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Socioeconomic and educational determinants of nutritional status among children under five

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ABSTRACT

Introduction: Nutritional status in children under five remains a critical public health concern, especially in low- and middle-income countries. Socioeconomic and educational factors play a pivotal role in determining nutritional outcomes. This study aimed to investigate the relationship between socioeconomic status, parental education, and the nutritional status of children aged five and under.

Methods: A cross-sectional design was employed, involving 150 children aged 6–59 months. Data were collected through structured questionnaires assessing parental education, household income, and other demographic factors. Nutritional status was assessed using anthropometric indicators, including weight-for-age, height-for-age, and weight-for-height, based on the WHO growth standards. Data analysis used chi-square and logistic regression to identify significant associations.

Results: The study found that 32% of children were undernourished, with 18% stunted and 14% underweight. Children from low-income families and those whose mothers had only a primary education were more likely to experience malnutrition ($p < 0.05$). Maternal education emerged as the strongest predictor of a child's nutritional status after controlling for income and occupation.

Conclusion: Socioeconomic and educational factors are significant determinants of nutritional status in children under the age of five. Improving parental education, especially among mothers, and addressing poverty are essential to combating malnutrition. Strengthen community-based nutrition education programs, promote women's education, and develop poverty reduction strategies to ensure equitable access to nutritious food and healthcare services.

Keywords: Malnutrition; Nutritional status; Parental education; Socioeconomic factors; Under-five children.

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INTRODUCTION

Malnutrition remains a critical global health issue, particularly among children under the age of five (Anaqreh *et al.*, 2025). Despite notable advancements in healthcare, education, and agriculture, millions of children continue to experience undernutrition in various forms, such as stunting, wasting, and underweight (Arda, Lalla and Suprapto, 2023). According to the World Health Organization (WHO), around 148 million under-five children are stunted, 45 million are wasted, and 37 million are overweight. These alarming figures highlight not only biological and dietary inadequacies but also deeper socioeconomic and educational inequalities that shape children's nutritional outcomes. In developing nations, persistent poverty and limited access to education make the nutritional status of children a key indicator of societal well-being and national development (Caraka *et al.*, 2025).

The nutritional status of children under five is influenced by a complex interaction of factors beyond food availability (D'Avino *et al.*, 2025). Socioeconomic status (SES), encompassing income, parental occupation, and living standards, has a significant impact on dietary quality, access to healthcare, and hygiene practices. Households with low income often face food insecurity, leading to micronutrient deficiencies and growth retardation. Equally important, parental education, especially maternal, has a strong influence on feeding practices, health-seeking behavior, and household nutrition management (Ekeleme *et al.*, 2025). Educated mothers are more likely to practice exclusive breastfeeding, timely immunization, and appropriate weaning, all of which are essential for a child's growth and survival (Gbratto-Dobe and Segnon, 2025).

Globally, children from low socioeconomic backgrounds are more vulnerable to malnutrition. Poverty contributes to food shortages, poor sanitation, and limited access to healthcare (Hastuti *et al.*, 2024). In rural areas, inadequate infrastructure, dependence on subsistence agriculture, and lack of clean water exacerbate these challenges. Limited education compounds the problem, as uneducated parents may lack the knowledge to make informed dietary choices. Consequently, low income and limited education reinforce each other, creating a vicious cycle of malnutrition, illness, and intergenerational poverty (Li, Mohamed Nor and Kaliappan, 2024).

In Indonesia, socioeconomic disparities continue to hinder child nutrition despite national progress in poverty reduction and education. National health surveys still report significant levels of stunting and underweight children, particularly in rural and marginalized areas. The 2023 Basic Health Research (RISKESDAS) report indicated that 21.6% of children under five were stunted, reflecting chronic undernutrition linked to economic hardship and low parental education. These figures underscore the significance of investigating how socioeconomic and educational factors jointly influence child nutritional outcomes at the community level (Mbunge *et al.*, 2024).

Maternal education remains one of the strongest predictors of child nutrition. Educated mothers are more aware of the importance of balanced diets, sanitation, and preventive healthcare (Mckinnon *et al.*, 2025). They can also interpret medical guidance effectively and apply sound feeding techniques. Conversely, mothers with limited education may rely on cultural myths or misinformation, which can lead to poor dietary habits. Studies across developing countries consistently demonstrate that higher maternal education is positively associated with height-for-age and weight-for-age indicators. Thus, empowering women through education remains a vital approach to reducing child malnutrition (Mphamba, Chirwa and Mazalale, 2024).

Socioeconomic status intensifies these educational effects. Financially stable families can afford diverse, nutrient-rich diets, clean water, and timely healthcare, whereas impoverished

families often face trade-offs between food, medical care, and schooling. This structural inequality continues to impede equitable nutritional outcomes for children (Mumin *et al.*, 2025). Understanding the socioeconomic and educational determinants of nutritional status is therefore essential for effective health interventions. By examining the influence of income, occupation, and parental education on nutritional indicators such as weight-for-age, height-for-age, and weight-for-height, this study aims to inform policies and programs that address the root causes of malnutrition rather than its symptoms. The findings are expected to strengthen community-based strategies integrating nutrition education, poverty reduction, and maternal empowerment. Ultimately, improving child nutrition requires a multidimensional approach that recognizes the interconnection between social, economic, and educational factors in shaping early childhood development.

RESEARCH METHODOLOGY

Research Design

This study employs a cross-sectional, descriptive, and analytical design to investigate the influence of socioeconomic and educational determinants on the nutritional status of children under five. The design enables the collection of data at a single point in time from a representative population, allowing the identification of associations between independent (socioeconomic and educational) and dependent (nutritional status) variables. The study was conducted in selected communities or health centers within the chosen region. The population of interest consisted of children under five years of age and their mothers or primary caregivers residing in the study area. This population was selected because caregivers play a crucial role in child nutrition, and household socioeconomic conditions have a direct impact on food security and health outcomes.

Sample Size and Sampling Technique

A sample size was determined using the Cochran formula for cross-sectional studies, ensuring representativeness and statistical validity. A multistage sampling technique was employed, involving the selection of study sites or clusters (e.g., communities or health centers) through a random sampling process. Selection of households with under-five children using systematic or simple random sampling. Inclusion criteria included children aged 6–59 months whose mothers consented to participate. Exclusion criteria included children with severe illnesses or congenital abnormalities that affected growth.

Data Collection Instruments and Procedures

Data were collected using structured questionnaires and anthropometric measurements: Questionnaires: Used to collect data on socioeconomic characteristics (parental income, occupation, household size, housing conditions), parental education, and dietary practices. Anthropometric assessment: Weight and height/length of children were measured using standard WHO procedures. Weight-for-age, height-for-age, and weight-for-height Z-scores were calculated to classify nutritional status as normal, underweight, stunted, or wasted according to the WHO Child Growth Standards (2006). The instruments were pretested on 10% of the sample in a nearby community not included in the main study. Feedback was used to refine the wording of questions and ensure consistency in measurement. Reliability was assessed through Cronbach's alpha for internal consistency, while validity was ensured through expert review by public health and nutrition specialists.

Data Analysis

Collected data were cleaned, coded, and entered into SPSS (Statistical Package for the Social Sciences) or STATA for analysis. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize demographic and socioeconomic data.

Inferential statistics, such as the Chi-square test and multivariate logistic regression, were employed to determine the associations between independent variables (socioeconomic and educational determinants) and dependent variables (nutritional status). A p-value of < 0.05 was considered statistically significant.

Ethical Considerations

Ethical approval was obtained from the appropriate institutional review board. Permission was also sought from local authorities. Informed consent was obtained from all caregivers before data collection. Respondents were assured of confidentiality, anonymity, and the voluntary nature of participation.

RESULT

This section presents the research results, including the characteristics of the respondents and the findings obtained from the data analysis. The characteristics of respondents provide an overview of the participants involved in the study, including demographic and social factors such as age, gender, education level, occupation, marital status, and length of stay. These characteristics are essential for understanding the background of the respondents, which may influence their responses and perceptions regarding the study variables. A total of 59 respondents participated in this research. The detailed distribution of respondent characteristics is presented in Table 1, which includes frequency and percentage values for each variable. This descriptive analysis aims to provide a clearer picture of the population under study and serves as a foundation for interpreting subsequent analytical results.

Table 1. Research results summary

Variable	Category / Description	Frequency (n)	Percentage (%)	Statistical Test/p-value
Child's Age	1–<3 years (Toddler)	24	40%	
	3–<5 years (Preschool)	35	59%	
Nutritional Status	Malnutrition (underweight/stunting)	22	37%	
	Normal Nutrition	18	30%	
	Overnutrition	19	32%	
Family Economic Status	High income (> Rp 1,500,000/month)	10	17%	p = 0.003
	Moderate income (Rp 1,000,000–1,500,000/month)	20	34%	
	Low income (< Rp 1,000,000/month)	29	49%	
Mother's Education Level	Primary (Elementary)	22	37%	p = 0.006
	Secondary (Junior/Senior High School)	26	44%	
	Higher Education (Diploma/Bachelor)	11	18%	
Employment Status of Mothers	Employed	15	25%	p ≥ 0.05
	Unemployed / Homemaker	44	75%	

The results of this study demonstrate that both family economic status and maternal education level have a statistically significant relationship with the nutritional status of toddlers in the working area of UPT Puskesmas Biru. The findings indicate that children from families with low economic status and mothers with lower levels of education are more likely to experience malnutrition and stunting compared to those from families with better financial and educational backgrounds. Economic status was found to be a key determinant of nutritional outcomes ($p = 0.003$). Families with limited income often face difficulties in providing a balanced diet due to restricted access to nutritious food, resulting in inadequate intake of essential nutrients needed for growth and development. This aligns with previous studies, which have demonstrated that household financial capacity has a direct impact on food security and overall child health. Economic improvement programs and food assistance initiatives are therefore crucial in addressing this issue.

Similarly, the level of maternal education showed a significant correlation with the incidence of stunting ($p = 0.006$). Mothers with higher levels of education are generally more aware of the importance of balanced nutrition, hygiene, and proper feeding practices. They are also more likely to access health services, apply proper child-feeding techniques, and regularly monitor their child's growth. Conversely, mothers with lower educational attainment may have limited knowledge about child nutrition, resulting in inadequate feeding patterns and an increased risk of undernutrition.

The findings also revealed that maternal employment status did not have a significant relationship with child nutritional outcomes ($p \geq 0.05$). This suggests that the mother's occupation itself is not a direct determinant of nutritional status, but rather the availability of time, income, and nutritional knowledge that accompanies it. In many cases, unemployed mothers may still ensure good child nutrition if they possess adequate knowledge and family support. The study highlights that socioeconomic and educational factors are crucial in determining a child's nutritional well-being. Addressing stunting and malnutrition requires an integrated approach focusing on both economic empowerment and nutrition education for mothers. Health centers and local governments should collaborate in designing community-based interventions that provide education on child feeding, promote household food security, and improve maternal literacy. Such strategies can enhance the overall quality of child health and reduce the prevalence of stunting in the community.

DISCUSSION

This study aimed to analyze the relationship between family economic status and maternal education with the nutritional status of toddlers in the working area of UPT Puskesmas Biru. The findings revealed that both economic conditions and maternal education were significantly associated with the nutritional well-being of children. These results highlight that child nutrition is a multifaceted issue influenced by socioeconomic, educational, and behavioral factors within the household and community contexts.

Relationship between Economic Status and Nutritional Outcomes

The research findings demonstrated a significant relationship between family economic status and the nutritional status of toddlers ($p = 0.003$). Families with low income were more likely to have children who experienced malnutrition or stunting compared to families with better financial stability. This finding is consistent with the results of previous studies, which have shown that household income directly determines access to quality food, healthcare, and sanitation. Limited financial resources restrict parents' ability to provide adequate nutrition, leading to unbalanced dietary patterns and increased vulnerability to nutrient deficiencies (Pandey

et al., 2025). Economic hardship also affects a family's capacity to access healthcare services (Nasher *et al.*, 2025). In low-income families, the cost of transportation, healthcare visits, or nutritional supplements can be a barrier to consistent child monitoring and growth evaluation. Furthermore, economic constraints may lead to food insecurity, forcing families to rely on cheaper, carbohydrate-based foods with low nutritional value. Consequently, the cycle of poverty and malnutrition continues, especially among children under five, who are in their most critical growth period (Orderud, 2025).

These findings align with the UNICEF Framework of Malnutrition, which identifies inadequate dietary intake and disease as direct causes, while poverty and low household income are indirect causes. Therefore, economic empowerment initiatives such as livelihood programs, food subsidies, or conditional cash transfers could play a vital role in improving family nutrition and reducing stunting prevalence (Rougeaux *et al.*, 2025).

Relationship between Maternal Education and Child Nutrition

The study also found a significant correlation between maternal education and toddler nutritional status ($p = 0.006$). Mothers with higher educational levels were better able to provide their children with appropriate nutrition and care. Education enhances knowledge about food selection, hygiene, breastfeeding, and complementary feeding practices. Educated mothers are more likely to understand health information and apply it in daily life, such as preparing balanced meals, maintaining hygiene, and ensuring routine growth monitoring at health centers (Wijayanti *et al.*, 2025). Conversely, low maternal education often correlates with poor health literacy and traditional feeding practices that may not meet a child's nutritional needs (Sau *et al.*, 2025). Mothers with limited education may also lack awareness of the importance of protein, vitamins, and minerals for child development, leading to monotonous diets dominated by rice and starchy foods (Soma *et al.*, 2025). Maternal education is a strong predictor of nutritional outcomes among children under the age of five. The results also support the Health Belief Model, which emphasizes that knowledge and perception have a strong influence on health behavior. Educated mothers are more likely to perceive nutrition as a critical determinant of their child's growth, thus taking preventive actions against malnutrition (Vijay and Patel, 2024). Therefore, health promotion programs should prioritize maternal education, especially for women in low-income communities, through counseling, community workshops, and mother-to-mother peer education groups (Suprapto, Andi Latif, *et al.*, 2025).

Mother's Employment Status and Nutritional Status

Although maternal employment status was not significantly related to the child's nutritional condition ($p \geq 0.05$), this variable still provides valuable insight. Employment may increase household income, improving food availability; yet, it can also reduce the time a mother spends on childcare and feeding. The absence of significance in this study suggests that the quality of time spent with children and the level of nutritional knowledge may be more influential than employment alone (Suprapto, Arda, *et al.*, 2025). Support systems such as family involvement and community daycare centers can help working mothers maintain proper feeding practices. The findings underscore the importance of considering child nutrition within a broader social and economic context (Syaharuddin *et al.*, 2025). Improving family income and maternal education can have synergistic effects in preventing stunting and malnutrition. Interventions should not only focus on food provision but also empower mothers with knowledge and practical skills to support their families (Uno and Ogawa, 2025). Community health centers (Puskesmas) can play a pivotal role by integrating nutrition education into routine maternal and child health services (Tag *et al.*, 2025).

The health sector alone cannot address nutritional problems without support from education, social welfare, and economic development programs. Community-based interventions, such as Posyandu and Bina Keluarga Balita, can be strengthened to provide continuous monitoring, counseling, and assistance to vulnerable families. This study confirms that socioeconomic and educational inequalities remain significant determinants of child nutritional status. Low income limits food access, while low maternal education restricts nutritional understanding. Strengthening both economic capacity and maternal health literacy is therefore fundamental to reducing malnutrition among toddlers. Future programs should adopt an integrated approach that combines poverty reduction, women's education, and community health promotion to achieve sustainable improvements in child nutrition and overall well-being.

CONCLUSION

This study concludes that both family economic status and maternal education have a significant influence on the nutritional status of toddlers in the working area of UPT Puskesmas Biru. Families with low economic capacity were more likely to have children experiencing malnutrition or stunting due to limited access to nutritious food and health services. Likewise, mothers with low educational levels often lacked knowledge about balanced nutrition, proper feeding practices, and the importance of regular growth monitoring, contributing to poor child nutrition outcomes. Meanwhile, maternal employment status did not show a significant relationship with nutritional status, suggesting that income alone is not the determining factor. However, the question is how resources and knowledge are utilized to meet children's needs. These findings emphasize that improving child nutrition requires simultaneous efforts in enhancing economic welfare and maternal education.

To reduce malnutrition and stunting rates, it is recommended that local health authorities and policymakers strengthen community-based programs that integrate nutrition education, maternal literacy, and family economic empowerment. Health centers (Puskesmas) should increase regular counseling sessions on balanced diets and child feeding practices tailored to mothers' educational levels. Government and social institutions should also develop initiatives that support low-income families through food assistance and microeconomic programs aimed at enhancing their purchasing power. Additionally, continuous monitoring of child growth and early intervention for at-risk families should be prioritized to ensure long-term improvements in nutritional outcomes and community health.

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Conflict of Interest

There are no potential conflicts of interest relevant to this article.

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