

Economic Growth Mediates the Effects of Socioeconomic Factors and Reduces Stunting in Indonesia

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ABSTRACT

Research Originality: This study offers original insights by examining the multifactorial determinants of stunting in Indonesia, with particular focus on the roles of social food assistance, food insecurity, public literacy, unemployment, and economic productivity within a panel data framework.

Research Objectives: This study aimed to analyze the effects of social food assistance, food insecurity, public literacy, unemployment, and economic productivity on the prevalence of stunting in Indonesia.

Research Methods: This study employs a quantitative approach using panel data for 34 Indonesian provinces from 2018 to 2022. The analysis used regression models to evaluate both direct and indirect relationships among the variables.

Empirical Results: The findings indicate that literacy, social food assistance, food security, and economic growth significantly reduce stunting rates. Unemployment does not directly affect stunting, but it does so indirectly through its impact on economic growth. Additionally, literacy, food assistance, and food security positively affect economic growth, whereas unemployment has a minimal direct impact. Economic growth is an important mediating variable for reducing stunting.

Implications: These results suggest that reducing stunting in Indonesia requires integrated policies that combine social food assistance with improvements in literacy, food security, and economic development. Policymakers should prioritize cross-sectoral strategies, including nutrition education and economic empowerment, to effectively address stunting.

Keywords:

economy; food security; literacy; stunting; unemployment

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INTRODUCTION

Human capital is an essential component of any economy. Human resources must be well-nourished to be practical. However, many communities fall short of meeting these requirements. Malnutrition is common in many population groups in developing countries, and stunting among children below five years of age is a significant concern. Stunting affects the growth and development of children, leading to lower intelligence, increased risk of non-communicable diseases, reduced productivity, and long-term poverty (Vonaesch et al., 2021). In the world, 165 million children below the age of five, which is around 26% of the population, are stunted. Of these, approximately 95.8 million are children from Asia, which comes in second after Africa in terms of stunted children, with a 26.8% prevalence. In Southeast Asia, it is 27.8%, representing approximately 14.8 million children. According to the 2022 report, the highest stunting rate is in Pakistan at 45%, followed by Congo (43%), Ethiopia (38%), India (39%), and Bangladesh (36) %. In contrast, the issue has a low incidence in China, at only 9%. According to WHO, stunting prevalence in Indonesia was 36.5% in 2021, whilst the WHO states the cut-off level is 20% (Wand et al., 2024).

Countries with high stunting challenges witness economic growth, which often correlates with high stunting prevalence. For example, India had a stunting prevalence of 39% in 2021, one of the highest rates, and also recorded slow year-over-year growth of 4.5% in the third quarter. Economic growth for Pakistan also fell from 5.5% the previous year to 3.3% in 2021 (Alderman et al., 2006). Nigeria, which has the third-highest number of stunting cases reported, has an average annual economic growth rate of 5.4%. Indonesia's economy grew by 3.69% in 2021, recovering from a 2.07% decline in 2020. The correlation that exists between stunting as an indicator of health and economic growth is evident. Economic growth helps reduce stunting by raising household incomes, thereby providing the means to access resources such as adequate food, healthcare, and education (Mary, 2018).

Nevertheless, stunting remains widespread in Indonesia, indicating that the public health situation in the country is still not ideal. According to H.L. Blum's theory, health status is determined by four indicators: environment (40%), behavior or lifestyle (30%), healthcare systems (20%), and genetics (10%). These determinants assist in planning effective health interventions (Blum, 1974). Environmental factors include physical, social, and economic factors. Hence, social food security and food assistance fall into this category, as those who are food secure have more resources and can thus reduce their risk of malnutrition. There are also social determinants, such as economic growth and unemployment, that affect the category and the primary focus of health needs (Paul et al., 2019). Behavioral risks, which range from individual actions to choices and decisions, account for 30%. Among the behavioral aspects, literacy comes into play in the area of health decision-making. Literate individuals will be more health-conscious and take precautions to avoid contracting diseases (Hanushek & Woessmann, 2020).

Stunting is affected by household food security. Households that face food insecurity tend to have children who are stunted in growth. There is also a need for a sufficient variety of food, especially for children under 5 years old, during rapid development.

The Food and Agriculture Organization (FAO's) conceptual framework describes food security in 4 dimensions: availability, access, utilization, and stability, which are factors that affect children's nutritional status. The availability and accessibility of an adequate and nutritious diet are essential to overcoming stunting. The social welfare theory shows how social and economic policies work together to improve well-being (Büttner et al., 2023). The human being Sen stresses goes beyond income or economic growth and is about improving people's abilities to lead healthy and productive lives. Focusing on food resources for social assistance and education, work placement, and other issues such as food security contributes to people's abilities and reduces stunting, promoting economic growth as well. There is evidence that stunting affects physical growth, cognitive development, and future living standards. The socioeconomic variables of social food assistance, literacy, food safety, and unemployment have a substantial impact on the scope of the stunting epidemic. Often offered in the form of cash or food subsidies, social food assistance programs improve the communities' access to nourishing food (Parekh et al., 2020).

Several studies have reported no significant association between social assistance programs and trends in stunting reduction. Community-level interventions such as conditional cash transfers (CCTs) appear to make little to no difference in stunting. In contrast, unconditional cash transfers (UCTs) and food vouchers may have only a potential impact, with findings qualified by low certainty of evidence (Berkowitz et al., 2024; Harper et al., 2023). This persistent ambiguity in the literature reflects a deeper theoretical tension: whether social food assistance operates as an independent driver of child nutrition outcomes or is contingent on broader macroeconomic conditions. Social protection interventions show a stronger nutritional impact when combined with behavior change communication and when they ensure income security sufficient for households to afford a healthy diet, suggesting that the channel through which assistance reaches nutritional outcomes is mediated by the economic context (Ataullahjan et al., 2025).

For mothers, literacy has been seen to help them understand nutritional education and practices. Maternal education has emerged as the strongest and most consistent predictor across all forms of child malnutrition, with children of mothers with no education facing more than twice the likelihood of stunting compared with those with higher-educated mothers (Meriç & Demirci, 2026; Wulandari et al., 2025). However, the relationship is not straightforward. Recent evidence from middle-income countries indicates that maternal knowledge alone is insufficient to explain stunting; it can have a meaningful impact only when food diversity and household food security are adequate, confirming that the effect of information operates through a mechanism strongly mediated by material conditions. This finding challenges the conventional assumption that literacy directly reduces stunting and implies that the protective effect of literacy may be conditional on economic enablers, a pathway that prior studies have rarely tested through formal mediation analysis (Suryaningsih & Qolbiyah, 2023).

Food security is widely regarded as a foundational determinant of child growth, as it increases people's sustainable access to food, reducing malnutrition and, in particular, the risk of stunting. A systematic review of studies conducted in Asia and published

between 2019 and 2023 confirmed that stunting is strongly linked to household food insecurity and poor dietary diversity, with socioeconomic factors and maternal education further moderating these associations (Walter De et al., 2023; Fogarty & García, 2025). However, food security is not immune to macroeconomic shocks. FAO's findings indicate that although an increase in per capita income reduces food insecurity in the short term, it does not necessarily produce equivalent long-term reductions in child malnutrition indicators, underscoring the need for integrated analyses that account for the indirect pathways linking economic growth, food access, and nutritional outcomes (UNICEF, 2024). Furthermore, unemployment, by reducing household income and limiting access to resources, may indirectly contribute to stunting. Evidence from Pakistan's subnational analysis confirms that improvements in socioeconomic status and coverage of income support programs targeting females were key factors driving reductions in child stunting. At the same time, poverty and increased food prices remain persistent barriers to accessing nutritious foods (Durao et al., 2020).

Theoretically, economic growth works against stunting for society's welfare. Cross-national analyses of low- and middle-income countries (LMICs) confirm a significant association between per-capita gross domestic product and children's risk of malnutrition, while also highlighting the importance of identifying which contributing factors most broadly enable economic growth to reduce malnutrition (Ataullahjan et al., 2025). The World Bank's Investment Framework for Nutrition 2024 further underscores that both undernutrition and obesity are obstacles to human capital and economic productivity, while every dollar invested in addressing undernutrition is estimated to generate a return of 23 dollars a ratio that suggests economic growth and nutrition outcomes are deeply intertwined rather than independent.

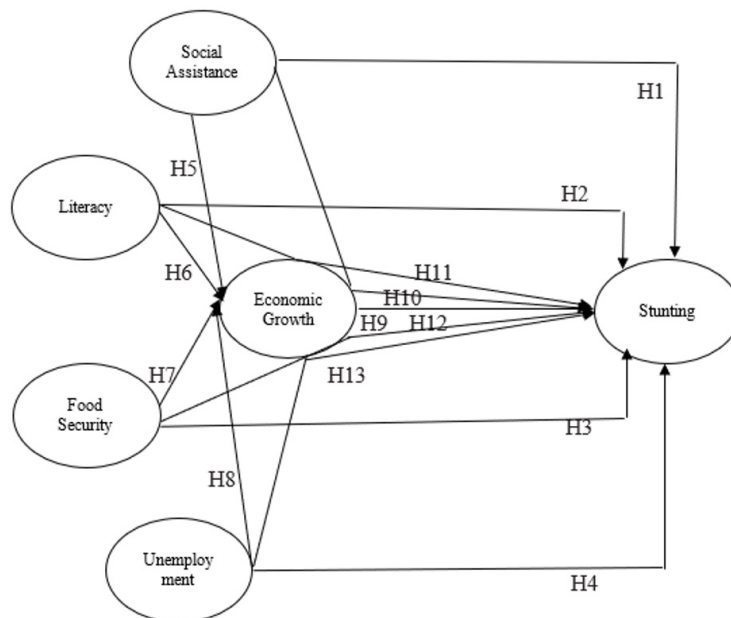
To date, studies have shed light on several aspects, but critical gaps remain. Existing research has examined social food assistance, literacy, food security, and unemployment largely as standalone predictors of stunting without adequately interrogating how these variables interact with economic growth or whether economic growth itself functions as a mediating variable between these determinants and stunting prevalence. The body of investigations that have been carried out tends to treat economic growth either as a background condition or as an outcome, rather than as a structural mediator through which upstream determinants ultimately shape children's nutritional status. This is a critical gap: if stunting is influenced by economic growth, then it is plausible that economic growth mediates the relationship between various determinants, including social food assistance, literacy, and food security, and stunting prevalence. For instance, social food assistance may reduce stunting more effectively when combined with sufficient economic growth, as increased purchasing power and expanded economic activity amplify the nutritional impact of assistance programs. Likewise, high literacy and household food security are more effective at reducing stunting when economic growth translates into expanded access to health services and greater dietary diversity. Simultaneously, the negative impact of unemployment on stunting may be offset by economic growth, which creates employment opportunities and increases household disposable income, enabling families to access

adequate diets. The present study addresses this gap by simultaneously examining literacy, social food assistance, food security, and unemployment as determinants of stunting while testing economic growth as a key mediating variable—an analytical framework that, to the authors' knowledge, has not been previously adopted in the existing literature.

METHODS

This study employs a quantitative research approach to examine the effects of social food assistance, literacy, food security, and unemployment on economic growth and the prevalence of stunting in Indonesia. The analysis uses panel data from 34 provinces during the period 2018–2022. This period was selected because Indonesia had 34 provinces during these years, ensuring consistency and comparability across the panel data. After 2022, the number of provinces increased to 38 following the establishment of new administrative regions, potentially creating structural inconsistencies in the dataset. Therefore, the period 2018–2022 was chosen to maintain data uniformity and analytical reliability. The data used in this research are secondary data obtained from several official government institutions. Data on social food assistance, literacy, food security, unemployment, and other economic indicators were collected from Statistics Indonesia, while data on stunting prevalence were obtained from the Ministry of Health. Additional economic indicators were sourced from the Ministry of Finance.

Figure 1. Research Framework



To analyze the relationship among variables across provinces and over time, this study employs panel data regression analysis, which allows examination of both cross-sectional variation among provinces and time-series dynamics during the study period. Panel data analysis is considered more efficient because it increases the number of

observations and improves estimation accuracy compared to purely cross-sectional or time-series analysis. To determine the most appropriate panel regression model, several model selection tests were conducted. The Chow test was used to compare the Common Effect Model (CEM) with the Fixed Effect Model (FEM). Furthermore, the Hausman test was applied to determine whether the Fixed Effect Model or the Random Effect Model (REM) is more suitable for the dataset. In addition, the Lagrange Multiplier (LM) test was employed to compare the Random Effect Model with the Common Effect Model. These tests ensure that the selected model provides the most consistent and efficient estimation for explaining the relationship between socio-economic determinants, economic growth, and stunting prevalence.

Furthermore, to evaluate the mediating role of economic growth, the analysis examines the direct and indirect effects of socio-economic variables on stunting prevalence using a panel regression framework. This approach enables a more comprehensive understanding of how socio-economic factors influence stunting both directly and indirectly through economic growth. The mediation role of economic growth in the relationship between the independent construct (social assistance, literacy, food security, and unemployment) and the dependent construct (stunting) was evaluated using the Sobel test. The research framework is shown in Figure 1.

This methodology provides a holistic view of the relationships and the total effects of the variables. The analytical procedure adopted in this research is panel data regression, which uses both cross-sectional and time-series data, allowing measurement of the same cross-sectional units at varying points in time. This technique provides information on the cross-sectional and time dimensions of the data.

Regression Equation 1

$$STN_{it} = \alpha + \beta_1 SFA_{it} + \beta_2 LTR_{it} + \beta_3 FS_{it} + \beta_4 UNF_{it} + \beta_5 EG_{it} + \varepsilon_{it} \quad (1)$$

Regression Equation 2

$$EG_{it} = \alpha + \beta_1 SFA_{it} + \beta_2 LTR_{it} + \beta_3 FS_{it} + \beta_4 UNF_{it} + \varepsilon_{it} \quad (2)$$

Description:

STN : Stunting
SFA : Social Food Assistance
LTR : Literacy
FS : Food Security
UNF : Unemployment
EG : Economic Growth
 ε : Error term
I : Province-level data
t : Period data

The mediation role of economic growth in the relationship between the independent construct (social assistance, literacy, food security, and unemployment) and the dependent construct (stunting) was evaluated using the Sobel test.

RESULTS AND DISCUSSION

Table 1 presents the results of the model selection tests used to determine the most appropriate estimation model for each equation. The selection process involves the Chow test, Hausman test, and Lagrange Multiplier (LM) test to compare alternative panel data models. Based on these tests, the Fixed Effects Model (FEM) is identified as the most suitable model for both equations, indicating that individual-specific effects play an important role in explaining variations in economic growth and stunting across observations.

Table 1. Model Selection Test Results

Test	H ₀	Equation 1	Equation 2
Chow Test	FEM vs CEM	F = 47.2134*** Prob = 0.0000	F = 39.8821*** Prob = 0.0000
Hausman Test	FEM vs REM	$\chi^2 = 32.5614^{***}$ Prob = 0.0000	$\chi^2 = 28.3197^{***}$ Prob = 0.0000
LM Test	REM vs CEM	LM = 86.4523*** Prob = 0.0000	LM = 74.1182*** Prob = 0.0000
Selected Model	-	FEM	FEM

Notes:

*** Significant at $\alpha = 1\%$ (p-value < 0.01)

** Significant at $\alpha = 5\%$ (p-value < 0.05)

* Significant at $\alpha = 10\%$ (p-value < 0.10)

Source: Data Analysis Results (2026)

Based on the data presented in Table 1, the model selection test results are shown for two dependent variables, namely *Economic Growth* and *Stunting*. The results of the Chow and Hausman tests for both dependent variables indicate significance values of 0.0000, which are lower than the 0.01 significance level. This implies that, for the *Economic Growth* variable in Equation 1 and the *Stunting* variable in Equation 2, the Fixed Effects Model (FEM) is more appropriate than the Random Effects Model.

Following the selection of the Fixed Effects Model (FEM) as the most appropriate specification, the analysis proceeds to hypothesis testing to examine the effect of each independent variable on the dependent variable. Table 2 presents the estimation results for Model 1, highlighting the direction and significance of the relationships between social food assistance, literacy, food security, unemployment, economic growth, and stunting.

Table 2. Hypothesis Testing Report Model 1

Variable	Coefficient	t-Statistic	Explanation
C	430.3457	7.518565	
Social Food Assistance	-1.884438	-6.572398	Accepted
Literacy	-0.039117	-1.991975	Accepted
Food Security	-0.213521	-2.957974	Accepted
Unemployment	-2.663792	-6.813352	Rejected
Economic growth	-53.81984	-6.030296	Accepted

Source: Data Analysis Results (2026)

The results show that Social Food Assistance has a significant effect on stunting. This implies that an increase in Social Food Assistance reduces the prevalence rates of stunting. This can be explained through pathways that improve the availability of nutritious food for low-income families. Food aid programs, such as the Social Food Assistance Program, ensure that beneficiary families purchase food items in accordance with their needs and nutritional requirements. Through Social Food Assistance, household purchasing power improves, enabling families to buy a broader range of more nutritious foods, such as fruits, vegetables, and animal-sourced foods. Enhanced intake of nutritious foods improves child nutrition status, which in turn reduces the risk of stunting. These results agree with previous work by Rukiko et al. (2023), which indicates that participation in food aid programs has adverse effects on efforts to reduce stunting. Likewise, Cliffer et al. (2020) examined the effects of social aid programs, including Household conditional cash transfer (CCT), on stunting. They concluded that such programs improve children's nutritional status and reduce the risk of stunting (He et al., 2024).

The research indicates that literacy negatively affects stunting. Specifically, among parents, literacy is often associated with the capacity to comprehend nutrition and appropriate information on childcare practices, health, and other relevant topics. Literacy skills involve the ability to read and write, as well as to retrieve information to improve the family's welfare. Higher literacy levels improve mothers' understanding of nutrition and health practices, thereby promoting children's growth. Maternal literacy is also associated with the ability to retrieve health information, such as the need for exclusive breastfeeding, immunizations, and a balanced diet, which help combat stunting. This finding is consistent with previous studies by Alsubaie (2022), which showed that Literate mothers tend to have children with appropriate Dietary Intake, which in turn lowers the chances of stunting by 30% in rural areas. This is due to mothers having a better understanding of the content and significance of nutrition and health messages. Research shows that Stunting prevalence can be reduced in developing countries where maternal literacy is considered necessary. This is because higher maternal literacy translates into better access to healthcare services and household financial resources to support children's nutrition (Alsubaie, 2022).

The results suggest a significant inverse relationship between food security and child stunting. A household that is firmly food secure can ensure that children have stable access to adequate food and nutrition, which enhances their growth and development. This is consistent with the evidence that food security enhances nutrition and can entirely stave off chronic malnutrition in children. The results above align with Mekonnen (2024), who found that children from low-Food Security households are at higher risk of stunting than their counterparts in food-secure households. Households with adequate food nutrition can then procure healthy foods for their children, which lowers the chances of stunting (Mekonnen, 2024). Adam Smith emphasizes that greater access to resources, enabled by improved distribution and trade, can lead to improvements in the economy and population health (Alderman et al., 2023). The case is also supported by Amartya Sen's Entitlement Theory, which emphasizes the need to enable local communities to build their own

food systems to increase Food Security (Abbood, 2024). Improved food security affects children's health and cognitive and physical development, thereby enhancing long-term economic productivity (Becker, 2023).

From the findings, stunting is adversely affected by unemployment, but in an inverse relationship. This suggests that the level of stunting does not correlate with unemployment levels within the regions. Consequently, it emerges that there are other underlying reasons for the decline in stunting across all regions. These observations are comparable to the findings of Tekeba et al. (2023), who also observed that Unemployment and poverty rates are closely related to human development indices but have no significant effect on stunting indices. According to the research findings, this study confirms a negative relationship between economic growth and stunting; thus, an increase in economic growth is associated with a reduction in stunting prevalence in Indonesia. This shows that increased economic activity increases the availability and accessibility of food, enabling families to meet the nutritional needs of their young children and thereby reducing stunting. These findings support those of Jumhur (2024), who found that growth in the primary sector is beneficial in the fight against stunting, whereas growth in the secondary sector is detrimental. Likewise, Suryana and Azis (2023) established a direct causal link: higher economic expansion is associated with lower stunting prevalence, although other socioeconomic variables moderate the effect.

This trend indicates that strong economic growth creates opportunities for families to expand their incomes, helping them afford food and their children's nutritional needs. With economic growth, families get opportunities to raise their incomes, leading to increased expenditure on the diet and nutrition of the entire family unit. Moreover, steady economic growth goes hand in hand with the development of infrastructure, healthcare, and educational institutions, which work together to promote children's well-being. Health care and education, once available, help children's families access the nutritional and health information needed to prevent stunting (Panda, 2024).

Table 3. Hypothesis Testing Report Model 2

Variable	Coefficient	t-Statistic	Explanation
C	6,385849	123,8658	
Social Food Assistance	0,014748	5,937009	Accepted
Literacy	0,001515	10,91102	Accepted
Food Security	0,000500	1,742500	Accepted
Unemployment	0,004830	1,274633	Rejected

Source: Data Analysis Results (2026)

Based on the modeling outcomes, the Fixed Effect Model (FEM) was deemed the most suitable, as shown in Table 3. The study's results show that social food assistance has a positive, significant influence on economic development. This is consistent with the work of Panda (2024), who observed that food assistance programs in India enhanced the

purchasing power of people experiencing poverty, thereby increasing their consumption. In addition, programs like these provide direct transfers to the poorest segments of the population, thereby decreasing poverty and economic inequality. Social Food Assistance, in particular, has also been said by Fernandes and Samputra (2022) to influence economic growth (Fernandes & Samputra, 2022). In the same vein, Ceesay et al. (2022) affirmed that Gambia's government reinforced social assistance programs to achieve economic growth in productive sectors of food security, poverty eradication, adaptation and development, education affordability, and quality of governance (Ceesay et al., 2022). According to Richard Musgrave's theories on fiscal policy, the redistribution of funds through social programs has been effective in stimulating the economies of developing countries (Atkinson, 2023).

The study reveals a strong positive relationship between literacy and economic development. This study is consistent with the findings of Hanushek and Woessmann (2020), who reported that a 1% increase in average educational attainment per worker in the country will result in a 1.56% increase in output (Hanushek & Woessmann, 2020). Likewise, Boris et al. (2023) found that literacy levels were positively correlated with economic growth. Educational institutions have placed more focus on tertiary and secondary education, where they train people in employable skills (Boris et al., 2023). The research findings reveal that food security positively impacts Indonesia's economic growth. Ceesay et al. (2022) observe that, as data on population and urban expansion increase, there are limited developments in food production because farmland is becoming smaller. Poor transportation and storage facilities have also led to high post-harvest losses and food distribution problems, limiting the potential of Food Security to contribute to economic growth (Ceesay et al., 2022). There is a conventional perception that even if the lifted Food Security brings about increased food supply, it only sometimes leads to greater agricultural production efficiency or innovations. It is crucial to note that other dimensions, such as government policies, overseas capital injections, and foreign market conditions, also affect economic development.

A study conducted by Hartono et al. (2023) inferred that, within the Indonesian context, the Food Security-economic growth relationship varies in its effect in the short run and, at times, may even be harmful (Akseer et al., 2022). In the same vein, statistics from the Ministry of Finance (2024) showed that agriculture's Gross Value Added accounts for only 13.57% of GDP. However, its growth was 1.46% YoY as of Q3 2023, underscoring the association between agricultural development and economic growth. Timmer (2023) argued that Food Security in Indonesia is actually determined, rather than determined, by pro-poor economic growth and the Green Revolution (Timmer, 2023). There is a need to adopt a more integrated policy approach to avoid the siloed treatment of food security, human capital, infrastructure investment, and other economic sector investments (Fernandes & Samputra, 2022; He et al., 2024).

The conclusions from this research show that Unemployment in Indonesia does not significantly hinder economic growth. Other determinants of economic growth include regional economic profiles, core sectors of the economy, and government policies. Ngubane

et al. (2023) concluded that, despite turbulent business cycles and high unemployment, poverty declined and the Human Development Index (HDI) continued to increase annually. However, employment levels exerted a noticeable impact on economic growth trends (Ngubane et al., 2023). Hasiru et al. (2024) confirmed the same idea, arguing that there is no meaningful association between economic growth and unemployment, indicating a non-linear relationship (Hasiru et al., 2024). Pratama et al. (2021) did not find any semblance of such a relationship, arguing that economic growth is instead dominated by active sectors such as agriculture, forestry, and fisheries (Palahudin et al., 2024).

The Sobel test assesses whether the ratio of the indirect effect coefficient to its standard error exceeds the critical value for statistical significance. The results show that economic growth plays a significant mediating role in the relationship between socio-economic variables and stunting (see Table 4). Social food assistance, literacy, and food security indirectly reduce stunting through economic growth, suggesting that improvements in these factors foster stronger economic conditions that support child nutrition outcomes. Similarly, unemployment also shows an indirect effect on stunting through economic growth. These findings suggest that economic growth strengthens the impact of socio-economic policies in reducing stunting prevalence.

Table 4. Results of the Sobel Test

Influence	Direct	Indirect	Total	Z-Score	Explanation
Social Food Assistance →	-1,8844	-0,7937	-2,6781	4.4270	Accepted
Literacy →	-0,0391	-0,0815	-0,1206	1.9910	Accepted
Food Security →	-0,2135	-0,0281	-0,2416	2.2657	Accepted
Unemployment →	-2,6638	-0,2599	-2,9237	4.5350	Accepted

Source: Data Analysis Results (2026)

In economic growth, social food assistance is an essential factor in reducing stunting. Welfare, in Amartya Sen's conceptualization of a society's social order, goes beyond the superficial numbers of aggregate economic growth to the people's ability to attain a valued range of being and doing in life. Sen elaborated that stunting is not only a matter of biology but also of resources, and that it is related to the community's capacity to access adequate nutrition and health facilities (Bhtacharya et al., 2016). These results are consistent with Happy (2023), who noted that economic development mediates the relationship between social assistance and stunting. Access to social assistance increases low-income families' purchasing power, giving them a better chance to meet their necessities, including food, healthcare, and education (Ahmed et al., 2022). Research by Ahmed et al. (2022) shows that people with higher levels of education and literacy are more effective at ensuring that children are fed nutritiously. This finding supports the Human Capital Theory, which holds that adult productivity and economic growth improve with education.

As discussed earlier, food security does affect stunting, but economic growth primarily drives it. According to social welfare theory, food security is vulnerable to anti-nutrition

and helps children grow up well. Parents who have access to better food for their children can directly help reduce stunting. Food security improves, with positive results for labor productivity, poverty, and living standards. As previous studies by Akseer et al. (2022) have shown, food insecurity profoundly contributes to stunting.

The research findings on the relationship between unemployment and stunting indicate that unemployment indirectly affects stunting through economic growth. Lower unemployment levels raise families' earnings, enabling parents to provide proper nutrition for their children, thereby directly improving health and reducing stunting. Other studies: Ceesay et al. (2022) support the creation of jobs as a long-term cure for stunting. According to Tekeba et al. (2023), economic employment growth encourages nutrition, which is a relationship that improves the standard of living and combats poverty (Tekeba et al., 2023).

CONCLUSION

The findings of this study indicate that food insecurity is associated with higher stunting prevalence, while social food assistance and literacy play important roles in reducing stunting by improving nutrition awareness, health practices, and parenting knowledge. Unemployment does not directly influence stunting; however, economic growth plays a significant role in reducing stunting by improving household income and access to nutritious food and health services. Furthermore, social food assistance and literacy contribute positively to economic growth, which in turn strengthens efforts to reduce stunting. These results highlight the importance of integrated policies that combine social food assistance programs with nutrition and health education to effectively reduce stunting. In addition, government interventions should prioritize vulnerable households, particularly families with children and pregnant women, while expanding public education through digital platforms and community outreach. Strengthening the synergy between social assistance, education, and economic development is essential to accelerate stunting reduction in Indonesia.

Based on these findings, the government is recommended to integrate social food assistance programs with comprehensive nutrition and health education, particularly targeting vulnerable households such as families with young children and pregnant women. The use of digital platforms and community outreach programs should be expanded to improve public literacy more equitably. Furthermore, the synergy between social assistance policies, literacy improvement, and inclusive economic growth must be strengthened through cross-sectoral coordination among relevant ministries, local governments, and development partners in order to accelerate sustainable stunting reduction across Indonesia

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