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Original Research Paper

The Relationship Between Family Income and Mother's Education Level and the Incidence of Stunting in Toddlers (Aged 24–59 Months) in the Working Area of Purwodadi 1 Public Health Center

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ABSTRACT

Background: Indonesia faces a triple burden of nutritional problems, including stunting, wasting, obesity, and micronutrient deficiencies such as anemia. Malnutrition occurs when individuals do not receive adequate intake of protein, energy, vitamins, and minerals, which can lead to stunting. **Objective:** This study aims to determine the relationship between family income and maternal education level with the incidence of stunting in toddlers in the working area of Purwodadi Community Health Center 1. **Method:** This observational study with a cross-sectional design involved 116 respondents. Data on family income and maternal education were collected through questionnaires and interviews, while toddler nutritional status was assessed through anthropometric measurements. **Results:** The majority of respondents had sufficient family income (54.3%), and most mothers had higher education levels (49.1%). Statistical analysis showed no significant relationship between family income and the incidence of stunting (p = 0.495). However, there was a significant relationship between maternal education level and the incidence of stunting (p = 0.006). **Conclusion:** Family income is not significantly associated with stunting incidence in toddlers, but maternal education level plays an important role in reducing stunting risk.

Introduction

Indonesia is currently facing a triple burden of nutritional problems, namely stunting, wasting, and obesity, along with micronutrient deficiencies such as anemia. Undernutrition occurs when individuals do not receive adequate intake of essential nutrients such as protein, energy, vitamins, and minerals, which can lead to stunting[1]. On the other hand, overnutrition occurs when individuals consume excessive calories and nutrients, often due to unhealthy dietary patterns and sedentary lifestyles[2]. In addition, micronutrient deficiencies involve a lack of essential vitamins and minerals required by the body to function optimally[3].

Stunting in children under five is a serious public health issue, especially in developing countries[4]. According to the World Health Organization (WHO), stunting is considered a public health problem when its prevalence reaches 20% or more[5]. Globally, approximately 162 million children under five experience stunting, with the highest prevalence in Sub-Saharan Africa (40%) and South Asia (39%). Indonesia is among the 14 countries with the highest number of stunted children and ranked fourth globally in 2019[3]. Based on data from the Basic Health Research (Riskesdas), there were 6.3 million stunted children in Indonesia, representing a prevalence of 27.7%, which is still far above the WHO standard of less than 20%[6].

The prevalence of stunting in Indonesia decreased to 21.6% in 2022[7], but this figure still exceeds the national target of 20%. One of the

provinces facing significant challenges in stunting reduction is Central Java. Based on the Indonesian Toddler Nutritional Status Survey (SSGBI), the prevalence of stunting in Central Java was recorded at 27.68% and decreased to 20.9% in 2021, although this figure remains relatively high[8]. At the district level, Grobogan Regency, which includes the Purwodadi sub-district, recorded a stunting prevalence of 29.13% in 2019. Although the 2021 SSGI data showed a significant decrease to 9.6%, the prevalence of stunting in Grobogan Regency increased again in 2022 to 19.3%[9].

Stunting in toddlers can be caused by multiple factors, such as socioeconomic conditions, maternal nutrition during pregnancy, childhood illnesses, and inadequate nutritional intake in infants[10]. Generally, these contributing factors persist over a long period (chronic)[11]. One of the key factors influencing stunting is the family's economic status. Studies have shown that families with low income tend to have limited ability to meet their children's nutritional needs, which can ultimately lead to nutritional deficiencies and increase the risk of stunting in toddlers[12].

A study conducted in the working area of Puskesmas Seginim, South Bengkulu Regency, found a strong association between family income and stunting in toddlers[13]. Similarly, research conducted in Lubuklinggau City also found a relationship between parental income and stunting in children aged 4 to 5 years, where toddlers from low-income families were at higher risk of experiencing stunting[14].

Parental education, particularly maternal education, also plays a significant role in preventing stunting[15]. Mothers with higher education levels tend to have better knowledge about nutrition and appropriate parenting practices, which can effectively prevent stunting in children[16]. Conversely, mothers with lower education levels and limited nutritional knowledge are at a higher risk of having stunted children[17]. In this context, low maternal education is often associated with suboptimal parenting patterns and difficulties in meeting the child's proper nutritional needs. However, a study conducted by Chahya (2022)[13] found no significant relationship between maternal education and the incidence of stunting among toddlers in the working area of Puskesmas Cinangka, Depok City.

This study aims to explore in greater depth the relationship between socioeconomic factors, education levels, and parenting patterns with the incidence of stunting among toddlers in Grobogan Regency, Central Java. By gaining a more comprehensive understanding of the factors influencing stunting, it is expected that more effective strategies can be developed to address the stunting problem in the region.

Materials and Methods

Study Design

This research is an observational study using a cross-sectional approach aimed at determining the relationship between family income and maternal education level with the incidence of stunting in toddlers. The independent variables in this study are family income and maternal education level, while the dependent variable is the incidence of stunting.

Sample

The study sample consisted of 116 mothers with toddlers living in the working area of Purwodadi 1 Public Health Center.

Data Collection Technique

Samples were selected using cluster random sampling (random sampling based on groups or clusters). The inclusion criteria were mothers or parents who could communicate well, parents who directly cared for and raised the child, and mothers of toddlers with permanent residence in the working area of Purwodadi 1 Public Health Center. The exclusion criteria were toddlers whose residence was not permanent

and toddlers who were absent during data collection.

Family income data were collected based on the total income of the father and mother and categorized as low (≤ IDR 1,500,000), moderate (IDR 1,500,000 – IDR 4,000,000), and good (> IDR 4,000,000). Maternal education level was obtained via questionnaires and categorized into higher education (Associate's, Bachelor's, Master's, or Doctorate degrees), secondary education (high school/vocational school), and basic education (elementary/junior high school or equivalent). Toddler nutritional status was assessed through anthropometric measurements of height.

Data Analysis Technique

Data analysis was performed using Microsoft Excel 2010 and SPSS for Windows version 20.0. The process included data collection, data cleaning, and data coding. Univariate analysis was used to describe each research variable, while bivariate analysis with the chi-square test was conducted to examine the relationship between family income and maternal education level with the incidence of stunting in toddlers.

Ethical Considerations

This study was ethically approved with the Ethical Clearance Letter No. 633/KEPK-FIK/XI/2024. The study met the seven WHO 2011 ethical standards, which include: 1) Social Value, 2) Scientific Validity, 3) Fair Distribution of Burden and Benefits, 4) Risk Assessment, 5) Prevention of Exploitation, 6) Confidentiality and Privacy, and 7) Informed Consent. The research also referred to the CIOMS 2016 Guidelines and fulfilled all required indicators for each ethical standard.

Results

The respondents in this study consisted of 116 mothers with toddlers residing in the working area of Purwodadi 1 Public Health Center. The characteristics of the respondents include family income, the mother's highest level of education, the mother's occupation, the toddler's gender, and the toddler's nutritional status based on z-score (Height-for-Age). The detailed characteristics of the respondents are presented in Table 1 below.

Table 1. Respondent Characteristics

Variable	Frequency (n = 116)	Percentage (%)
Family Income		
Low	15	12.9%
Moderate	63	54.3%
High	38	32.8%
Mother's Education		
Basic	26	22.4%
Intermediate	33	28.5%
Higher	57	49.1%
Mother's Occupation		
Housewife	35	30.2%
Private Employee	50	43.1%
Civil Servant	10	8.6%
Teacher	10	8.6%
Entrepreneur	11	9.5%
Child's Gender		
Male	64	55.2%
Female	52	44.8%
Nutritional Status		
Normal	95	81.9%
Stunting	21	18.1%

Source: *Primary Data*

Based on Table 1, most families in the working area of Purwodadi 1 Public Health Center have a moderate income, accounting for 54.3%. The family's monthly income influences household food security, as a portion of the income must be allocated to meet food needs. Additionally, the majority of respondents in this study have a high level of education, with 49.1% of mothers categorized in this group. In terms of employment, most respondents work as private employees, representing 43.1%, which reflects the dominance of the informal sector in the area. Meanwhile, the number of male toddlers involved in the study is higher than that of female toddlers, accounting for 55.2%. Regarding nutritional status, the study found that most toddlers in this area have a normal nutritional status, with 81.9% categorized as

normal. These findings indicate that despite variations in the families' socioeconomic factors, most families in this region are able to meet their children's optimal nutritional needs.

Table 2. Distribution of Stunting Incidence Based on Family Income and Mother's Education

Variabel	Z-Score (Height-for-Age)						P – value
	Stunting		Normal		Total		
	N	%	N	%	N	%	
Family Income							
Low	4	26,7	11	73,3	15	100	0,495
Moderate	12	19	51	81	63	100	
High	5	13,1	33	86,9	38	100	
Mother's Education							
Basic	6	23	20	77	26	100	0,006
Intermediate	11	33,3	22	66,7	33	100	
Higher	4	7	53	93	57	100	

Source: Primary Data

Based on Table 2, it can be seen that there were 12 respondents with moderate family income who had stunted toddlers, while 51 respondents with moderate family income had toddlers with normal nutritional status. The chi-square test results showed no significant relationship between family income and stunting incidence (p = 0.495). In contrast, there were 11 respondents with a moderate education level whose toddlers were stunted, and 22 respondents with a moderate education level whose toddlers had normal nutritional status. The analysis indicated a significant relationship between the mother's education level and the incidence of stunting in toddlers (p = 0.006).

Discussion

The study results showed that among respondents with low income, 26.7% of toddlers experienced stunting, while 73.3% had normal nutritional status. In the moderate-income group, 19% of toddlers were stunted and 81% had normal nutrition. Meanwhile, in the high-income group, only 13.1% of toddlers experienced stunting, while 86.9% had normal nutritional status. However, bivariate analysis indicated that there was no significant relationship between family income and the incidence of stunting (p = 0.495). In other words, family income did not have a significant effect on the nutritional status of toddlers in the region.

This study is consistent with research conducted in Langkan Luar Village, South Sumatra, which stated that family income is not related to the incidence of stunting. This may be due to the ability of low-income families to manage their finances effectively. They are able to provide nutritious meals using simple and affordable ingredients. Moreover, the income they earn is not solely allocated for basic needs but is also used to meet other essential family requirements[18].

A study conducted in the working area of Jati Makmur Public Health Center, North Binjai, found no significant relationship between family income levels and the incidence of stunting (short stature) in toddlers[19]. This may be due to the fact that family income is not entirely used to purchase basic food needs but is instead allocated for other expenses. Therefore, even though a family may have a high income, it does not necessarily guarantee good nutritional status in toddlers, as the available income may not be sufficiently allocated to meet nutritious food requirements.

Furthermore, the relationship between maternal education and the incidence of

stunting in toddlers showed significant results. Among toddlers whose mothers had a basic level of education (elementary or junior high school), 77% had a normal TB/U Z-score. In toddlers whose mothers had a middle level of education (high school), 66.7% had normal nutritional status, and among toddlers whose mothers had a higher level of education, 93% had normal nutritional status. The statistical test showed a p-value of 0.006, indicating a significant relationship between the mother's level of education and the incidence of stunting in toddlers. This finding is consistent with studies conducted in the working area of Way Urang Public Health Center, South Lampung Regency[20], and in East Semarang District[21]. Maternal education plays a crucial role in family health, including the nutritional status of toddlers. Mothers with higher education levels tend to have better knowledge about nutrition and child health, and they are generally more capable of managing family needs, especially in selecting nutritious foods within limited budgets. On the other hand, mothers with lower education levels often have limited knowledge about nutrition and proper feeding practices, which may result in less attention to maintaining their children's nutritional balance[22].

The provision and quality of food for infants are highly influenced by the mother's knowledge and level of education, as well as the availability of food resources in the surrounding environment[23]. Mothers with higher education levels tend to better understand the importance of providing nutritious food to support their children's growth, while mothers with lower education levels may lack adequate understanding of this matter[24]. Consequently, although nutritious food is not always expensive, the proper selection of food is often strongly influenced by the mother's knowledge of nutrition and health. This is in line with other opinions[25] stating that mothers with lower education levels often struggle to choose balanced and affordable foods, which may lead to suboptimal nutritional status in their children[26]. Stunting is a serious issue as it is associated with an increased risk of illness and mortality, and it can hinder children's mental and motor development. Therefore, improving maternal and child health quality, as well as disease prevention and control, is crucial through the implementation of the Healthy Living Community Movement (GERMAS).

Overall, this study confirms that although family income is not directly related to stunting, maternal education has a significant impact on nutritional status and growth of toddlers. Therefore, efforts to improve maternal nutritional knowledge, especially for mothers with low education, can be an important strategy in preventing stunting among toddlers.

Conclusion

Most families in the working area of Puskesmas Purwodadi 1 have a sufficient income, with 54.3% falling into this category. Additionally, the majority of mothers in the area, specifically 49.1%, have completed higher education. Regarding the nutritional status of toddlers, this study shows that 81.9% of the children have normal nutritional status, while 18.1% are experiencing stunting. The analysis results indicate that there is no significant relationship between family income and the incidence of stunting among toddlers in the Puskesmas Purwodadi 1 area. This means that although family incomes vary, this factor does not directly influence the occurrence of stunting in children. However, this study found a significant relationship between the mother's education level and the incidence of stunting in toddlers. This finding suggests that the mother's education plays an important role in reducing the risk of stunting in children, possibly due to better knowledge of child nutrition and health among mothers with higher education levels.

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