Research Article

Risk Factors for Stunting in Children Aged 24–59 Months in Jambi City, Indonesia, 2024

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Abstract

Objective: To analyze factors associated with stunting among children aged 24–59 months at the Tanjung Pinang Community Health Center, Jambi City, Indonesia, in 2024.

Methods: This quantitative cross-sectional study involved all stunted children registered at the Tanjung Pinang Community Health Center (n = 42). Total sampling was applied. The independent variables included child age, maternal age, maternal education, economic status, maternal knowledge, and maternal attitude. Data were collected using structured questionnaires with established validity and reliability. Statistical analysis was performed using the chi-square test, with a significance level set at $p < 0.05$.

Results: The analysis showed no significant associations between stunting and child age ($p = 0.509$), economic status ($p = 0.746$), maternal education ($p = 0.170$), maternal knowledge ($p = 0.355$), or maternal attitude ($p = 0.395$). However, maternal age was significantly associated with the incidence of stunting ($p = 0.024$), with a higher risk observed among mothers aged <20 years and >35 years.

Conclusion: Maternal age was the only factor significantly associated with stunting among children aged 24–59 months in this study. These findings highlight the importance of targeted interventions focusing on maternal age as part of stunting prevention strategies.

Keywords: attitude, economic status, knowledge, maternal age, maternal education, stunting.

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INTRODUCTION

Children who experience stunting a condition reflecting long-term nutritional inadequacy exhibit impaired physical growth and tend to have a height far below the standard for their age group. Stunting is recognized as a major public health concern because it increases the risk of illness and mortality and causes delays in motor and cognitive development. This condition results from prolonged growth faltering combined with insufficient catch-up growth, indicating a failure to achieve optimal growth potential.[1]

Stunting has a profound impact on a child's overall well-being. Its consequences include an increased risk of mortality and morbidity, as well as impairments in cognitive, motor, and language development. Stunted children often require greater healthcare utilization and may later experience obesity, reproductive health problems, reduced academic performance, and decreased physical productivity. Short stature among stunted children reflects chronic nutritional deprivation beginning early in life, even during the fetal period. Beyond physical growth impairment, stunting also contributes to broader developmental challenges.[2]

Multiple factors contribute to the occurrence of stunting, including parental knowledge, education, employment status, household

income, caregiving practices, dietary patterns, family size, infectious diseases, history of exclusive breastfeeding, low birth weight (LBW), and chronic health conditions. Increased attention to toddler nutrition is essential, as inadequate nutritional intake remains a major contributor to child mortality. Globally, stunting and malnutrition continue to pose serious public health problems. Stunting affects a substantial proportion of children worldwide, and in 2023 an estimated 148.1 million children under five years of age were classified as stunted. This condition has long-term consequences, including developmental delays, reduced cognitive capacity, increased susceptibility to disease, and decreased productivity throughout the life course.[3]

Strengthening health promotion related to *Keluarga Sadar Gizi* (KADARZI), or Nutrition-Aware Families, plays an important role in preventing stunting. KADARZI refers to households that consistently practice balanced nutrition, recognize and address nutritional problems among family members, provide exclusive breastfeeding during the first six months of life, routinely monitor child growth, consume diverse and nutritious foods, use iodized salt, provide appropriate nutritional supplements, and maintain a clean and healthy living environment. Collectively, these practices contribute to reducing the incidence of stunting.[4]

Indonesia continues to pursue several Sustainable Development Goals (SDGs), including reducing maternal and child mortality, improving nutritional status to address stunting, strengthening health systems, expanding access to reproductive health information and education, ensuring equitable healthcare services, supporting family planning programs, and improving sanitation. Reproductive health professionals play a vital role in reducing maternal and child mortality by providing quality antenatal and delivery services, offering reproductive health counseling, and supporting family planning initiatives. Increasing public awareness and education is essential to accelerate progress toward achieving these SDGs, ultimately reducing maternal and neonatal morbidity and mortality while improving the well-being of future generations.[5]

Stunting remains a serious public health issue in Indonesia. According to the 2018 Global Nutrition Report, Indonesia ranked 108th out of 132 countries in terms of stunting prevalence. The Ministry of Health's 2020 Performance Report *(Laporan Kinerja* [LKj]*)* set a target stunting prevalence of 24.1% (5,543,000 children) among children under five years of age. Data from the Community-Based Nutrition Recording and Reporting System *(ePPGBM SIGIZI),* covering 34 provinces and updated on January 20, 2021, showed that among 11,499,041 children assessed using height-for-age (H/A), 1,325,298 were below −2 standard deviations, indicating that 11.6% of Indonesian toddlers were classified as stunted.[6]

The Jambi Provincial Health Office's 2023 ePPGBM report indicated that Batang Hari Regency had the highest number of stunting cases in Jambi Province, followed by West Tanjung Jabung Regency (993 cases), East Tanjung Jabung Regency (742 cases), Sarolangun Regency (669 cases), Merangin Regency (605 cases), and Kerinci Regency (585 cases), while Sungai Penuh City reported the fewest cases, with only 26 cases recorded.[6]

In 2022, there were 342 reported cases of stunting across all community health centers in Jambi City, according to data from the Jambi City Health Office. The Tanjung Pinang Community Health Center recorded the highest number of cases (67 cases), followed by the Talang Banjar Community Health Center (46 cases), the Simpang Kawat Community Health Center (42 cases), the Kebon Handil Community Health Center (3` 5 cases), and the Talang Bakung Community Health Center, which reported only two cases.

Based on the 2022 report from the Jambi City Health Office, the prevalence of stunting in Jambi City was approximately 14%, indicating that despite ongoing nutrition interventions, the city has not yet achieved the reduction targets set by the provincial government. Notably, health service data revealed that within the working area of the Tanjung Pinang Community Health Center, 67 cases of stunting were reported in 2023, making this area a priority for further investigation. These findings motivated the present study entitled *"Factors Associated with Stunting Incidence at the Tanjung Pinang Community Health Center",* which aims to identify determinants of stunting at the community health center level.

Furthermore, routine monitoring data from the Tanjung Pinang Community Health Center in 2024 recorded 52 toddlers experiencing stunting. This finding indicates that stunting remains a significant public health concern in the health center's catchment area and highlights the need to identify factors associated with stunting at the community level.

METHODS

This study employed a quantitative cross-sectional design and was conducted at the Tanjung Pinang Community Health Center, Jambi City, in May 2024.

The study population consisted of 52 toddlers identified as stunted based on routine health center records. However, only 42 toddlers were included in the final analysis. Ten subjects were excluded due to incomplete data, relocation outside the study area during the data collection period, and the unavailability of caregivers for interviews despite repeated follow-up attempts.

The dependent variable was stunting status, classified as short and very short based on height-for-age Z-scores. The independent variables included child age, maternal age (<20 years or >35 years vs. 20–35 years), maternal education (low, middle, and high), economic status (low and high), maternal knowledge, and maternal attitude toward child nutrition.

Data were collected using structured questionnaires. Instrument validity was assessed using item–total correlation analysis, and reliability was evaluated using Cronbach's alpha coefficients, with values greater than 0.70 indicating acceptable reliability for all measurement scales.

Data analysis was performed using descriptive statistics and chi-square tests to examine associations between variables. Statistical significance was defined as $p < 0.05$.

ETHICAL APPROVAL

This study received ethical approval from the Health Research Ethics Committee of the Ministry of Health Polytechnic of Jambi City (Certificate No. LB.02.06/21145/2024)

RESULTS

Among the 52 stunted children, 15 (35.7%) were classified as very short and 27 (64.3%) as short. The chi-square analysis demonstrated no significant association between stunting and child age, economic status, maternal education, maternal knowledge, or maternal attitude ($p > 0.05$). In contrast, maternal age showed a significant association with stunting incidence ($p = 0.024$), with higher proportions of stunted children among mothers aged <20 years and >35 years.

Table 1. The Relationship between Knowledge Level and the Incidence of Stunting

Knowledge level	Stunting				Total		*P-value*
	Stunted		not Stunted				
	N	%	N	%	N	%	
Poor	0	0.0	3	7.1	3	7.1	
Good	10	23.8	14	33.3	24	57.1	0.355
Fair	5	11.9	10	23.8	15	35.7	
Total	15	35.7	27	64.3	42	100.0	

The findings presented in Table 1.1 indicate that among mothers with poor knowledge, there were no children classified as very short (0.0%) and 3 children (7.1%) classified as short. Among mothers with moderate knowledge, 10 children (23.8%) were very short and 14 children (33.3%) were short. In the group with good maternal knowledge, 5 children (11.9%) were classified as very short and 10 children (23.8%) as short. The chi-square test yielded a p-value of 0.355 ($p > 0.05$), indicating no statistically significant association between maternal knowledge level and the incidence of stunting.

Table 2. The Relationship between Maternal Attitudes and Stunting

Mother's attitude	Stunting				Total		*P-value*
	Stunted		not Stunted				
	N	%	N	%	N	%	
Negative	7	16.7	9	21.4	16	38.1	0.395
Positive	8	19.0	18	42.9	26	61.9	
Total	15	35.7	27	64.3	42	100.0	

Based on Table 2, among mothers with negative attitudes toward stunting, 7 children (16.7%) were classified as very short and 9 children (21.4%) as short. In contrast, among mothers with positive attitudes, 8 children (19.0%) were classified as very short and 18 children (42.9%) as short. The chi-square test yielded a p-value of 0.395 (p > 0.05), indicating no statistically significant association between maternal attitudes and stunting.

Tabel 3. The relationship between maternal age and the incidence of stunting

Maternal age	Stunting				Total		*P-value*
	Stunted		not Stunted				
	N	%	N	%	N	%	
<20 and >35	2	4.8	13	31.0	15	35.7	
20-35	13	31.0	14	33.3	27	64,3	
Total	15	35.7	27	64.3	42	100.0	0.024

Based on Table 1.3, among mothers aged <20 years and >35 years, 2 children (4.8%) were classified as very short and 13 children (31.0%) as short. In contrast, among mothers aged 20–35 years, 13 children (31.0%) were classified as very short and 14 children (33.3%) as short. The chi-square test yielded a p-value of 0.024 (p < 0.05), indicating a statistically significant association between maternal age and the incidence of stunting.

DISCUSSION

Overview of Stunting Incidence

The findings of this study showed that all respondents had children classified as stunted, with 35.7% categorized as severely stunted and 64.3% as moderately stunted. Stunting is defined as impaired linear growth, reflected by a height-for-age Z-score below −2 standard deviations, indicating chronic malnutrition. Unlike acute malnutrition, stunting develops gradually and reflects long-term nutritional deprivation, particularly during critical periods of growth.

Stunted children may present with body weight that appears proportional to their age; however, their linear growth remains significantly compromised. This condition reflects cumulative nutritional deficits and repeated exposure to adverse environmental and health factors. Therefore, stunting serves as a key indicator of chronic nutritional problems rather than short-term dietary insufficiency.[8]

Child's Age and Stunting

The chi-square analysis showed no significant association between child age and stunting prevalence (p = 0.509). This finding suggests that age alone does not influence the likelihood of stunting among children in this study population. This result is consistent with the understanding that stunting originates primarily from chronic nutritional inadequacy, particularly during the first 1,000 days of life, from conception until the age of two years.

Once stunting has occurred, deficits in linear growth tend to persist and do not substantially improve with increasing age. Therefore, preventive interventions should not be delayed until children reach a certain age but should begin early, including during pregnancy. These findings highlight that stunting prevention efforts should prioritize maternal nutrition, early infant feeding practices, infection prevention, sanitation, and caregiving environments rather than focusing solely on the child's chronological age.

Economic Status and Stunting

The analysis indicated no significant relationship between household economic status and stunting incidence (p = 0.746). This finding aligns with studies conducted in Tembalang District, Semarang City, which also reported no direct association between family income and stunting prevalence.

The absence of a significant association may be explained by household income allocation toward non-nutritional expenditures, limiting its direct impact on child dietary quality. Additionally, intermediary factors such as parenting practices, sanitation, and utilization of health services may mitigate or override the influence of economic conditions on child nutritional status. Nevertheless, this finding contrasts with other studies reporting a higher risk of stunting among children from low-income households due to limited access to nutritious

foods and healthcare services. This discrepancy suggests that the relationship between economic status and stunting is complex and context-dependent, influenced by mediating behavioral and environmental factors.

Maternal Education and Stunting

The chi-square test revealed no significant association between maternal education level and stunting incidence (p = 0.170). This finding suggests that formal education alone does not necessarily translate into optimal nutritional practices or appropriate caregiving behaviors at home.

This result is consistent with previous studies conducted in Madiun City and Bojonegoro, which also reported no significant association between maternal education and stunting. Mothers with different educational backgrounds may have similar access to health information, particularly through community health services and mass media. Therefore, maternal education should not be viewed as an isolated determinant of child growth. Factors such as food availability, sanitation, environmental hygiene, and household health practices may play a more decisive role in influencing linear growth outcomes.[9]

Maternal Knowledge and Stunting

The results indicated no statistically significant association between maternal knowledge level and stunting incidence (p = 0.355). Although higher maternal knowledge is often assumed to promote better feeding and caregiving practices, this study demonstrates that knowledge alone does not guarantee improved child nutritional outcomes.

This finding supports previous research showing that adequate knowledge does not always translate into appropriate behavior. Practical constraints such as limited access to nutritious foods, economic challenges, poor environmental sanitation, and cultural practices may hinder the application of nutritional knowledge. Furthermore, possessing information does not automatically result in behavioral change unless accompanied by enabling resources and supportive environments. Thus, stunting prevention strategies should integrate educational interventions with structural and environmental improvements.[10]

Maternal Attitudes and Stunting

The analysis showed no significant association between maternal attitudes and stunting incidence (p = 0.395). This finding indicates that positive maternal attitudes toward nutrition and child health do not necessarily lead to measurable improvements in child growth outcomes.[11]

This result is consistent with previous studies demonstrating that favorable attitudes are not always reflected in actual caregiving behaviors. According to health behavior theories, attitudes influence behavior indirectly and are often mediated by economic conditions, food availability, practical skills, and environmental support. These findings reinforce the notion that stunting prevention efforts should extend beyond cognitive and attitudinal components to address broader contextual factors, including household resources, sanitation, and access to health services.[12]

Maternal Age and Stunting

In contrast to the other variables examined, maternal age showed a statistically significant association with stunting incidence (p = 0.024). Children born to mothers aged below 20 years or above 35 years were more likely to experience stunting compared to those born to mothers aged 20–35 years.

This finding is consistent with previous studies indicating that maternal age is an important determinant of child growth. Very young mothers may lack physical maturity, psychological readiness, and caregiving experience, while older mothers may face increased health risks during pregnancy and reduced physical capacity.[13]

Biologically, pregnancies at extreme maternal ages are associated with a higher risk of complications that may adversely affect fetal growth and nutritional status. These findings underscore the importance of reproductive health interventions aimed at promoting optimal maternal age at pregnancy and improving nutritional support for women of childbearing age to reduce the risk of stunting.[14]

Study Limitations

This study had a relatively small sample size and was limited to a single health center, which may restrict the generalizability of the findings. Additionally, the cross-sectional design does not

allow for causal inference.

CONCLUSION

This study demonstrates that maternal age is a significant risk factor associated with stunting among children aged 24–59 months, whereas other examined factors showed no statistically significant association. This finding contributes to the existing evidence by emphasizing the critical role of maternal reproductive age in child growth outcomes, particularly in community-level settings.

From a public health perspective, these results highlight the need for targeted interventions focusing on women of high-risk reproductive ages (<20 years and >35 years). Strengthening reproductive health education, optimizing antenatal and postnatal care, and improving nutritional counseling for mothers in these age groups may help reduce the risk of stunting.

Policy efforts should prioritize the integration of maternal age–specific strategies into stunting prevention programs, including adolescent health initiatives and preconception care for older women. Such targeted approaches are essential to enhance the effectiveness of community-based stunting prevention and support long-term improvements in child health outcomes.

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