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Determinants of Adolescents Pregnancy and the Incidence of Stunting in Children 24-59 Months of Age

Didien Ika Setyarini, Reni Wahyu Triningsih, [CA]Hening Ryan Aryani, Dwi Estuning Rahayu
Poltekkes Kemenkes Malang, Indonesia
[CA]Corresponding Author hening.ryan@poltekkes-malang.ac.id

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Abstract

Adolescent pregnancy is a significant public health issue that can lead to various adverse outcomes, including stunting in children. This study aimed to investigate the determinants of adolescent pregnancy and their association with the incidence of stunting in children aged 24-59 months at Poncokusumo Health Center, Malang Regency. The study employed a cross-sectional design, collecting primary data through interviews and secondary data from the Poncokusumo Health Center. The study included 93 mothers of stunted toddlers with a history of adolescent pregnancy. The sampling technique used purposive sampling. The data were analyzed by chi-square. The analysis reveals significant relationships between educational level economic status, knowledge, the role of healthcare providers, and family support with the incidence of stunting, while employment status showed no significant correlation. The findings suggest that targeted interventions addressing these determinants could mitigate stunting rates among children born to adolescent mothers. Further research should explore the psychosocial impacts and long-term outcomes for these children, as well as the effectiveness of existing healthcare interventions.

Correspondence Address:
Poltekkes Kemenkes Malang – East Java, Indonesia
Email: direktorat@poltekkes-malang.ac.id
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INTRODUCTION

Stunting, a condition characterized by impaired growth and development in children due to chronic malnutrition, particularly during the first 1000 days of life, has been a significant public health concern in Indonesia. The impact of stunting extends beyond physical stature, affe cting cognitive development, susceptibility to diseases, and long-term health outcomes (Romadhona et al., 2023a). Factors contributing to stunting are multifaceted, involving maternal, environmental, and nutritional elements (Supariasa et al., 2023a). Maternal factors such as education, nutritional status, and age play crucial roles in determining the incidence of stunting in toddlers (Yulika et al., 2024a). Additionally, maternal behaviors during pregnancy, including anemia and inadequate weight gain, have been linked to an increased risk of stunting in children (Sulistyawati et al., 2024).

Teenage pregnancy has emerged as a notable factor associated with stunting in children, with adolescents facing challenges such as poor nutrition, limited education, and higher levels of poverty, all of which contribute to the prevalence of stunting (Simbolon et al., 2021) . Furthermore, the history of anemia during pregnancy has been identified as a significant predictor of stunting in toddlers, highlighting the importance of addressing maternal health conditions to prevent adverse outcomes in children (Rahayu, 2021). Maternal depression during pregnancy has also been suggested as a contributing factor to the occurrence of stunting in toddlers, emphasizing the need for comprehensive maternal mental health support (Apriliana et al., 2022a).

Global Nutrition Report 2018 reported that 22.2% of children under the age of five worldwide are stunted, with Africa having the highest prevalence at 58.7% (Rahmadiani et al., 2024). Nationally, Indonesia had a stunting prevalence of 24.4% in 2021 (Rochmawati et al., 2023). In East Java, based on data from the Indonesian Ministry of Health, there was a decrease in the prevalence of stunting from 27.7% in 2019 to 24.4% in 2021(Darojat et al., 2023). The prevalence of stunting in Indonesia remains a major concern, although it has decreased in the last five years (Pristya et al., 2021).

Adolescent pregnancy remains a pressing public health issue that contributes to a cycle of poor maternal and child health outcomes, including stunting. Early pregnancy often leads to inadequate maternal nutrition, limited access to healthcare, and insufficient knowledge about child care, which significantly increase the risk of chronic malnutrition in children (Nguyen et al., 2021). Moreover, socio-economic disparities and low educational attainment among adolescent mothers further exacerbate the prevalence of stunting, particularly in low- and middle-income countries such as Indonesia (Kinyoki et al., 2023). Addressing these multidimensional factors is essential to break the intergenerational cycle of malnutrition and improve child growth outcomes (Black et al., 2023)

The study conducted at Poncokusumo Health Center, Malang Regency in 2023 aims to address a critical gap in understanding the interplay between adolescent maternal age and its impact on child health outcomes, specifically stunting in toddlers aged 24-59 months. While existing literature has explored the association between maternal age and child health outcomes like infant mortality and stunting (Finlay et al., 2017), there is a need for more specific research focusing on the unique context of teenage pregnancy and its implications for stunting in toddlers.

Moreover, studies have investigated factors contributing to malnutrition and stunting in children under five in various regions (Fernandes et al., 2017)·(Tiwari et al., 2014). However, there is a gap in research specifically examining the relationship between teenage pregnancy and stunting incidence in the Indonesian context, particularly in regions like Malang. Understanding the specific determinants and pathways through which teenage pregnancy influences stunting in toddlers can provide targeted interventions to address this issue effectively.

This study aimed to investigate the relationship between teenage pregnancy and the occurrence of stunting in toddlers aged 24-59 months. While previous research has explored

factors associated with stunting and teenage pregnancy separately, this study seeks to examine how teenage pregnancy influences the prevalence of stunting in toddlers within a localized setting.

METHODS

This study was analytical research with a cross-sectional design. It uses primary data collected directly by the researchers through interviews, as well as secondary data from the Poncokusumo Health Center in Malang Regency to determine the prevalence of stunting in each village area. This study took place from September to December 2022. The target population in this study consisted of all mothers of stunted toddlers in the working area of the Poncokusumo Health Center, Malang Regency, while the accessible population included all selected mothers of stunted toddlers with a history of teenage pregnancy in the working area of the Poncokusumo Health Center, Malang Regency, totaling 114 individuals. The sample in this study included all mothers of stunted toddlers aged 24-59 months with a history of teenage pregnancy, recorded at local posyandus (integrated health posts), totaling 93 individuals. The data collection was conducted through interviews for primary data and by utilizing secondary data from the Poncokusumo Health Center regarding the prevalence of stunting in each village area. The data collection included information from mothers of toddlers who possess a maternal and child health book with a history of teenage pregnancy. The data on stunting were obtained by measuring body length using standard anthropometric procedures. Stunting was diagnosed by comparing the child's length-for-age (L/A) or height-for-age (H/A) with the growth reference charts provided in the Maternal and Child Health (MCH) Book (Buku KIA). Children whose L/A or H/A falls below –2 standard deviations (–2 SD) from the WHO growth standards were classified as stunted. Meanwhile, data on adolescent marriage and its influencing factors were collected using a structured questionnaire. The data analysis was performed using univariate analysis to determine the distribution and characteristics of the study, followed by Chi-Square analysis to identify the relationships between the variables under investigation. This research was conducted using ethics in the form of informed consent, anonymity, and confidentiality which were carried out carefully during the study. This study has received a ethical approval from the State Polytechnic of Health, Malang, Indonesia with the registered number 208/KEPK-POLKESMA/2021.

RESULTS

The characteristics of the respondents are shown in the table below.

Table 1. The characteristics of the respondents (n=93)

Characteristics	n	Percentage %
Mother's age at pregnancy		
< 20 years old	48	51.6
≥ 20 years old	45	48.4
Latest education		
Elementary school	7	7.5
Junior High School	42	45.2
Senior High School	38	40.8
College	6	6.5
Occupation		
Employed	19	20
Unemployed	74	80
Level of knowledge on reproductive health		
Good	8	8.6
Enough	27	29

Poor	58	62.4
Economical Status		
Upper class	4	4.3
Middle class	49	52.7
Lower class	40	43
The role of health workers		
Good	47	51
Not good enough	46	49
Family support		
Favorable	26	28
Unfavorable	67	72

Table 1 shows that most of the respondents (51.6%) were <20 years old at the time of pregnancy, almost half of the respondents (45.2%) had the last education of junior high school, almost all respondents (80%) were unemployed, most respondents (62.4%) had poor reproductive health knowledge, most respondents (52.7%) had middle class economic status, most respondents (51%) considered the role of health workers to be good, and most respondents (72%) felt unfavorable in their family support.

Table 2. The results of the chi-square test analysis of factors associated with the incidence of teenage pregnancy on the incidence of stunting in toddlers aged 24-59 months

Variable	p-value
Latest education	< 0.001
Occupation	0.067
Level of knowledge on reproductive health	<0.001
Economical Status	0.010
The role of health workers	0.043
Family support	<0.001

Table 2 shows that the factors associated with age at first marriage for women that spring stunted toddlers are education level, knowledge level, economic status, the role of health workers, and family support. The employment status factor was not associated with age at first marriage.

DISCUSSION

The present study confirms that adolescent pregnancy remains embedded within a complex network of socio-demographic, economic, informational, and healthcare-related vulnerabilities that may subsequently contribute to poor child growth outcomes. Recent international evidence emphasizes that adolescent mothers experience disproportionately higher reproductive risks, lower health literacy, and more limited utilization of maternal health services compared with adult mothers, all of which may intensify the risk of chronic undernutrition among their children (Derbisbek et al., 2026).

Education level is a significant factor that influences the occurrence of teenage pregnancy and its impact on stunting in toddlers aged 24-59 months. Previous studies have emphasized the importance of maternal education in determining child health outcomes, including stunting. Maternal education plays a crucial role in shaping parenting practices, nutritional knowledge, and healthcare utilization, all of which are essential in preventing stunting in children. Research has demonstrated that higher levels of maternal education are linked to improved child health outcomes, including a reduced risk of stunting. Maternal education

influences household decision-making, access to healthcare services, and adoption of healthy practices, all contributing to enhanced child nutrition and growth. Additionally, maternal education is associated with increased awareness of proper nutrition, hygiene practices, and healthcare-seeking behavior, all crucial in preventing stunting in toddlers (Handayani et al., 2017).

Another study focusing on factors related to stunting in toddlers with working mothers in Indonesia emphasized the critical role of strengthening the education sector and enhancing family resilience to reduce the prevalence of stunting (Laksono et al., 2022). This underscores the need for comprehensive interventions that consider educational empowerment and family support to combat stunting effectively. Moreover, research in Ethiopia highlighted that the education level of parents, including the husband/partner, significantly influenced the incidence of stunting in children under five (Tesfaw & Dessie, 2022). This suggests that parental education plays a vital role in shaping child health outcomes, including the risk of stunting.

In the context of Malang Regency, a study analyzing nutritional factors affecting toddler stunting identified mother's education level as one of the determinants of stunting, emphasizing the need to address educational disparities to improve child health outcomes (Supariasa et al., 2023a). This underscores the importance of considering maternal education as a key factor in addressing stunting in toddlers.

Maternal education is a crucial factor associated with the incidence of teenage pregnancy and stunting in toddlers. This finding is strongly supported by recent systematic evidence showing that maternal educational attainment remains one of the most consistent universal predictors of child stunting because education affects maternal decision-making autonomy, health-seeking behavior, and nutritional caregiving capacity. Mothers with limited schooling are more likely to have inadequate understanding of antenatal nutrition, infant feeding, and preventive healthcare utilization (Ayue et al., 2025). Enhancing educational opportunities for mothers, especially in regions like Malang, can potentially contribute to reducing the prevalence of teenage pregnancy and mitigating the risk of stunting in children, highlighting the significance of education as a determinant of child health outcomes. Moreover, studies have indicated an inverse relationship between maternal education and the incidence of teenage pregnancy. Higher levels of education empower women to make informed decisions about their reproductive health, leading to delayed childbearing and a reduced risk of teenage pregnancy. Adolescent mothers with lower levels of education may encounter challenges in providing adequate care and nutrition to their children, thereby increasing the likelihood of stunting (Handayani et al., 2017).

Therefore, the level of education emerges as a key determinant in the relationship between teenage pregnancy and stunting in toddlers. Enhancing educational opportunities for young women can positively impact reducing the incidence of teenage pregnancy and subsequently lowering the risk of stunting in children. By addressing educational disparities and promoting maternal education, interventions can be tailored to empower mothers with the knowledge and skills necessary to ensure optimal growth and development in their children, thereby mitigating the impact of teenage pregnancy on stunting incidence.

In the present study, maternal employment status was not significantly associated with the study outcome. This finding suggests that occupational status alone may not adequately reflect the complex vulnerability experienced by adolescent mothers in relation to child growth. In this population, employment does not necessarily indicate financial autonomy, access to household resources, or improved caregiving capacity, particularly because the majority of respondents were unemployed, resulting in relatively limited occupational variation. Previous evidence has similarly demonstrated that broader socio-demographic determinants such as maternal education, household economic stability, and access

to reproductive health services exert stronger influence on adolescent pregnancy consequences and child nutritional outcomes than employment status alone (Romadhona et al., 2023b; Supariasa et al., 2023b; Yulika et al., 2024b), (Apriliana et al., 2022b)). Recent international findings further confirm that maternal occupational label is often less predictive than underlying socio-economic deprivation, caregiving quality, and maternal health knowledge in explaining persistent stunting vulnerability among children in disadvantaged households (Nafisah & Christiana, 2025). Therefore, interventions should not narrowly focus on maternal employment generation, but should address the wider structural and informational disadvantages surrounding adolescent motherhood.

Reproductive health knowledge plays a crucial role in shaping behaviors and decisions related to sexual and reproductive health, including the incidence of teenage pregnancy and its impact on child health outcomes such as stunting in toddlers aged 24-59 months. Studies have highlighted the significance of adequate reproductive health knowledge in preventing early pregnancies and promoting optimal child health. Research has shown that adolescents with higher levels of reproductive health knowledge are more likely to make informed decisions regarding sexual activity, contraception, and pregnancy prevention, reducing the risk of teenage pregnancies (Nasution & Manik, 2020)·(Wani Damanik et al., 2023). Adequate knowledge about reproductive health empowers adolescents to understand the consequences of early pregnancies and take proactive measures to prevent them. Moreover, reproductive health knowledge is essential in promoting safe sexual practices, understanding menstrual hygiene, and recognizing the risks associated with early pregnancies, which can contribute to reducing the incidence of stunting in toddlers (Pertiwi, 2018)·(Naufi et al., 2021). Recent intervention studies among adolescent mothers further demonstrate that insufficient reproductive and nutritional knowledge is one of the earliest modifiable pathways leading to poor pregnancy preparation, inadequate maternal diet, and suboptimal infant feeding practices. Educational reinforcement specifically tailored for adolescents has been shown to significantly improve stunting prevention awareness and maternal nutritional behavior (Erfina et al., 2025). Educating adolescents about reproductive health not only empowers them to make informed choices but also equips them with the necessary information to protect their own health and well-being.

Studies have also indicated that reproductive health knowledge is positively associated with positive attitudes and behaviors towards sexual and reproductive health, leading to improved health outcomes and reduced risks of adverse events such as early pregnancies and stunting in children (Ramadani et al., 2015)·(Fallo et al., 2023). Comprehensive reproductive health education programs that focus on increasing knowledge, changing attitudes, and promoting healthy behaviors have the potential to positively impact adolescent health outcomes. Furthermore, interventions that enhance reproductive health knowledge among adolescents, such as peer education, school-based programs, and community outreach initiatives, have been effective in improving awareness and promoting responsible sexual behaviors, ultimately contributing to the prevention of teenage pregnancies and reducing the incidence of stunting in toddlers (Sukmaningsih et al., 2018). Reproductive health knowledge plays a critical role in shaping behaviors and decisions related to sexual and reproductive health among adolescents. By enhancing reproductive health knowledge through targeted educational interventions, adolescents can make informed choices, reduce the risk of early pregnancies, and contribute to better health outcomes for themselves and their children.

Economic status significantly influences the incidence of teenage pregnancy and the occurrence of stunting in toddlers aged 24-59 months. Research consistently demonstrates that socio-economic factors play a crucial role in shaping health outcomes for both adolescents and young children. Studies have consistently shown a correlation between economic status and teenage pregnancy,

with lower socio-economic backgrounds often associated with higher rates of adolescent pregnancies (Ariati, 2019)·(Suwoyo et al., 2021). Economic constraints can restrict access to education, healthcare, and family planning services, contributing to an increased risk of early pregnancies among economically disadvantaged populations. Moreover, economic status has been linked to the prevalence of stunting in toddlers, with research indicating that poverty and food insecurity are significant risk factors for malnutrition and stunting (Setyarini et al., 2022)·(Zulu et al., 2023). Limited financial resources can hinder access to nutritious foods, healthcare services, and proper sanitation, all essential for healthy growth and development in children. Additionally, research has highlighted that economic disparities can exacerbate the risk of stunting in children, particularly in regions with high poverty rates and limited access to social services (Bloem et al., 2013)·(E. D. Lestari et al., 2018). The lack of financial resources can impede families from providing adequate nutrition and healthcare for their children, increasing the likelihood of stunting. Furthermore, economic status impacts the overall well-being of families, influencing their ability to afford essential healthcare services, nutritious foods, and a conducive living environment for child development (Tiwari et al., 2014)·(Woldesenbet et al., 2023). Children from economically disadvantaged backgrounds are more susceptible to stunting due to the lack of resources necessary for optimal growth and health.

Economic status plays a critical role in shaping the incidence of teenage pregnancy and stunting in toddlers. Updated maternal-child health evidence in 2025 also confirms that family economic deprivation consistently limits food diversity, access to antenatal supplementation, and continuity of child healthcare monitoring, thereby creating persistent biological and environmental exposure to growth faltering (Putri et al., 2025). Addressing socio-economic disparities through targeted interventions, such as poverty alleviation programs, access to quality healthcare, and nutritional support, is crucial for reducing the prevalence of teenage pregnancies and mitigating the risk of stunting in young children. The involvement of healthcare providers in addressing the incidence of teenage pregnancy and its impact on stunting in toddlers aged 24-59 months is crucial in promoting maternal and child health outcomes. Healthcare providers, including doctors, nurses, and midwives, play a significant role in providing essential reproductive health services, education, and support to adolescents and young mothers.

Research has shown that the involvement of healthcare providers in adolescent reproductive health education and counseling can positively influence adolescents' knowledge, attitudes, and behaviors related to sexual and reproductive health, ultimately reducing the risk of teenage pregnancies (Ramadani et al., 2015)·(Ida Hannum et al., 2023). By providing accurate information, guidance, and support, healthcare providers can empower adolescents to make informed decisions about their reproductive health and prevent early pregnancies. Furthermore, healthcare providers play a vital role in providing prenatal care and support to pregnant adolescents, ensuring safe pregnancies and healthy outcomes for both the mother and the child (Mariyami & Sanjaya, 2022)·(E. Lestari et al., 2024). Adequate prenatal care, including regular check-ups, nutritional guidance, and monitoring of maternal and fetal health, can help reduce the risk of complications during pregnancy and childbirth, ultimately contributing to better child health outcomes.

In the context of stunting in toddlers, healthcare providers play a critical role in promoting maternal and child nutrition, growth monitoring, and early intervention for stunted children (Harahap et al., 2023)·(Mahfujiah et al., 2022). By providing guidance on proper infant feeding practices, nutritional supplementation, and growth monitoring, healthcare providers can help prevent and manage stunting in toddlers, ensuring optimal growth and development. Moreover, healthcare providers can support families in accessing essential healthcare services, including immunizations, growth monitoring, and treatment for childhood illnesses, which are crucial in

preventing stunting and promoting overall child health (Azis et al., 2021)·(Ishomuddin et al., 2024). More recent evidence indicates that adolescent-friendly maternal services and continuous provider-assisted counseling significantly improve maternal readiness, nutritional compliance, and early recognition of child growth problems. Strengthening healthcare contact has therefore been identified as one of the most actionable institutional strategies to reduce stunting among children born to vulnerable mothers (Erfina et al., 2025) . By working closely with families and communities, healthcare providers can address the underlying factors contributing to stunting and implement targeted interventions to improve child nutrition and health. The role of healthcare providers in addressing the incidence of teenage pregnancy and stunting in toddlers is essential in promoting maternal and child health. By providing comprehensive reproductive health services, prenatal care, and nutritional support, healthcare providers can contribute to reducing the incidence of teenage pregnancies and stunting, ultimately improving health outcomes for adolescents and young children.

Family support is crucial in influencing the incidence of teenage pregnancy and its impact on stunting in toddlers aged 24-59 months. The involvement of family members, especially parents, significantly affects the health and well-being of adolescents and young children. Family support can offer adolescents guidance, open communication, and a safe space to discuss reproductive health issues. Open conversations between parents and children about sexual health, contraception, and pregnancy prevention can help adolescents make informed decisions and reduce the risk of early pregnancies (Vir, 2016). Family support during pregnancy and early motherhood is crucial for pregnant adolescents. Emotional support, practical assistance, and encouragement from family members can help pregnant adolescents navigate the challenges of pregnancy, access prenatal care, and make healthy lifestyle choices that benefit both the mother and the child(Nguyen et al., 2019). Family support plays a role in providing nutritional support to pregnant adolescents and young children, which can impact their health outcomes (Nguyen et al., 2019). Family support is a key factor in addressing the incidence of teenage pregnancy and stunting in toddlers. By fostering supportive family environments, promoting open communication, and providing practical assistance, families can contribute to the well-being of adolescents and young children, ultimately reducing the risk of early pregnancies and promoting healthy growth and development. In addition, contemporary studies emphasize that family support functions not only as emotional assistance but also as a determinant of maternal confidence, adherence to antenatal recommendations, infant feeding consistency, and healthcare attendance. Adolescent mothers living in unsupportive households are more likely to experience caregiving stress and reduced child nutrition monitoring (Juniarti et al., 2025).

Overall, the present findings reinforce the growing international consensus that stunting among children born to adolescent mothers is not caused by a single biological factor, but by an interaction between maternal immaturity, limited education, poor reproductive health knowledge, economic hardship, inadequate institutional support, and weak family caregiving environments. Therefore, interventions should move beyond nutrition-specific programs alone and incorporate adolescent-centered reproductive education, family empowerment, and strengthened maternal-child health systems (Ayue et al., 2025).

CONCLUSION

The study has successfully achieved its objectives by identifying key determinants of adolescent pregnancy and their correlation with the incidence of stunting in children aged 24-59 months. The findings highlight that factor such as education level, economic status, knowledge level, the role of healthcare providers, and family support play significant roles in influencing stunting among children of adolescent mothers. However, employment status did not show a significant correlation with stunting.

SUGGESTION

These results suggest that targeted interventions addressing these determinants could potentially reduce the incidence of stunting in this vulnerable population. Future research should explore the psychosocial impacts of adolescent pregnancy on mothers and children, the long-term outcomes for children, and the effectiveness of current healthcare interventions. Additionally, studies investigating the interaction between genetic and nutritional factors could provide a more comprehensive understanding of stunting. Ongoing research in these areas is essential to develop more effective strategies for prevention and intervention, ultimately contributing to better health outcomes for children born to adolescent mothers.

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CONFLICTS OF INTEREST

The authors confirm that there are no conflicts of interest related to this study.

AUTHOR CONTRIBUTIONS

Didien Ika Setyarini played a key role in the conceptualization of the study, data management, formal analysis, methodology development, and validation of the research findings. Reni Wahyu Triningsih contributed significantly to the investigation process, data collection, methodological support, and provision of resources for the study. Hening Ryan Aryani served as the corresponding author and was primarily responsible for drafting the original manuscript, reviewing and editing the article, organizing the scientific discussion, and coordinating the manuscript submission process. Dwi Estuning Rahayu contributed to the literature review, critical revision of the manuscript, language editing, and final approval of the version to be published. All authors have read and approved the final manuscript.

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