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ORIGINAL ARTICLE

Identifying risk factors for stunting among toddlers at PPA Helefanika, Gunungsitoli City

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Abstract

Stunting exerts detrimental effects on health, growth and development, and economic outcomes. These adverse impacts encompass elevated risks of morbidity and mortality, cognitive and language delays, and increased healthcare expenditures. Given these significant consequences, stunting has become a global health priority. This cross-sectional study investigates the influence of maternal height and exclusive breastfeeding practices on the incidence of stunting among children under five years of age in Gunungsitoli City. Conducted from February to April 2024, the study initially included 375 children aged 12–59 months. Due to specific inclusion criteria, the final sample comprised 63 participants selected through purposive sampling. The independent variables analyzed were maternal height and exclusive breastfeeding, with stunting incidence serving as the dependent variable. Data collection employed five questionnaires, and maternal height was measured using a stadiometer. Statistical analyses, including univariate analysis and chi-square tests, were performed using SPSS version 25.0 to explore associations between the variables. The results revealed that most mothers had an elementary school education (34.85%), exhibited normal height (63.64%), and the majority of children were exclusively breastfed (60.61%). Statistical analysis demonstrated a significant association between maternal height and stunting incidence (p=0.026), indicating that children born to shorter mothers were at higher risk of stunting. Furthermore, a significant association was found between exclusive breastfeeding practices and stunting incidence (p=0.003), with children who were not exclusively breastfed having a 3.94 times greater odds of experiencing stunting. This study concludes that maternal height and exclusive breastfeeding practices are crucial factors influencing the incidence of stunting in children.

Keywords: stunting, maternal height, exclusive breastfeeding practices

Introduction

Stunting, a condition of chronic malnutrition characterized by below-average height in children under five years of age, has detrimental effects on health, development, and economic outcomes.[1,2] These adverse effects include an increased risk of morbidity and mortality, cognitive and language delays, and elevated healthcare expenditure.[3] Stunting is also associated with shorter parental stature, compromised reproductive health, suboptimal body composition, and increased risk of chronic diseases later in life. Furthermore, stunting negatively affects economic capacity through suboptimal learning abilities and unrealized work potential. Given its significant consequences, stunting has become a global health priority and focus of international reduction efforts.[4–6]

Global stunting prevalence among children under 5 years decreased from 39.7% in 1990 to 26.7% in 2010, with projections estimating 21.8% by 2020.[7] Between 1990 and 2015, the number of stunted children decreased by 98.5 million worldwide. Significant reductions were observed in East Asia, Pacific, and South Asia, while minimal declines occurred in Latin America, the Caribbean, Middle East, North Africa, and sub-

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Saharan Africa.[8] Approximately 37% of children in Indonesia are affected by stunting, a problem that has remained widespread over the last decade.[9] Stunting prevalence in Indonesia, as measured by the Indonesian Basic Health Survey, has fluctuated over the years. In 2007, it was 36.8%, decreasing slightly to 35.6% in 2010. However, it rose again to 37.2% in 2013. More recent surveys show a decline, with 29.9% prevalence in children under two and 30.8% in toddlers in 2018[10], and a further decrease to 27.67% in 2019[11]. According to data from the Central Bureau of Statistics (BPS), the prevalence of stunting in Gunungsitoli City among children in 2018[12] was 40.4%, and based on the Indonesian Nutritional Status Survey (SSGI) in 2021[13], the number of stunted children in Gunungsitoli City was 26.3%.

Studies worldwide have explored the link between child stunting and various risk factors, commonly focusing on maternal, child, household, and service availability factors. A study reported that mothers of stunted children are frequently between 20 and 30 years of age, with approximately 33% having their first child before the age of 19 years. Maternal short stature, defined as a height less than 145 cm, is associated with an increased risk of child stunting.[14] Children aged 24-35 months were found to have double the risk of stunting compared to other age groups. Additionally, low maternal education was associated with a 1.57 times greater risk of stunting in children, while those living in rural areas faced a 1.39 times higher risk.[15] Household environment characteristics include access to clean water and sanitation, cultural factors, access to healthcare, and type of residence.[9,16]

Interviews conducted with ten mothers of stunted toddlers at the Child Development Center (CDC), hereafter referred to as PPA Helefanika in Gunungsitoli City, revealed a high susceptibility to upper respiratory tract infections (URTIs) among their children. Six out of ten mothers reported not having exclusively breastfed their children. When questioned about their knowledge of stunting and nutritious food, eight mothers stated that they had heard of these terms, but lacked a comprehensive understanding of stunting and its consequences. Based on this preliminary finding, the researcher recognizes the importance of further investigation into "the risk factors influencing stunting among toddlers at PPA Helefanika in Gunungsitoli City" to facilitate targeted interventions.

Method

This cross-sectional study aimed to determine whether the incidence of stunting among children under five years of age is influenced by maternal height and exclusive breastfeeding practices. The study was conducted in Gunungsitoli City, with participants recruited from the PPA Helefanika. Data were collected between February and April, 2024. This study involved 375 children aged 12-59 months enrolled. A total of 63 participants were obtained using purposive sampling, a non-probability sampling method in which participants were selected based on specific criteria relevant to the research question. The inclusion criteria for this study were (1) children of respondents enrolled in the PPA Helefanika, (2) respondents' willingness to participate, and (3) residence in Gunungsitoli City. Children with special needs (physical disabilities) and acutely ill children were excluded. In this study, the independent variables were maternal height and exclusive breastfeeding habits. The dependent variable was the incidence of stunting among children aged 12-59 months.

Data were collected through five questionnaires. Maternal height was measured using a stadiometer with a capacity of 200 cm and a precision of 0.1 cm. For the variables of maternal height and exclusive breastfeeding, numerical coding was employed: 1 represented a positive outcome, and 2 represented a negative outcome. Similarly, for stunting status, one indicated stunting and two indicated no stunting. Univariate analysis was then performed to describe the characteristics of the variables under investigation. The Statistical Package for the Social Sciences (SPSS) version 25.0 was used to conduct a chi-square test to examine the association between the independent and dependent variable.

Results

Table 1 presents the characteristics of the toddlers and maternal samples. The age distribution of the toddlers was relatively uniform. Fourteen toddlers (21.21%) were one year old, 12 (18.18%) were two years old, 14 (21.21%) were three years old, 11 (16.67%) were four years old, and 15 (22.73%) were five years old. It is evident that the one, three, and five-year-old age groups were the most represented in the

sample, with similar numbers for each. The majority of the toddlers in the sample were female (n = 40, 60.61%), while 26 (39.39%) were male.

Maternal educational levels varied within the sample. The largest proportion of mothers (n = 23, 34.85%) completed elementary school. This was followed by mothers who had completed junior high school (n = 18, 27.27%), senior high school (n = 12, 18.18%), and those who had not completed elementary school (n = 9, 13.64%). The smallest number of mothers (n = 4, 6.06%) had completed a tertiary education. Based on height measurements, the majority of mothers in the sample had a normal height (n = 42, 63.64%), while 24 (36.36%) were classified as short stature. The majority of toddlers in the sample were exclusively breastfed (n = 40, 60.61%), whereas the remaining 26 (39.39%) were not.

Table 1. Characteristics of respondents (n=63)

Characteristics	n	%
Age of toddler		
1 year	14	21,21
2 years	12	18,18
3 years	14	21,21
4 years	12	16,67
5 years	15	22,73
Gender of toddler		
Male	26	39,39
Female	40	60,61
Mother's education level		
Did not finish elementary school	9	13,64
Graduated from elementary school	23	34,85
Junior high school graduate	18	27,27
High school graduate	12	18,18
Graduated from university	4	6,06
Mother's height		
Normal	42	63,64
Short	24	36,36
Exclusive breastfeeding		
Yes	40	60,61
No	26	39,39

Table 2 presents the correlation between risk factors and the incidence of stunting. Two risk factors were analyzed: maternal height and exclusive breastfeeding. Of the 66 children studied, 46 (69.7%) were born to mothers of short stature and 20 (30.3%) were born to mothers of normal stature. Among the stunted children, 28 (60.87%) were born to mothers of short stature and 18 (39.13%) were born to mothers of normal stature. Among non-stunted children, 13 (65%) were born to mothers of short stature and seven (35%) were born to mothers of normal stature. Statistical analysis revealed a significant association between maternal height and stunting (P = 0.026). Children born to mothers of short stature had a 1.19 times greater odds of being stunted than children born to mothers of normal stature.

Table 2. Correlations between risk factors and stunting incidence

Variable	Stunting						p	OR
	Yes		No		Total			
	n	%	n	%	n	%		
Mother's height								
Normal	18	39,13	7	35,0	25	37,88	0,026	1,19
Short	28	60,87	13	65,0	41	62,12		
Exclusive breastfeeding								
Yes	17	48,57	6	19,35	23	34,85	0,003	3,94
No	18	51,43	25	80,65	43	65,15		

Of the 66 children studied, 35 (53%) were exclusively breastfed and 31 (47%) were not. Among the stunted children, 17 (48.57%) were exclusively breastfed and 18 (51.43%) were not. Among the non-stunted children, 6 (19.35%) were exclusively breastfed, and 25 (80.65%) did not. Statistical analysis demonstrated a significant association between exclusive breastfeeding and stunting (P = 0.003). Children who were not exclusively breastfed had a 3.94 times greater odds of being stunted than children who were exclusively breastfed.

Discussion

This study presents compelling characteristics of the sampled children under five and their mothers. The relatively even distribution of the children's ages reflects a robust representation across various age groups. With 21.21% of the children being one year old, 18.18% two years old, 21.21% three years old, 16.67% four years old, and 22.73% five years old, the one, three, and five-year-old cohorts were the most prevalent. This is significant as it provides a broader perspective on child development across different early life stages. Regarding gender, the majority of children in the sample were female (60.61%), a factor that may influence their nurturing dynamics and social development. Furthermore, the variation in maternal educational attainment was a crucial focus of this study. The largest proportion of mothers (34.85%) had only completed elementary school, with only 6.06% having attained higher education. This

suggests potential limitations in knowledge and resources that could impact parenting practices and child health.

Analysis of the association between risk factors and stunting prevalence revealed significant results. Of the 66 children studied, 69.7% were born to mothers with short stature. Among stunted children, 60.87% were born to mothers with short stature. These findings align with previous research indicating a strong correlation between maternal height and child nutritional status. With a p-value of 0.026, there is strong statistical evidence that children born to mothers with short stature have a 1.19 times greater odds of experiencing stunting compared to children born to mothers of normal stature. Research consistently demonstrates a strong intergenerational link between maternal stature and child nutritional status. Children born to mothers with short stature (<145 cm) have significantly higher odds of experiencing stunting, wasting, and being underweight compared to those born to taller mothers.[17,18] Maternal height emerges as the strongest predictor of child stunting, followed by paternal height and household wealth.[19] Every 1 cm increase in maternal height is associated with a reduced risk of child stunting and wasting.[18] While maternal BMI is also correlated with child nutritional status, its sensitivity and specificity as a predictor are too low to replace direct child growth measurements.[20] These findings highlight the importance of addressing maternal nutrition and stature to break the cycle of intergenerational undernutrition, emphasizing the need for comprehensive nutrition strategies targeting both maternal and child health.[17]

In addition to maternal height, exclusive breastfeeding was another analyzed factor. Of the total sample, 53% of children were exclusively breastfed. However, among stunted children, only 48.57% were exclusively breastfed. Conversely, among non-stunted children, the percentage of those exclusively breastfed was considerably lower (19.35%). Analysis demonstrated a significant association between exclusive breastfeeding and stunting prevalence, with a p-value of 0.003. Children who were not exclusively breastfed had 3.94 times greater odds of experiencing stunting compared to those who were exclusively breastfed. The research papers consistently demonstrate a significant association between exclusive breastfeeding and reduced stunting prevalence in children. Sari et al.[21] found that children who were not exclusively breastfed had 3.1 times higher risk of stunting compared to those who were. Similarly, Umiyah & Hamidiyah[22] reported that non-exclusively breastfed children had 2.451 times higher odds of becoming stunted. Luthfia et al.[23] confirmed a relationship between exclusive breastfeeding history and stunting incidence. Hadi's[24] systematic review of studies from 2013 to 2023 also concluded a significant connection between exclusive breastfeeding and stunting. These findings highlight the importance of promoting exclusive breastfeeding as a strategy to reduce stunting prevalence. Additionally, Sari et al.[21] emphasized the need for health promotion activities targeting not only mothers but also other caregivers involved in child care.

Conclusion

This study's findings underscore the significant influence of maternal factors, including height and exclusive breastfeeding practices, on the nutritional status of children under five. These results have implications for public health interventions aimed at raising awareness of the importance of maternal nutrition during pregnancy and lactation, and at supporting families in establishing and maintaining exclusive breastfeeding. A comprehensive understanding of the characteristics of this population and the risk factors associated with stunting will enable the development of more effective intervention programs to reduce its prevalence among children under five.

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