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Factors associated with stunting among children under five

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Abstract

Background: The incidence of stunting cannot be separated from the many factors that cause the risk of stunting. In Piasak village, Selimbau District, there are still many stunting incidents occurring. Factors such as the weight of toddlers, exclusive breastfeeding, nutritional knowledge of toddlers, basic sanitation of toddlers and economic status are thought to be the reasons for the high incidence of stunting there.

Purpose: to find the relationship between the factors that cause stunting and the most dominant ones that cause stunting.

Method: The research method used is quantitative descriptive using a questionnaire to 100 respondents as a data collection tool, then it will be analyzed using the chi-square test, and crosstabs and linear regression using SPSS.

Results: The results of the research stated that there was a significant influence of the toddler's weight (p value=0.00), toddler's nutritional knowledge (p value=0.00), and basic sanitation of toddlers (p value=0.029) and there was no influence of exclusive breastfeeding. (p value = 0.670) and family economic status (p value = 0.266).

Conclusion: The nutritional knowledge factor of toddlers is the most dominant factor influencing the incidence of stunting with the beta coefficient being the farthest away from 0 ($\beta = -0.572$).

Keywords: Basic Sanitation of Toddlers; Exclusive Breastfeeding; Nutritional Knowledge; Stunting; Toddlers; Toddlers Weight.

INTRODUCTION

In 2045, Indonesia is expected to enter a demographic bonus period, often referred to as "Golden Indonesia 2045," where the majority of its population will be of productive age. This demographic bonus is expected to present a significant opportunity for economic progress and national development. Therefore, it is crucial to prepare the current generation of young people to face challenges and optimally utilize this demographic bonus. Therefore, one of the key factors in achieving the goal of "Golden Indonesia 2045" is a focus on developing superior human resources (Finaka, 2023).

When discussing developing superior human resources, the focus is on preparing children to become future pioneers of Indonesia with the skills, cognitive intelligence, and physical abilities necessary to drive the Indonesian economy. One

factor hindering the creation of superior human resources is stunting. According to other study the government has issued social protection policies and programs, such as the Family Hope Program and social assistance (Coordinating Ministry for Human Development and Culture of the Republic of Indonesia, 2023). These efforts are intended to prevent our generation from becoming stunted and trapped in extreme poverty. In general, stunting is a health problem that must be addressed and resolved, especially in Indonesia (Fadlilah & Fibriana, 2023).

Stunting is a growth and development disorder experienced by children due to poor nutrition, repeated infections, and inadequate psychosocial stimulation (World Health Organization, 2013). Determination of stunting status in children is based on the anthropometric index of Length for Age (H/A)

or Height for Age (H/A), with a Z-score limit of <-2 to ≤ -3 SD for the stunted category and <-3 SD for the very stunted category (Puspitasari, 2020). Toddlerhood is a critical period for obtaining quality human resources (HR) and is vulnerable to nutritional issues, particularly stunting. Therefore, the toddler period is a serious concern in addressing stunting cases (Fikadu, Assegid, & Dube, 2014).

Stunting in children can affect them from infancy through adulthood. The impact of stunting on children can lead to impaired brain development and impaired metabolism, learning difficulties, increased susceptibility to non-communicable diseases, lower immunity, loss of productivity, and stunted physical growth. Stunting can lead to poverty, low levels of education, and an inability to keep up with modern developments. This can potentially lead to a 20% loss of income for workers, widening the economic gap, reducing total income by 10%. A mother born with stunting is more likely to give birth to a child with stunting, leading to intergenerational poverty and hampering national economic growth (Secretariat of the Vice President of the Republic of Indonesia, 2018).

Risk factors associated with stunting include family economic status, maternal occupation, birth length, cessation of breastfeeding before 6 months, and maternal education (Kismul, Acharya, Mapatano, & Hatløy, 2017; Yuniarti, Margawati, & Nuryanto, 2019). The impacts of stunting in children include decreased intelligence, impaired brain development and physical growth, and metabolic disorders (World Health Organization, 2021).

Furthermore, the impacts of stunting in adulthood include height that is not appropriate for one's age, susceptibility to degenerative diseases, decreased reproductive health, a lower intelligence quotient compared to normal children, resulting in suboptimal learning capacity at school, suboptimal work performance, and low productivity (Puspitasari,

2020). The consequences of stunting that persist into adulthood, if not addressed promptly, will impact the next generation and lead to weakened human resources, such as poor cognitive and verbal motor skills development (Dayuningsih, Permatasari, & Supriyatna, 2021). One way to prevent stunting is to avoid risk factors (Permatasari & Syafruddin, 2016).

RESEARCH METHOD

The research design utilized in this study was a descriptive-analytic method with a cross-sectional approach. The sampling technique employed was non-probability sampling, specifically accidental sampling, yielding a total sample size of 100 respondents. Sample selection was based on the following inclusion criteria: mothers of children under five (toddlers); individuals willing to participate as respondents and sign the informed consent; parents who completed the questionnaire fully; and parents representing diverse levels of education, age, and occupation. The variables examined in this study included birth weight, exclusive breastfeeding, maternal knowledge, basic toddler sanitation, family socioeconomic status, and the incidence of stunting. The questionnaires utilized had previously undergone validity and reliability testing.

The data collection procedure was conducted by directly distributing the questionnaires to the respondents for immediate completion, obtaining informed consent, and ensuring that all questions were thoroughly answered. The collected data were analyzed through a processing sequence consisting of editing, coding, entering, tabulating, and data cleaning. The data were then processed and presented using univariate analysis in the form of frequency distributions and percentages, as well as bivariate analysis employing the Chi-square test with a 95% confidence level to evaluate the relationship between the two variables.

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RESEARCH RESULTS

Table Statistical Analysis of Risk Factors Associated with Stunting (N=100)

Variable	Stunting Status		OR 95% CI	P-value
	Yes (n=32)	No (n=68)		
Toddler Weight (n/%)				
Sufficient	4/12.5	61/89.7	61.00 (16.505-225.491)	0.000
Insufficient	28/87.5	7/10.3		
Exclusive Breastfeeding (n/%)				
Yes	23/72.0	46/67.6	1.222 (0.486-3.076)	0.670
No	9/28.0	22/32.3		
Nutritional Knowledge (n/%)				
Good	1/3.0	61/89.7	0.004 (0.000-0.031)	0.000
Poor	31/97.0	7/10.3		
Basic Sanitation (n/%)				
Good	17/53.0	51/75.0	0.378 (0.156-0.915)	0.029
Poor	15/47.0	17/25.0		
Socioeconomic Status (n/%)				
Adequate	16/50.0	58/85.3	0.619 (0.265-1.446)	0.266
Inadequate	16/50.0	48/70.6		

Toddler Weight: A significant relationship was observed between toddler weight and stunting in Piasak Village ($p=0.000<0.05$). Toddlers with inadequate body weight were 61 times more likely to experience stunting compared to those with adequate weight ($OR=61.000$; $95\% CI=16.505-225.491$). **Exclusive Breastfeeding:** No significant correlation was found between exclusive breastfeeding and stunting ($p=0.670>0.05$). Toddlers who received exclusive breastfeeding had an odds ratio of 1.222 for avoiding stunting compared to their non-exclusively breastfed counterparts ($OR=1.222$; $95\% CI=0.486-3.076$). **Nutritional Knowledge:** Maternal knowledge regarding child nutrition was significantly associated with stunting ($p=0.000<0.05$). Mothers with poor nutritional knowledge had an odds ratio of 0.004 for preventing stunting compared to mothers with good knowledge ($OR=0.004$; $95\% CI=0.000-0.031$). **Basic Sanitation:** Basic sanitation showed a significant association with stunting ($p=0.029<0.05$). Poor

sanitation practices correlated with an odds ratio of 0.378 for stunting outcomes compared to households with good sanitation ($OR=0.378$; $95\% CI=0.156-0.915$). **Socioeconomic Status:** Family socioeconomic status demonstrated no significant relationship with stunting ($p=0.266>0.05$). Toddlers from families with adequate socioeconomic status presented an odds ratio of 0.619 for avoiding stunting relative to those from lower socioeconomic brackets ($OR=0.619$; $95\% CI=0.265-1.446$).

DISCUSSION

The statistical results indicate that toddler birth weight is significantly linked to the incidence of stunting District ($p=0.000$). This finding aligns with other research who reported that a history of low birth weight (LBW) is significantly correlated with stunting ($OR = 12.78$). Children with a history of LBW face a 12.78-fold higher risk of stunting because fetal growth restrictions often persist postnatally, causing long-

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term developmental delays. Similarly, other study verified this association ($p=0.03$, $OR = 1.31$), highlighting that birth weight serves as a robust predictor of subsequent physical stature (Chasanah, Susilowati, Yuwono, Zilda, & Fawzya, 2019).

Field observations confirmed that toddler weight plays a vital role in stunting manifestations. This vulnerability often traces back to maternal adolescence, where poor dietary intake driven by body image concerns leads to Chronic Energy Deficiency (CED) during subsequent pregnancies. This issue is compounded by poor compliance with iron-folic acid supplementation during gestation, alongside inadequate nutritional intake for the child from fetal life through the first two years of existence. Consequently, weight metrics remain a crucial diagnostic criterion for stunting, with most stunted children in this study exhibiting low birth weights below the national threshold ($<2,500$ grams).

This study indicates that exclusive breastfeeding is not a statistically significant determinant of stunting ($p=0.670$). This lack of significance stems from instances where toddlers who were exclusively breastfed still exhibited stunting, often due to maternal misperceptions that led to premature introduction of complementary foods before six months. This finding corresponds with other research who found no significant correlation between exclusive breastfeeding and stunting ($p=0.536$). They noted that maternal physical and psychological health before, during, and after pregnancy dictates the volume and nutritional composition of breast milk (Novayanti, Armini, & Mauliku, 2021). Similarly, other study observed no significant association ($p=0.143$), citing instances where delayed or insufficient lactation forced mothers to combine breast milk with formula or other liquids early on (Khairani & Soviana, 2022).

Conversely, this result diverges from other research who demonstrated that exclusive breastfeeding serves as a vital shield against stunting by providing essential nutrients without premature complementary liquids. In their study, a lack of exclusive breastfeeding frequently stemming from poor maternal knowledge strongly predicted stunting (Anita, Novita, & Vasra, 2023).

Field data showed that both exclusively breastfed and formula-fed infants were susceptible to stunting. In-depth interviews revealed that delayed lactation immediately postpartum prompted early introduction

of formula. Additionally, some mothers avoided breastfeeding due to cosmetic concerns regarding breast sagging. Family pressures also interfered with proper feeding practices, as relatives frequently introduced non-milk substances, such as honey or rice water, invalidating the exclusivity of breastfeeding. These practices highlight a substantial deficit in maternal knowledge regarding optimal infant feeding, suggesting other overarching environmental or nutritional variables exert a stronger influence on stunting in this locale. Nevertheless, breast milk remains irreplaceable during the first six months of life.

The statistical analysis verified a significant association between maternal nutritional knowledge and toddler stunting ($p=0.000$). Malnutrition is frequently exacerbated by a mother's poor understanding of nutrition and her inability to implement dietary guidelines in daily care. Maternal knowledge shapes behaviors regarding food selection, which dictates household nutritional health.

This study mirrors Hasnawati et al., who found that stunting among children aged 12–59 months is closely tied to maternal comprehension levels ($p=0.02$). Their data revealed that 70% of very short toddlers were cared for by mothers with poor nutritional knowledge. This pattern is corroborated by Purnama et al., who observed that limited maternal knowledge strongly correlates with severe stunting categories. According other study advanced maternal nutritional and childcare knowledge directly enhances dietary patterns and upbringing, optimizing toddler nutritional status. When a mother possesses a solid understanding of nutrition, she can better curate the quality and quantity of food to satisfy her child's developmental requirements (Puspasari & Andriani, 2017).

According to UNICEF's framework (1997), modified by Ministry of National Development Planning/National Development Planning Agency 2018 maternal knowledge operates as an indirect determinant that influences child nutritional outcomes. Adequate understanding fosters positive dietary and caregiving behaviors, whereas knowledge deficits compromise child health and development, triggering stunting (Ministry of National Development Planning/National Development Planning Agency, 2018).

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However, this finding contradicts with other research who observed no significant connection ($p=0.698$). In their cohort, most mothers were high school graduates with adequate access to health information, yet high knowledge did not automatically translate into positive caregiving or healthy lifestyles (Fitriani & Darmawi, 2022). According to other study knowledge serves as a blueprint for behavior, fostering conceptual clarity regarding the definitions, triggers, signs, impacts, and preventions of medical conditions (Yoga, 2020).

Field data in this study revealed that poor maternal knowledge stemmed from limited information access, deep-seated misconceptions, and low educational backgrounds. Interestingly, some mothers with high tested knowledge still raised stunted children. This anomaly occurred because their positive theoretical understanding did not translate into practical caregiving habits. The primary barriers identified were incomplete health communication and the fact that the term "stunting" is perceived as an abstract, foreign concept that is difficult to grasp.

The analysis revealed a significant relationship between household basic sanitation and toddler stunting ($p=0.029$). Basic sanitation depends on three pillars: clean water management, sanitary latrine availability, and waste disposal. This finding contrasts with other research who found no significant association between latrine ownership and stunting ($p=0.588$). In their study, many stunted children belonged to households with accessible latrines, though latrine hygiene and maintenance behaviors were not assessed (Wuriningsih, Sari, Khasanah, Distinarista, Rahayu, & Wahyuni, 2021). Conversely other research confirmed a powerful connection between clean water access and stunting ($p=0.000$), showing that families lacking clean water faced a significantly higher risk of stunting due to waterborne pathogens (Yulizawati, Rahmi, Iffah, Halida, Fitrayeni, Andriani, & Taufia, 2024). Similarly, other study noted that 40% of their respondents lacked sanitary waste disposal, frequently littering due to poor environmental awareness (Soeracmad, Ikhtiar, & Agus Bintara, 2019).

Field assessments revealed that households with stunted children faced poor environmental sanitation. Challenges regarding clean water, waste processing, and hygienic latrines were tied to geography: most

respondents resided along the banks of the Kapuas River. The river water is turbid, brown, and heavily contaminated with domestic waste and untreated sewage from overwater latrines. Using this contaminated water source triggers recurrent childhood infections, creating an environment where stunting becomes inevitable.

Stunting occurred across both affluent and low-income families. The village's riverbank geography grants all residents easy access to affordable local proteins (fish), native vegetables, and fruits. Furthermore, strong communal and kinship ties promote food sharing without financial transactions. Government welfare initiatives targeted at lower-income families further alleviate economic deficits. Ultimately, a mother's willingness and skill in preparing nutritious meals outweigh household wealth as a determinant of stunting in this community.

CONCLUSION

The prevalence of stunting among toddlers stands at 32% (32 children), while 68% (68 children) are non-stunted. Toddler body weight ($p=0.000$), maternal nutritional knowledge ($p=0.000$), and basic sanitation ($p=0.029$) are significantly associated with stunting. Exclusive breastfeeding ($p=0.670$) and family socioeconomic status ($p=0.266$) show no statistically significant relationship with stunting and maternal nutritional knowledge constitutes the most dominant factor influencing stunting in this region, displaying the highest beta coefficient ($\beta = -0.572$).

SUGGESTION

Integrated health services should intensify monitoring of infant birth weight and growth milestones, given that inadequate toddler weight is a major predictor of stunting. Educational programs should focus heavily on improving maternal nutritional knowledge, as this factor was identified as the most dominant determinant influencing stunting outcomes.

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