

Teenage Pregnancy Age and Stunting Incidence Among Children Aged 12-24 Months: A Case-Control in Jember, Indonesian

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Abstract

Background: Stunting is a global health issue, including in Indonesia. One of the main risk factors for stunting is teenage pregnancy resulting from early marriage, which is still common in Jember. Pregnancy during adolescence poses a risk of fetal growth disorders due to physical and psychological unpreparedness for pregnancy and childbirth. This study aims to analyze the relationship between teenage pregnancy and the incidence of stunting in children aged 12-24 months within families in Jember Regency.

Materials and Methods: This study used a retrospective design with a case-control approach. The study population consisted of toddlers aged 12-24 months. A sample of 201 participants was recruited, with 69 toddlers in the case group (stunted) and 69 in the control group (not stunted). Data were collected using a questionnaire to determine the mother's age at pregnancy and by measuring the toddlers' height and weight using a length board. Data were analyzed using the Chi-square test.

Results: The incidence of stunting was higher among mothers who were ≤ 18 years old during pregnancy (56.52%) compared to those who were >18 years old (43.48%). The analysis showed a significant relationship between adolescent gestational age and the incidence of stunting ($\chi^2 = 11.795$, $p\text{-value} = 0.001$). The Odds Ratio (OR) was 3.379, indicating that teenage pregnancy carries a 3.4 times higher risk for stunting compared to adult pregnancy.

Conclusion: Adolescent pregnancy is a significant risk factor for stunting that requires intervention at the family level. Interventions should include reproductive health education, prevention of early marriage, and ensuring adequate nutrition for pregnant women.

Key Words: Early Marriage, Family, Stunting, Teenage Pregnancy.

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1- INTRODUCTION

Stunting is a condition of chronic malnutrition in toddlers, characterized by a height that does not correspond to their age. In Jember, the incidence of stunting reaches 29.7%, with the highest rates in Rambipuji District (13.80%), Sumberjambe (13.16%), and Ledokombo (9.53%) (1,2). Stunting is caused by various factors, including improper breastfeeding (3,4), poor nutrition in mothers and toddlers (5), and teenage pregnancy, which is often triggered by early marriage (6,7).

Early marriage is a significant problem in Jember, with 1,295 cases recorded and the highest percentages in Sumberjambe (15%), Ledokombo (4%), and Rambipuji (2%) (8). This phenomenon is supported by data from the East Java Province Communication and Informatics Office, which recorded 15,212 applications for marriage dispensation in 2022 (9,10). Jember was one of the largest contributors with 1,388 cases (11). Approximately 80% of these cases were caused by unwanted pregnancies, while 20% were due to arranged marriages (11,12). Local culture and family roles often serve as key drivers of early marriage (13,14).

Teenage pregnancy carries a high risk of leading to stunting in infants due to the immaturity of the reproductive system, as well as physical and mental unpreparedness (15). This can interfere with fetal growth and development (16), increasing the risk of stunting compared to pregnancies in women aged 20 and over (17,18). Additionally, a family's low economic status is a risk factor because the nutritional needs of pregnant mothers and their fetuses are not met (14,15). Based on this description, teenage pregnancies have a relatively high risk of stunting. Therefore, this study aims to further analyze whether there is a relationship between teenage pregnancy age and the incidence of stunting.

2- MATERIALS AND METHODS

2-1. Study Design

This study utilized a retrospective case-control quantitative design to investigate the correlation between teenage pregnancy and stunting.

2-2. Samples and Location

The study population consist of 201 families with toddlers aged 12-24 months in the working areas of the Rambipuji, Sumberjambe, and Ledokombo Health Centers in Jember Regency. The case group comprised 69 families with stunted toddlers, while the control group included 69 families with non-stunted toddlers. A stratified random sampling technique with a probability sampling approach was used to select participants from each group.

2-3. Data Collection

Data were collected from April to May 2025 in collaboration with the Rambipuji, Sumberjambe, and Ledokombo Health Centers. The study received institutional review board approval from the Jember City Health Office (number 000.9.2/3202/35.09.311/2025). Data were collected door-to-door, with the assistance of local posyandu cadres.

The data collection instruments included a questionnaire to gather sociodemographic information and a digital body length board (Onemed Digital Baby Scale Model: OD231B) to measure the height and weight of toddlers aged 12-24 months. The collected toddler data were then entered into the WHO Anthro application to assess growth based on WHO guidelines. The results were classified according to the standards of the Ministry of Health of the Republic of Indonesia.

2-4. Study Instruments

The study instrument was a questionnaire designed to collect information on maternal characteristics

(age, education, ethnicity, history of marriage age, and history of gestational age) and toddler characteristics (age, gender, height, weight, and body mass index).

For toddlers aged 12–24 months, weight and length were measured using a digital baby scale (Onemed Digital Baby Scale Model: OD231B). The data obtained were then entered into the WHO Anthro application, a software tool that supports the implementation of child growth standards based on WHO guidelines. Researchers used height-for-age indicators, and the results were classified according to the standards of the Ministry of Health of the Republic of Indonesia.

2-5. Data Analysis

All data were entered into SPSS software, version 25, for statistical analysis. The Chi-square statistical test was used to determine the relationship

between the independent and dependent variables. A significance value of $p < 0.05$ was considered statistically significant.

3- RESULTS

Table 1 indicates that the median age of mothers in the case group was 19 years, which was lower than the control group's median age of 25 years. The median age at marriage was also lower in the case group at 18 years compared to the control group at 22 years. In the case group, the majority of mothers had completed junior high school (71.02%), while in the control group, the majority had completed senior high school (66.67%). The majority of respondents in the case group were of Madurese ethnicity (68.1%), whereas the control group had a more balanced distribution between Javanese (50.7%) and Madurese (49.3%) ethnicities.

Table-1. Distribution of Demographic Respondents Characteristics in Jember Regency, April-May (n=138).

Family and Toddler Characteristics	Case (f=69)		Control (f=69)	
	Mean (SD)	Md (P ₂₅ -P ₇₅)	Mean (SD)	Md (P ₂₅ -P ₇₅)
Mother's age (years)	18 (0,77)	19 (18-19)	25 (2,29)	25 (20-29)
Married age (years)	17 (0,63)	18 (17-18)	21 (1,32)	22 (20-24)
Children's age (months)	18 (3,51)	18 (16-21)	15 (2,24)	16 (15-17)
	f (%)		f (%)	
Tribe				
Javanese	22 (31,9)		35 (50,7)	
Madurese	47 (68,1)		34 (49,3)	
Educational attainment				
Primary school	7 (10,14)		2 (2,9)	
Junior high school	49 (71,02)		21 (30,4)	
Senior high school	13 (18,84)		46 (66,7)	
Gender of toddler				
Male	43 (62,32)		30 (43,5)	
Female	26 (37,68)		39 (56,5)	
Category of toddler (H/A)				
Very short	18 (26,1)		9 (13)	
Short	31 (44,9)		20 (29)	
Normal	20 (29)		40 (58)	

Notes: Md : Median, P₂₅-P₇₅ : Percentiles 25-75, f(%) : Number of participants (Percentage). Source: Primary Data (April-May 2025).

3-1. Age of Pregnant Mother

The Kolmogorov-Smirnov test results have a p value <0.05 (p-value = 0.001) at gestational age ≤ 18 years, which indicates that there is a significant difference. This indicates that adolescent gestational age is more at risk of giving birth to toddlers with stunting incidence compared to adult gestational age. The median value at ≤ 18 years of gestational age is around 18 years of age and the median value at >18 years of age is around 24 years of age. The age of pregnant women ≤ 18 years is more at risk of giving birth to toddlers with stunting incidence as much as 35.51% compared to the age of pregnant women >18 years as much as 21.01%. Whereas in toddlers who are not stunted, the age of pregnant women >18 years is more at 28.99% compared to the age of pregnant women ≤ 18 years as much as 14.49%. Pregnant women aged 16 years are at risk of giving birth to stunted toddlers compared to pregnant women

aged 31-33 years who tend to give birth to toddlers who are not stunted. In the group of toddlers who were not stunted, most of them came from a gestational age of >18 years (28.99%) and for toddlers with stunting more came from a gestational age of ≤ 18 years (35.51%).

3-2. Incidence of Stunting in Toddlers

Table 2 shows that stunted toddlers in the case group had a mean height of 74 cm, shorter than the control group's mean height of 79 cm. The case group also had a lower median weight of 8.2 kg (classified as underweight) compared to the control group's median of 9.7 kg (classified as normal). The Mann-Whitney test results showed a significant difference in height-for-age, weight-for-age, and weight-for-height between the two groups, with a p-value of 0.001 ($p < 0.05$). However, no significant difference was found in body mass index for age (p-value = 0.150; $p > 0.05$).

Table-2. Distribution of Nutritional Status of Childrens Aged 12-24 Months in Jember Regency, April-May 2025 (n=138).

	Case			Control			P-value ^b
Measurement Result	Md(P ₂₅ -P ₇₅)	Z	P-value ^a	Md(P ₂₅ -P ₇₅)	Z	P-value ^a	
Height (cm)	74 (73-77)	0.105	0.055	79 (77-80)	0.100	0.082	0.001
Body weight (kg)	8.2 (7.8-9)	0.120	0.015	9.7 (9.08-10)	0.101	0.076	0.001
Nutritional status							
Height-for-Age (H/A)	-2.53 (-3.04- -2.23)	0.174	0.001	-0,01 (-0.36-0.47)	0.079	0.200	0.001
Weight-for-Age (W/A)	-1.84 (-2.56- -1.46)	0.103	0.069	-0.47 (-0.72- -0.1)	0.092	0.200	0.001
Weight-for-Height (W/H)	-1.42 (-1.86- -0.67)	0.100	0.084	-0.53 (-0.92-0.01)	0.080	0.200	0.002
BMI-for-Age (BMI/A)	-1.31 (-1.76- -0.39)	0.093	0.200	-0.68 (-1.2- -0.15)	0.086	0.200	0.150

Notes: Md: Median, P₂₅-P₇₅: Percentiles 25-75, Z: Calculated value of Kolmogorof Smirnov Test, P-value: significant Kolmogorof Smirnov Test, P-value^b: significant Mann-Whitney.

3-3. Relationship between Adolescent Pregnancy Age and Stunting Incidence

Table 3 reveals that the Chi-square statistical test yielded a value of $\chi^2 = 11.795$ and a p-value of 0.001 ($p < 0.05$). The Chi-square test demonstrated a

significant association between teenage pregnancy age and the incidence of stunting in children aged 12–24 months ($\chi^2 = 11.795$, p -value = 0.001). Gestational

age of ≤ 18 years was found to be 3.4 times more likely to result in a stunted child compared to a gestational age of > 18 years (OR = 3.379; 95% CI = 1.67–6.85).

Table-3. The Relationship between Adolescent Pregnancy Age and Stunting Incidence in Jember Regency, April-May 2025 (n=138).

Gestational Age (years)	Child Stunting Status				χ^2	P-value	OR	95% CI
	Stunting		Not Stunting					
	f	%	f	%				
≤18	49	35.51	20	14.49	11.975	0.001	3.379	1.67-6.85
>18	29	21.01	40	28.99				

Notes: f : number of participants, %: percentage, χ^2 : chi-square value; **p-value:** significant chi-square; **f(%):** number of participants (percentage); **OR** : Odds Ratio; **95% CI** : 95 Confidence Interval.

4- DISCUSSION

This study found a significant relationship between teenage pregnancy and the incidence of stunting in toddlers aged 12–24 months, a finding confirmed by a Chi-square test (p -value = 0.001). These results indicate that teenage pregnancy increases the risk of stunting. This increased risk is largely due to the physical and psychological immaturity of teenage mothers, whose bodies are often still developing and therefore not fully prepared for the demands of pregnancy and childbirth (7,9). The increased risk is largely due to the physical and psychological immaturity of adolescent mothers, whose bodies are often still developing and thus not fully prepared for the demands of pregnancy and childbirth (11). This immaturity can lead to suboptimal nutrient transfer from mother to fetus, hindering fetal growth and increasing the likelihood of stunting.

The issue is compounded by deep-rooted cultural practices, particularly the prevalence of early marriage. Our findings highlight a significant difference in the median marriage age between the case group 18 years and the control group 22 years (18). This disparity points to the influence of local cultures, especially within the predominantly Madurese

community in our study's case group. Cultural beliefs can profoundly impact personal decisions, including those surrounding marriage (7). This demonstrates that stunting is not merely a nutritional problem but a complex issue intertwined with social and cultural norms.

Addressing stunting effectively requires a multi-faceted approach that goes beyond just medical and nutritional interventions. Families play a crucial role in prevention. This includes encouraging their children to abide by the legal marriage age of 19 years, as stipulated by Law Number 16 of 2019 (19). Additionally, providing adolescents with comprehensive reproductive health education is vital (20). This education should cover the importance of delaying marriage, the physical and emotional changes during adolescence (21,22), and the risks associated with early pregnancy. Moreover, families must be empowered to plan their children's marriages and the birth of their first child, ensuring that mothers are at least 20 years old, which is the ideal age for a first pregnancy (21,23).

Ultimately, the fight against stunting must also address the socioeconomic factors that contribute to it. Families must be supported in fulfilling the nutritional needs of both pregnant women and toddlers. This

study's findings underscore the urgent need for comprehensive interventions that tackle the social and cultural drivers of early marriage and teenage pregnancy.

4-1. Limitation

The main limitation of this study is its narrow focus on maternal age at marriage and pregnancy. This single-factor approach prevents a comprehensive analysis of other significant variables that contribute to stunting, such as family income, parenting patterns, and other environmental factors. Future research should include these variables to provide a more holistic and accurate understanding of stunting incidence.

5- CONCLUSION

There is a significant association between teenage pregnancy and stunting in toddlers aged 12–24 months. Our findings indicate that mothers aged ≤ 18 years are 3.4 times more likely to have a stunted child compared to mothers aged >18 years (OR = 3.379, $p < 0.05$). This study underscores the crucial role of nurses in preventing teenage pregnancies and their consequences.

Nurses should act as health educators by providing reproductive health information, counselors by helping adolescents manage peer pressure and emotional issues, and advocates by facilitating access to youth-friendly health services. Additionally, they should serve as caregivers, offering medical and psychological support to pregnant teenagers to mitigate the risks associated with adolescent pregnancy and childbirth.

6-ETHICAL CONSIDERATIONS

This study has been approved by the Ethics Committee of the Faculty of Nursing at Jember University, Indonesia (Number: 125/UN25.1.14/KEPK/2025). Respondents received informed consent and an explanation about the study's objectives and procedures before

answering the questionnaire. They were also allowed to ask for clearer explanations for any doubts they have to ensure informed consent. Participants were volunteers and had the right to withdraw from the study.

7- CONFLICT OF INTEREST

The author declared no conflict of interest.

8- ACKNOWLEDGMENTS

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