of family members, and household income are presented in **Table 1**.

Table 1. Frequency distribution of respondents

Characteristics	Labuhan Ratu Kampung	Banjar Ketapang	Gunung Labuhan	n	%
Stunting Status					
Stunting	5	17	13	35	53.80
Normal	2	20	8	30	46.20
Father's Occupation					
Labourer	4	21	11	36	55.40
Farmer	3	13	8	24	36.90
Mechanics	0	0	1	1	1.50
Staff	0	1	1	2	3.10
Self-employed	0	2	0	2	3.10
History of Exclusive Breastfeeding					
Not exclusively breastfed	4	15	10	29	44.60
Exclusive breastfeeding	3	22	11	36	55.40
Number of Family Members					
Large	0	13	8	21	32.30
Small	7	24	13	44	67.70
Household Income					
Low	6	35	19	60	92.30
Moderate	1	2	2	5	7.70
Total				65	100

Univariate analysis by village revealed variations in respondent characteristics across the three study villages: Labuhan Ratu Kampung, Banjar Ketapang, and Gunung Labuhan. Among the 65 total respondents, the majority were located in Banjar Ketapang ($n = 37$), followed by Gunung Labuhan ($n = 21$), and Labuhan Ratu Kampung ($n = 7$).

Based on stunting prevalence, the highest proportion of stunted children was found in Labuhan Ratu Kampung, 5 out of 7 respondents

(71.4%), followed by Gunung Labuhan with 13 out of 21 respondents (61.9%). At the same time, Banjar Ketapang had a lower stunting rate, at 17 out of 37 respondents (45.9%). Thus, although the overall stunting rate reached 53.8%, there were differences in stunting rates across regions.

Based on fathers' occupations, manual labor was the most common type of work in all three villages. The proportion of fathers working as manual laborers was 57.1% in Labuhan Ratu Kampung, 56.8% in Banjar Ketapang, and 52.4%

in Gunung Labuhan. Farming was the second most common occupation, with proportions of 42.9%, 35.1%, and 38.1%, respectively. Other occupations, such as mechanics, office staff, and self-employed individuals, were found only among a small proportion of respondents, primarily in Banjar Ketapang and Gunung Labuhan.

Regarding the history of exclusive breastfeeding, the proportion of exclusive breastfeeding was higher than that of non-exclusive breastfeeding in Banjar Ketapang and Gunung Labuhan, at 59.5% and 52.4%, respectively. Conversely, in Labuhan Ratu Kampung, the proportion of children who were not exclusively breastfed was higher (57.1%) than those who were exclusively breastfed (42.9%).

In terms of number of family members, all respondents in Labuhan Ratu Kampung came from small families (100%). In comparison, large families were found among 35.1% of respondents in Banjar Ketapang and 38.1% in Gunung Labuhan. The proportions of small families in Banjar Ketapang and Gunung Labuhan were 64.9% and 61.9%, respectively. Regarding household income, the low-income category

dominated across all villages. Its proportion reached 85.7% in Labuhan Ratu Kampung, 94.6% in Banjar Ketapang, and 90.5% in Gunung Labuhan. Meanwhile, the proportion of households with moderate income was relatively small, at 14.3%, 5.4%, and 9.5%, respectively.

Overall, the results of the stratified univariate analysis by village indicate variations in respondent characteristics, particularly regarding the stunting status, history of exclusive breastfeeding, and household size. However, these findings are descriptive and are not intended to indicate statistical associations between variables. Bivariate analysis was still conducted on the entire sample because stratification by village would result in relatively small subgroup sizes, particularly in Labuhan Ratu Kampung, which could reduce statistical power and increase estimation instability. The Gamma test was used in the bivariate analysis to assess the direction, strength, and significance of the association between exclusive breastfeeding history, number of family members, household income, and stunting status. The results are presented in the following **Table 2**.

Table 2. Association between history of exclusive breastfeeding, number of family members, and family income with stunting status in under-fives

Variable	Stunting Status		P-value	Gamma Coefficient
	Stunting	Normal		
History of Exclusive Breastfeeding				
Not Exclusive breastfeeding;	24	12	0.01	0.53
exclusive breastfeeding	11	18		
Number of Family Members				
Large	15	6	0.04	-0.50
Small	20	24		
Household Income				
Low	30	30	0.01	-1.00
Moderate	5	0		

The results of the study indicate that a history of exclusive breastfeeding, family size, and household income are significantly associated with the stunting status among toddlers. In the group that was not exclusively breastfed, the stunting rate was 66.7%, whereas in the group that was exclusively breastfed, it was 37.9%. The Gamma test results showed a Gamma value of 0.532 with $p=0.016$, indicating a moderate-strength association. These findings support the role of exclusive breastfeeding as a protective

factor against stunting. Breastfeeding during the first six months provides nutrients and various immunological components that support growth and help protect infants from infectious diseases that can hinder nutrient utilization and linear growth (8, 17).

The findings of the present study support previous evidence reported by Hadi et al. (2021), who found a lower likelihood of stunting among exclusively breastfed children, particularly those from low-income families (18). Similarly, Wibowo

and Rustiawan (2024) found that the absence of exclusive breastfeeding was associated with a 2.38-fold and 3.84-fold higher risk of stunting in urban and rural settings, respectively (11). Lahdji et al. (2022) also identified a significant association between exclusive breastfeeding history and stunting (19). Collectively, these findings highlight the potential importance of exclusive breastfeeding in reducing the risk of impaired linear growth during early childhood.

In the study area, the Community Health Center (Puskesmas) has implemented various nutrition improvement programs, including classes for pregnant women and mothers of toddlers, nutrition counseling, and growth monitoring through Posyandu. These programs support mothers' understanding of exclusive breastfeeding, appropriate introduction of complementary foods, and monitoring of toddler growth. However, interview results indicate that there are still barriers to exclusive breastfeeding. A total of five mothers reported that they felt their breast milk supply was insufficient, so their infants were given formula before six months of age, while some other mothers worked outside the home. In the group that did not receive exclusive breastfeeding, the average duration of breastfeeding was about five months before the infants received complementary foods or beverages. These conditions indicate that nutrition programs need to be accompanied by support capable of addressing the practical barriers mothers face in maintaining exclusive breastfeeding.

Family size also showed a significant association with stunting status. The stunting status in families with more than four members was 71.4%, which was higher than that in families with fewer than four members (45.5%). The results of the Gamma test showed a Gamma value of -0.500 with $p=0.040$, indicating a moderate-strength, negative association. Most families in the study had fewer than four members. Interview results indicated that this finding was related to the participation of the majority of mothers (53 women, 81.5%) in the Family Planning (KB) program. In contrast, among families with more than four members, 12 mothers (18.5%) did not participate in the KB program and consequently had more children.

From a socioeconomic perspective, family size can influence the extent of food needs and the resources that must be allocated to all family members. When resources are limited, an increase in family size can result in economic resources, food, time, attention, and care having to be divided among more members, which may potentially affect the fulfillment of children's nutritional needs and their growth and development (4, 13, 21). These findings are consistent with the study by Khati and Ariesta (2023), which identified a significant relationship between family size and the occurrence of stunting (22). Budiana et al. (2023) also identified family size as one of the determinants of stunting, along with family income and maternal characteristics (23). Furthermore, Yani et al. (2023), through a scoping review, demonstrated that household characteristics, including family size, are associated with food availability, child-rearing practices, and access to child health services (24).

Family income also showed a significant association with stunting status. In the low-income group, 30 toddlers (50.0%) were stunted, and 30 toddlers (50.0%) had normal nutritional status. Meanwhile, in the moderate-income group, which consisted of 5 respondents, all toddlers (100%) were stunted. The Gamma test results showed a Gamma value of -1.000 with $p=0.016$, indicating a very strong negative association. Most heads of households in the study worked as laborers (55.4%) and farmers (36.9%), whose incomes generally depended on job availability and the harvest season. These conditions resulted in 92.3% of respondents falling into the low-income category, defined as $\leq \text{Rp}2,716,497.00$ per month.

Findings from observations and interviews indicate that families' basic food needs are generally still being met. Still, their ability to provide nutritious food, particularly animal protein sources such as fish, meat, eggs, and milk, remains limited. Most of their income is allocated to other basic needs, so nutritious food for toddlers has not yet become a top priority. This situation can affect the quality and diversity of nutrient intake during the growth period. Conceptually, income can influence a family's ability to obtain a diverse and high-quality diet; however, a child's nutritional status is also influenced by feeding

practices, parental knowledge, and the food environment (25,26). These findings are in line with the study by Sihotang et al. (2023), which identified family income as an important determinant of stunting (27). Siramaneerat et al. (2024) also demonstrated that children from families with low socioeconomic status face a higher risk of stunting compared to children from families with better socioeconomic status (24).

Nevertheless, the results of the study show that all respondents in the "adequate income" category had toddlers with stunting. This finding does not necessarily indicate that higher income increases the risk of stunting. There were only five respondents in the "adequate income" category, so the distribution of data across groups was unbalanced and may have affected the magnitude of the Gamma coefficient. Furthermore, stunting is a multifactorial condition related not only to family income but also to the history of exclusive breastfeeding, complementary feeding practices, infectious diseases, parental education, environmental sanitation, and parenting styles (13). Therefore, family income should be understood as one of the factors contributing to stunting status, not as the sole determining factor.

Overall, the study findings indicate that the stunting status in the study area is associated with child feeding practices and family socioeconomic characteristics. The local context reveals barriers to maintaining exclusive breastfeeding, variations in family size, a predominance of jobs with relatively unstable incomes, and families' limited ability to provide animal-based protein sources. Therefore, efforts to prevent stunting in the study area need to maintain and strengthen existing programs at community health centers (Puskesmas), particularly support for exclusive breastfeeding, nutrition counseling, growth monitoring, family planning programs, and education on selecting and managing nutritious foods in accordance with families' economic circumstances.

CONCLUSION AND RECOMMENDATION

The results of the study indicate that family size ($p=0.040$), family income ($p=0.016$), and history of exclusive breastfeeding ($p=0.016$) are significantly associated with stunting status among under-fives in the villages of Labuhan Ratu

Kampung, Banjar Ketapang, and Gunung Labuhan, North Lampung Regency. The proportion of stunting was higher among under-fives from families with more than four members and among those who were not exclusively breastfed. Based on these findings, parents and caregivers are encouraged to provide exclusive breastfeeding for the first six months and appropriate complementary feeding thereafter, while optimising family resources to support the child's nutritional needs. The Ketapang Community Health Centre is encouraged to strengthen nutrition education and counselling on exclusive breastfeeding, complementary feeding, and household nutritional resource management. Future research should involve larger samples and examine other potential factors, including maternal education, infectious diseases, environmental sanitation, and childcare practices, to provide a more comprehensive understanding of stunting.

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