



THE EFFECT OF SOCIOECONOMIC STATUS AND *FOOD HABITS* ON STUNTING TODDLERS AND NON-STUNTING

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ABSTRACT

Socioeconomic status indirectly affects the ability of families to meet nutritional needs and access health services, resulting in malnutrition being more prevalent among families with low socioeconomic status. This condition is also associated with eating habits or food habits. This study aimed to determine the relationship between family income and food habits with the incidence of stunting among toddlers aged 24–59 months in the working area of Buano Selatan Public Health Center. This study employed an observational method with a case-control approach. The study population consisted of toddlers aged 24–59 months registered in the working area of Buano Selatan Public Health Center. A total of 180 toddlers were included in the study, consisting of 90 stunted toddlers as the case group and 90 non-stunted toddlers as the control group, with a 1:1 ratio. Food habits scores were obtained using the Individual Dietary Diversity Score (IDDS). Inferential analysis was conducted using the chi-square test to determine the relationship between family income and stunting incidence. The results showed that 96.7% of parents of stunted toddlers had low income, while 97.8% had low food habits scores. Among non-stunted toddlers, 88.9% of parents had high income and 94.4% had food habits scores in the high category. The statistical analysis showed that family income was significantly associated with stunting incidence ($p = 0.048$). The odds ratio indicated that toddlers from families with low income had a 3.178 times greater risk of experiencing stunting. These findings indicate that family income is associated with stunting incidence, with low family income increasing the risk of stunting among toddlers. Furthermore, the dietary diversity scores of both stunted and non-stunted toddlers based on the IDDS were categorized as low.

Keywords: family income; *food habits*; socioeconomic status; stunting; toddlers

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INTRODUCTION

Toddlers need adequate nutritional intake to support the growth and development process. Nutritional needs in toddlers can be met by consuming a variety of foods. Adequate food fulfillment is reflected in the availability of sufficient food (Zhao et al., 2017). The incidence of stunting is indirectly influenced by socioeconomic factors such as education level, family income, and food availability. The lack of food availability in a family can continuously cause diseases due to malnutrition. The economic status of the family affects the family's ability to fulfill nutritional needs and access health services. Children in families with low economic status are more at risk of experiencing stunting due to inadequate nutritional fulfillment, which increases the risk of malnutrition (Waliulu & Rumaolat, 2021; Saputri & Rusman, 2022).

Food habits can influence nutritional intake and nutritional status in children. The Individual Dietary Diversity Score (IDDS) is based on food groups and can be used to assess dietary diversity and predict nutritional adequacy at the individual level. Toddlers tend to have poor eating habits, such as consuming only one type of food, which can lead to inadequate nutritional intake and malnutrition (Saputri & Rusman, 2022). Food habits are influenced by two factors, namely internal and external factors. Internal factors affecting food habits include income, nutritional knowledge, culture and religion, and food preferences. External factors include the production, availability, and distribution of food. Households in agricultural areas have higher incomes compared with

households in coastal areas, while household food expenditure in coastal communities may also be higher (Christina, 2011; Andari, 2018).

Data from the South Buano Health Center showed that the average number of toddlers in 2019 was 80, increasing to 84 toddlers in 2020. In 2021, the number of toddlers increased to 90, and in 2022, it remained at 90 toddlers. Stunting prevention and control can be carried out by maintaining adequate nutritional intake from pregnancy through early childhood. The results of a preliminary study conducted in the working area of the South Buano Health Center, which is located in a coastal and island area, indicated that the prevalence of stunting was relatively high and ranked third. In December 2022, there were 90 toddlers, and socioeconomic conditions among parents, particularly low levels of education, employment opportunities, and income, were associated with poor food habits among stunted toddlers. Meanwhile, non-stunted toddlers from families with better income tended to have better *food habits*, resulting in more balanced nutritional intake.

The socioeconomic conditions and food habits of families in coastal and island areas are important factors that need to be considered in efforts to prevent and control stunting. However, information regarding the relationship between family income, food habits, and stunting among toddlers in the working area of the South Buano Health Center is still limited. Therefore, this study is important to provide evidence regarding the role of socioeconomic conditions and dietary diversity in stunting incidence in this specific geographical and community context. The findings are expected to contribute to the development of appropriate nutritional interventions and stunting prevention programs that are responsive to the socioeconomic and food access conditions of families in coastal and island communities. Therefore, this study aimed to determine the relationship between family income and food habits with the incidence of stunting among toddlers aged 24–59 months in the working area of the South Buano Health Center.

METHOD

This type of study is observational with a *case control* design. The population in this study is toddlers aged 24-59 months who are registered in the medical record data of the South Buano Health Center. Samples were taken from 180 toddlers using *simple random sampling techniques*. Food *habits scores* were obtained from the *Individual Dietary Diversity Score* (IDDS). Data analysis was descriptive to describe the characteristics of the respondents, namely age, gender, education and parental work). Meanwhile, the inferential analysis uses the *chi-square* test to determine the level of income and *food habits* with the incidence of stunting. The number of cases is 90 people and the control is 90 people, which means 1:1.

RESULT

Table 1.
Frequency Distribution of Case (n=90) and Control (n=90) responden

Variabel	f	%
Stunting Toddler Age		
24-36 months	52	57.8
37-59 months	42	42.2
Non-Stunting Toddler Age		
24-36 months	72	80
37-59 months	18	20
Gender of Stunting Toddlers		
Male	45	50
Women	45	50
Gender of Non-Stunting Toddlers		
Male	68	75.6
Women	22	24.4
Education of Stunting Toddlers		
Elementary School	32	35.6
Junior High School	38	42.2
Senior High School	17	18.9

Variabel	f	%
Bachelor's/Diploma	3	3.3
Education for Parents of Non-Stunting Centers		
Elementary School	7	7.8
Junior High School	4	4.4
Senior High School	46	51.1
Bachelor's/Diploma	33	36.7
Work of Parents of Stunting Toddlers		
PNS	3	3.3
Self-employed	20	22.2
Farmer	31	34.4
Fisherman	36	40
Work of Parents of Non-Stunting Toddlers		
PNS	25	27.8
Self-employed	45	50
Farmer	8	8.9
Fisherman	12	13.3
Income of Stunting Toddler Parents		
Low	87	96.7
Height	3	3.3
Income of Non-Stunting Toddler Parents		
Low	10	11.1
Height	80	88.9
Food Habits Balita Stunting		
Miscellaneous	2	2.2
Not Diverse	88	97.8
Food Habits Balita Non-Stunting		
Miscellaneous	85	94.4
Not Diverse	5	5.6

Table 2.
The Effect of Socioeconomic Status on Stunting Incidence

The Effect of Socioeconomic Status on Stunting Incidence							
Variabel		Control Cases			N	OR (95%CI)	p-value
		Non Stunting	Stunting	%			
		f	f				
Parental Income	Low	10	87	96.7	97	3.178	
	Height	80	3	3.3	83	(0.987-10.228)	0.048*

Table 3.
The Effect of Food Habits on Stunting Incidence

The Effect of Food Habits on Stunting Incidence							
Variabel		Control Cases			N	OR (95% C1)	p-value
		Non-Stunting	Stunting	%			
		f	f			1,000	
Food Habits	Diverse (IDDS Score ≥ 4)	85	2	2.2	87	(0,342-	
	Not Diverse (IDDS Score < 4)	5	88	97.8	93	2,923)	1.000

DISCUSSION

Characteristics of Toddlers by Age and Gender

The results of the study show that the characteristics of toddlers in terms of age and gender are presented in Table 1. Among stunted toddlers, 57.8% were aged 24–36 months, while 80.0% of non-stunted toddlers were in the same age group. These findings indicate that a substantial proportion of toddlers in both groups were within the 24–36-month age range. This period is important because adequate nutritional intake is required to support continued linear growth and development. Stunting is a manifestation of chronic nutritional problems that can develop during the early stages of life and may persist when nutritional needs are not adequately met.

Recent evidence emphasizes that stunting is associated with multiple factors, including socioeconomic conditions, dietary intake, and other household and child characteristics. A study among Indonesian children aged 6–59 months found that stunting was associated with low

socioeconomic status, with the highest prevalence observed among children from the lowest socioeconomic group. Therefore, the age distribution observed in this study should be interpreted together with other determinants of stunting rather than as an independent explanation for the occurrence of stunting.

Based on Table 1, the distribution of male and female toddlers in the case and control groups was relatively similar. The proportion of female toddlers in the stunting group was 50%, while the proportion of male toddlers was also 50%. A similar distribution was observed in the non-stunting group. Thus, the findings of this study do not indicate a substantial difference in the distribution of stunting according to sex. Recent national evidence also demonstrates that child sex may be associated with nutritional status in specific populations, but the magnitude and direction of the association can vary according to socioeconomic, dietary, and environmental conditions. The relatively similar distribution of sex between the case and control groups may also be related to the case-control sampling design, in which the number of cases and controls was intentionally balanced at 90 respondents each. Therefore, differences in the proportion of male and female toddlers between the two groups should not be interpreted as evidence that sex has no relationship with stunting without a specific statistical analysis of sex as an independent variable.

Family Income and Stunting

The results showed substantial differences in family income between the stunting and non-stunting groups. Among parents of stunted toddlers, 96.7% had low income, while only 3.3% had high income. In contrast, among parents of non-stunted toddlers, 88.9% had high income and 11.1% had low income. These findings indicate that low family income was more commonly observed among families of stunted toddlers in this study. Family income is an important socioeconomic factor because it may influence a household's ability to obtain adequate and diverse food and access health services. Research conducted among Indonesian children aged 6–59 months found that stunting and micronutrient deficiencies were associated with socioeconomic status. Children from the lowest socioeconomic group had a higher prevalence of stunting than children from higher socioeconomic groups.

The present study also found a statistically significant relationship between family income and stunting ($p = 0.048$). The odds ratio (OR) of 3.178 indicates that toddlers from families with low income had higher odds of experiencing stunting compared with toddlers from families with higher income. This finding is consistent with a 2023 study in Indonesia examining maternal employment, family income, and household expenditure, which highlighted the relationship between socioeconomic circumstances and stunting among children under five. The socioeconomic condition of families may also influence children's dietary patterns. Families with limited financial resources may have fewer opportunities to provide a wide variety of foods, particularly foods that are relatively expensive but important sources of protein and micronutrients. In addition, socioeconomic circumstances may affect access to nutrition information, health services, and other resources required to support optimal child growth. However, the relationship between family income and stunting should not be interpreted as a single causal pathway. Stunting is a multifactorial nutritional problem involving dietary intake, disease, sanitation, maternal and child factors, household socioeconomic conditions, and access to health services. Therefore, the significant association found in this study indicates an important relationship within the study population but does not establish that low income alone causes stunting.

Food Diversity and Stunting

Food diversity is an important component of an adequate diet because consuming foods from different food groups increases the opportunity to obtain a wider range of nutrients. In the present study, the food diversity score was assessed using the Individual Dietary Diversity Score (IDDS). The results showed that the food diversity scores of both stunted and non-stunted toddlers were generally classified as low. Recent research using Indonesian national data found that dietary

diversity was significantly associated with children's nutritional status. Children who consumed a more diverse range of foods had higher odds of having normal nutritional status compared with children who experienced stunting or severe stunting, after controlling for demographic, socioeconomic, and breastfeeding factors. This finding supports the importance of dietary diversity in maintaining adequate nutritional status among young children. A study conducted in Jeneponto, Indonesia, also reported an association between dietary diversity and stunting. The study found that inadequate dietary intake and limited dietary diversity were related to stunting among children. These findings demonstrate that the quality and variety of foods consumed by children are important considerations in understanding nutritional status.

In the present study, however, the Chi-square analysis showed no significant relationship between food diversity and stunting ($p = 1.000$). The odds ratio was also 1.000, with a 95% confidence interval of 0.342–2.923. This result indicates that, within the study population, the measured food diversity category was not statistically associated with stunting. The absence of a statistically significant association does not necessarily mean that dietary diversity is unrelated to child nutritional status in general. The finding may be influenced by the relatively similar distribution of low dietary diversity in both the stunting and non-stunting groups. Another possible explanation is that dietary diversity is influenced by broader socioeconomic conditions. Research on Indonesian children has demonstrated socioeconomic inequalities in minimum dietary diversity, with household wealth, maternal education, paternal occupation, and other factors contributing to differences in children's dietary diversity. Thus, the dietary diversity observed in the present study may reflect the characteristics of the coastal and island community, where food availability, household income, occupation, and access to different food sources can influence children's diets. The finding that food diversity was low in both groups is nevertheless important from a nutritional perspective. Although no statistically significant association with stunting was identified in this study, inadequate dietary diversity may indicate that children are not consistently receiving a wide range of food groups. Therefore, dietary diversity remains relevant as part of nutritional assessment and stunting prevention efforts, while its relationship with stunting in this particular population requires consideration of other factors.

Food Habits and Dietary Patterns

The results also showed differences in food habits between toddlers. Female toddlers tended to consume a more diverse range of foods than male toddlers based on the dietary diversity scores. However, some food groups, including organ meats, were not commonly consumed by female toddlers. Based on the food recall data, male toddlers were reported to consume snacks more frequently, which may have contributed to a less diverse dietary pattern. Food preferences and eating behavior can influence the variety and nutritional quality of foods consumed by toddlers. The availability of diverse foods at home, parental knowledge, household income, and children's preferences may interact in determining dietary patterns. Research in Indonesia has demonstrated that dietary diversity is associated with socioeconomic characteristics, including household wealth and parental education.

Therefore, differences in food habits between boys and girls should be interpreted cautiously. The observed pattern in this study describes the characteristics of the study participants and does not by itself demonstrate that sex determines dietary diversity. Other factors, such as parental food choices, household food availability, and children's individual preferences, may also contribute to the observed dietary patterns. Overall, the findings of this study indicate that family income had a statistically significant relationship with stunting, whereas food diversity based on the IDDS did not show a statistically significant relationship with stunting in the study population. The findings emphasize that socioeconomic conditions and dietary characteristics should be considered together when examining stunting among toddlers, particularly in coastal and island communities where access to diverse food sources may be influenced by geographic and economic conditions.

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