

Original Research Paper

Gender and nutritional status based on weight-for-age (W/A) in toddlers and its association with stunting cases

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Abstract

Malnutrition remains a persistent public health issue in Indonesia, with the government yet to fully address the problem. In 2021, the prevalence of stunting in Indonesia decreased from 24.4% to 21.6% in 2022, with a national target of reducing it to 14% by 2024. In Trageh Public Health Center, the prevalence of stunting was recorded at 6.52% in 2023, while cases of wasting and underweight were 3.13% and 3.16%, respectively. This study aims to analyze the correlation between gender and nutritional status in toddlers with stunting. The research employed a correlational analytic design with a cross-sectional approach. The study population consisted of all toddlers ($n = 243$), with a sample size of 151 determined through simple random sampling. Univariate data analysis utilized frequency distribution tables, while bivariate analysis was conducted using Linear Regression with a significance level of $\alpha = 0.05$. The findings revealed that nearly half of the respondents ($n = 65$; 43.05%) were female and classified as normal (non-stunted). Additionally, the majority of toddlers had good nutritional status and were not stunted ($n = 93$; 61.59%). Statistical analysis using Spearman's correlation test yielded $\rho = 0.651$, indicating no significant relationship between gender and stunting, whereas the correlation between nutritional status and stunting was statistically significant ($\rho = 0.000$).

Keywords: gender; nutritional status; stunting

1. Introduction

Stunting is a condition of impaired growth caused by recurrent illness or chronic malnutrition during childhood, significantly affecting physical and cognitive development and leading to long-term health consequences. It primarily occurs due to inadequate nutrition during the critical First 1,000 Days of Life (HPK). One contributing factor is the poor nutritional intake among children and adolescents, including adolescent girls who experience anemia due to iron deficiency. Stunting adversely affects cognitive growth, academic achievement, immune resilience, and productivity. In the long term, it impairs the body's ability to metabolize fat, increasing the risk of obesity, hypertension, cardiovascular diseases, and other degenerative conditions. This issue is considered highly dynamic and cannot be resolved unilaterally—it requires collaboration among multiple stakeholders to mitigate its impact on growth and development (Kemenkes, 2024). The Indonesian government has implemented several stunting prevention strategies through the Five Pillars of the National Strategy for Accelerating Stunting Prevention, which includes: (1) Commitment and leadership vision, (2) National campaigns and behavioral change communication, (3) Program convergence at central, regional, and village levels, (4) Food and nutrition security, and (5) Monitoring and evaluation. However, despite these efforts, the stunting reduction rate has only reached 24.4%, still below the WHO threshold of 20% (Al-Jihad et al., 2022; Azhari & Mahwati, 2022).

In 2021, the prevalence of stunting in Indonesia declined from 24.4% to 21.6% in 2022, with a national target of reducing it to 14% by 2024 (Kemenkes, 2023). In Bangkalan, the number of stunting

cases recorded at the end of 2022 was 1,931 toddlers, compared to 2,300 cases in 2021 (Theresa, 2024). The prevalence decreased from 38.9% in 2021 to 26.2% in 2022, marking a reduction of 12.7%. However, despite this progress, there has been an observed increase in wasting and underweight cases, which, if they are not adequately addressed, could escalate into stunting. Wasting refers to acute malnutrition leading to severe thinness, while underweight is associated with chronic malnutrition resulting in low body weight. In 2023, the prevalence of stunting at Trageh Public Health Center, Bangkalan was 6.52%, while wasting and underweight cases stood at 3.13% and 3.16%, respectively (Badan Pusat Statistik Kabupaten Bangkalan, 2021).

According to the Indonesian Ministry of Health (2020), child anthropometric standards are based on weight and height/length parameters. These standards serve as a reference for stakeholders in assessing nutritional status and child growth trends. Nutritional status assessment in children aged 5 to 18 years is classified into severely thin, thin, normal, overweight, and obese categories using the Body Mass Index-for-Age (BMI/A) parameter (Kemenkes, 2020; UNICEF, 2020; UNICEF et al., 2023). Addressing childhood nutritional issues requires a thorough understanding of risk factors – previous studies have demonstrated that gender, maternal education level, and maternal employment are closely related to a child's nutritional status (Adinda Putri Sari Dewia, Kusumastutia, 2022; Apriningtyas & Kristini, 2019).

Other studies have also reported an association between gender and stunting prevalence (Setiawati et al., 2022). Several studies have focused on various factors influencing stunting. However, research specifically examining the relationship between gender and nutritional status remains limited, particularly regarding nutritional status. Stunting is classified as a nutritional status issue but is typically measured using Height-for-Age (H/A) or Length-for-Age (L/A). In contrast, this study investigates the relationship between nutritional status based on Weight-for-Age (W/A) and stunting, which is assessed using H/A or L/A (Menko PMK, 2021). Gender has been linked to stunting due to parental tendencies to prioritize male children in receiving optimal nutrition. However, some studies indicate that male toddlers are at higher risk of experiencing stunting; therefore, this study aimed to analyze the correlation between gender and nutritional status in toddlers with stunting at Trageh Public Health Center, Bangkalan.

2. Research Methods

This study employed a correlational analytical method with a cross-sectional approach, aiming to examine the relationship between variable Y and variable X by collecting data for both variables simultaneously. The independent variables in this study were toddler gender and nutritional status, while the dependent variable was stunting case. The study was conducted from March to April 2024 at Trageh Public Health Center, Bangkalan. The study population comprised all 243 toddlers registered at the health center, with the sample size determined using Slovin's formula, resulting in 151 toddlers selected through simple random sampling. The inclusion criteria for the sample selection were: (1) toddlers who possessed a Maternal and Child Health (MCH) Handbook, (2) toddlers recorded in the health center's registry, and (3) those whose guardians consented to their participation as respondents. The exclusion criteria included toddlers who were absent during the weighing and measurement process and those who were unwell at the time of data collection. Data collection was carried out in several stages, beginning with obtaining official permission from the Trageh Public Health Center – this was followed by coordination with the head midwife to facilitate the collection of research data through toddlers' weight measurement and height assessment.

The research instrument consisted of a structured questionnaire, which was completed by the researcher based on the measurement results. The questionnaire included sections for the toddler's identity (name, gender, and age) along with the anthropometric measurements. Data processing

involves several steps: editing, scoring, coding, and tabulating. The coding system was structured as follows: (1) Gender: Code 1 for male, Code 2 for female, (2) Nutritional status (based on Weight-for-Age, W/A): Code 1 for severely underweight, Code 2 for underweight, Code 3 for normal, Code 4 for at risk of overweight, Code 5 for overweight, and Code 6 for obese, (3) Stunting status: Code 1 for severely stunted, Code 2 for stunted, Code 3 for normal, and Code 4 for tall. This study has obtained ethical approval under the reference number 2016/KEPK/STIKES-NHM/EC/III/2024. For data analysis, univariate analysis was performed using frequency distribution tables, while bivariate analysis was conducted using Linear Regression statistical tests with a significance level of $\alpha = 0.005$.

3. Results and Discussion

3.1.Characteristics of Respondents at Trageh Public Health Center

Following the completion of data collection, the primary characteristic analyzed to support this study was the age distribution of toddlers. Table 1 provides a detailed summary of the data:

Table 1. Age Distribution of Toddlers

No	Toddler Age Group	Frequency	%
1	0 – 12 months	29	19.20
2	13 – 24 months	25	15.56
3	25 – 36 months	31	20.50
4	37 – 48 months	37	25.54
5	49 – 60 months	29	19.20
Total		151	100

Source: Primary Data, 2024

Based on Table 1, the largest proportion of respondents (25.54%) were aged 37–48 months. The classification of infant and toddler age groups can be categorized into several stages: neonates (0–28 days), infants under two years (<24 months, commonly referred to as baduta), infants under three years (<36 months, known as batita), and toddlers (children under five years of age, <60 months). Furthermore, toddlerhood is a crucial developmental stage that can be divided into three subcategories: the infant group (0–2 years), the young toddler group (2–3 years), and the preschool-age group (>3–5 years). According to the World Health Organization (2020), the ideal toddler age range extends from 0 to 60 months.

Stunting, once again, defined as a failure to achieve optimal growth due to chronic malnutrition, resulting in a height-for-age measurement significantly below the expected standard for a child's age group. Nutritional deficiencies leading to stunting can originate as early as the prenatal period or emerge during early childhood, with manifestations typically becoming apparent after the age of two. The period from infancy to two years of age is considered a critical window for ensuring adequate nutritional intake, as deficiencies during this phase can have long-term consequences on growth and development. Several scientific studies have demonstrated that exclusive breastfeeding up to six months of age plays a crucial role in reducing infant morbidity and mortality rates, as well as mitigating growth disorders related to weight and height. Notably, children who experience frequent illnesses remain at risk of developing stunting, even if their nutritional intake is sufficient, as their nutrients are predominantly allocated toward recovery rather than growth (Agushybana et al., 2022; R. P. Adhikari et al., 2019; Wardita et al., 2021). The onset of stunting within a given region typically begins around six months of age and becomes more prominent between the second and third years of life. Stunting that occurs within the first 36 months of a child's life is frequently associated with long-term adverse effects, as six months of age marks the transition period following exclusive breastfeeding. If mothers choose to wean their

infants prematurely or discontinue breastfeeding before 24 months, toddlers may lose a key source of essential nutrients provided through breast milk. Consequently, inadequate nutritional intake during this period can significantly compromise immune system function, rendering toddlers more susceptible to infections and growth impairments (Cahyani et al., 2019; Yuningsih, 2022).

3.2. The Relationship Between Gender and Stunting at Trageh Public Health Center

Based on the previous research objective, which aims to analyze the relationship between gender and stunting cases, the following table presents the study's findings:

Table 2. Correlation Between Gender and Stunting Cases

No	Gender Stunting	Female		Male		Total	
		n	%	n	%	n	%
1	Severely Stunted	9	5.96	4	2.65	13	8.61
2	Stunted	6	3.96	13	8.61	19	12.57
3	Normal	65	43.05	48	31.79	113	74.84
4	Tall	3	1.99	3	1.99	6	3.98
	Total	83	54.96	68	45.06	151	100
	B	SE	t	95% CI		Sig.	
				Lower	Upper		
	0.043	0.094	0.0453	-0.143	0.228	0.651	

Source: Primary Data, 2024

Based on Table 2, it can be concluded that nearly half of the respondents, specifically 65 children (43.05%), were female and classified as normal (not stunted). The results of the regression analysis yielded a p-value of 0.651, indicating that gender is not significantly associated with stunting cases. On the other hand, the coefficient (B) value for gender was positive, with a magnitude of 0.043, suggesting a weak positive correlation between gender and stunting. These findings differ from those reported by Setiawati et al. (2022), who found that an equal proportion of male and female children—12 children (40%)—were classified as normal. However, a small proportion of male children (13.3%)—equivalent to four children—fell into the severely stunted category. Their statistical analysis also yielded a p-value $< \alpha$, signifying a significant relationship between gender and stunting cases (Setiawati et al., 2022). Similarly, the present study contradicts the findings of Dewi (2016) who reported that stunting was more prevalent among male children, accounting for 53.13% of cases, whereas female children comprised 46.88% of the stunted population (Marwang et al., 2022; Yuningsih & Perbawati, 2022).

The risk of stunting appears similar among male and female children, particularly considering that early childhood represents a critical period of growth and development (the "golden period") during which adequate nutritional intake is essential for optimal development. However, in reality, many toddlers exhibit selective eating behaviors, which can affect their nutritional status. This tendency is characterized by a preference for snack foods such as biscuits, chips, ice-based treats, and other processed snacks over nutritionally balanced meals that should be consumed regularly to meet their dietary requirements; such selective eating habits have been linked to children's overall eating patterns (Kumalasari & Wulandari, 2024). When toddlers develop a preference for foods other than staple meals, they are likely to lose interest in balanced meals and instead favor snack foods as substitutes—even for their daily diet. This, in turn, increases the risk of inadequate nutrient intake, which is essential for their growth and development. Such a condition arises because snack foods often lack the complete range of nutrients required for optimal physical and cognitive development. At this stage, parents must be particularly attentive to their child's dietary choices. If a loss of appetite is not promptly addressed, male

and female toddlers may become vulnerable to stunting due to prolonged nutritional deficiencies (Kurniawati & Yulianto, 2022).

3.3. The Relationship Between Nutritional Status Based on Weight-for-Age (W/A) and Stunting at Trageh Public Health Center

In line with the second research objective, which aims to analyze the relationship between nutritional status based on Weight-for-Age (W/A) and stunting cases, the following table presents the research findings:

Table 3. Correlation Between Nutritional Status and Stunting Cases

No	Stunting Nutritional Status	Severely Stunted		Stunted		Normal		Tall		Total	
		f	%	F	%	f	%	f	%	F	%
1	Poor	5	3.31	1	0.66	0	0	0	0	6	3.97
2	Underweight	8	5.30	9	5.96	0	0	0	0	17	11.26
3	Normal	0	0	8	5.30	93	61.59	6	3.97	107	70.86
4	At Risk of Overweight	0	0	0	0	7	4.64	0	0	7	4.64
5	Overweight	0	0	0	0	11	7.28	0	0	11	7.28
6	Obese	0	0	1	0.66	2	1.33	0	0	3	1.99
	Total	13	8.61	19	12.58	113	74.84	6	3.97	151	100
	B	SE		t		95% CI		Sig.			
	0.392	0.053		7.429		Lower 0.287		Upper 0.496		0.000	

Source: Primary Data, 2024

Based on Table 3, the data demonstrates that the majority of respondents—93 toddlers (61.59%)—who had a "normal" nutritional status were in a non-stunted condition. Statistical testing results indicate a p-value of 0.000, signifying a significant correlation between nutritional status and stunting. Meanwhile, the coefficient (B) for nutritional status based on Weight-for-Age (W/A) is 0.392, which suggests a positive and strong correlation with stunting. A "normal" nutritional status in toddlers signifies that they are undergoing proper growth and development, as reflected by their weight increase following the age. These findings align with a study by Yuningsih (2022) which revealed that the majority of stunted toddlers—whether classified as "stunted" or "severely stunted"—had an "underweight" nutritional status (33% or 26 toddlers). Conversely, a smaller portion of stunted toddlers had an "overweight" nutritional status (12% or 10 toddlers) and an "obese" status (7% or 6 toddlers). Meanwhile, 19 toddlers (12%) with stunting were found to have a "normal" nutritional status (Yuningsih (2022)).

Nutritional status is closely associated with stunting in toddlers, as those classified within the "normal" nutritional category are more likely to experience optimal growth and development (Kartikasari, 2023). During early childhood growth, height measurements are taken and subsequently adjusted according to age and gender. Key determinants of stunting include dietary intake and overall health status. Inadequate nutrient intake disrupts growth and development, while frequent illness can further impair nutritional status by diminishing appetite and reducing nutrient absorption. Consequently, these factors exacerbate growth retardation. Given the rapid growth phase during early childhood, adequate nutrition serves as a crucial determinant of overall well-being (Anitya et al., 2023).

Additionally, an indirect but significant factor contributing to stunting is caregiving practices, particularly feeding patterns, which play an essential role in ensuring proper nutrition.

A study conducted by Susanto, et al. found a significant relationship between maternal attention and support in food provision, preparation, and storage practices with the incidence of stunting. In other words, the researchers concluded that mothers who actively provide care and support for their children's growth and development positively impact their nutritional status. The primary form of support that toddlers require from their parents to achieve optimal growth and development according to their age is the provision of nutritious food, which is essential for both physical and cognitive development. The pattern of food provision plays a crucial role in shaping the nutritional status of toddlers, as it directly influences their overall growth and development.

A well-balanced diet that aligns with the specific nutritional requirements of toddlers, coupled with the careful selection of high-quality food ingredients, significantly contributes to maintaining optimal health. Proper dietary patterns ensure that children receive the necessary macronutrients and micronutrients essential for their physical and cognitive development. Conversely, excessive food intake beyond the body's requirements can lead to overweight conditions, which in turn may increase the risk of metabolic disorders and other health complications associated with an overabundance of nutrients. On the other hand, insufficient food intake can result in inadequate nutritional fulfillment, leading to underweight conditions and increased vulnerability to infections and diseases due to weakened immunity. Both of these extremes—over-nutrition and under-nutrition—pose significant health risks and are classified as forms of nutritional imbalance. (Kurniati et al., 2022; Sheliha, 2020; Susanto et al., 2024; Tobing et al., 2021).

4. Conclusion

The findings of this study indicate that gender is not associated with stunting cases; however, nutritional status is significantly related to stunting at Trageh Public Health Center, Bangkalan. Future research should focus more on direct factors influencing children's nutritional status, such as feeding practices (dietary habits) and parental caregiving patterns. It is expected that with a rigorous and accountable analysis of these factors, stunting in children can be effectively prevented. In cases where stunting has already occurred, healthcare professionals should implement timely and appropriate interventions to minimize its adverse effects on children's growth and development. A limitation of this study is that it was conducted in a single region identified as a stunting locus; future research should expand the research to multiple regions with similar concerns aimed to enhance the applicability and generalizability of the findings.

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