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The impact of maternal factors on stunting in Serdang Village, South Bangka Regency

Ade DEVRIANY, Zenderi WARDANI, Emmy KARDINASARI

Department of Nutrition, Health Polytechnic of the Ministry of Health Pangkalpinang, Pangkalpinang City, Indonesia.

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ABSTRACT

Background: Several villages and sub-districts in Bangka Belitung still have stunting prevalence rates above 20%, particularly Serdang Village, a stunting locus in South Bangka Regency, since 2022 with a prevalence of 10%. Various risk factors for stunting in Indonesia can originate from maternal, child, or environmental factors. Early marriage, resulting in teenage pregnancy, is one of the risk factors causing stunting in children. This research examines the relationship between early marriage and the proportion of stunting in Serdang Village, South Bangka Regency.

Methods: This study was observational, with the quantitative research using a cross-sectional design conducted from August to November 2023. The sample size in this study was 84 mothers with children aged 0-59 months recorded in February 2023 in Serdang Village, South Bangka Regency. The statistical method used by the researchers to determine the relationship between two influencing variables is the Chi-square test.

Results: Reveal no significant relationships between maternal and child factors and stunting incidence. Among mothers who married early, 64.3% of their children were stunted compared to 35.7% for those who did not, with a chi-square p-value of 0.694 and an OR of 0.7. For employment status, stunting affected 3.6% of children with working mothers and 96.4% with non-working mothers, yielding a p-value of 1.000 and an OR of 0.7. Regarding education, 42.9% of children of elementary-educated mothers experienced stunting, compared to 3.6% for those with higher-educated mothers (p=0.541). Mothers who did not receive complete antenatal care had a 57.1% stunting rate in their children compared to 52.9% in those who did, with a p-value of 0.396 and an OR of 1.7. Exclusive breastfeeding and gender were also non-significant, with p-values of 0.758 and 0.396, respectively.

Conclusion: The practice of early marriage in Serdang Village does not significantly affect the incidence of stunting.

KEYWORDS

Child Growth, Chronic Malnutrition, Maternal and Child Health, Family Planning, Physical Development, Social Vulnerability.

INTRODUCTION

Stunting in toddlers is a chronic nutritional problem, particularly during the first 1000 days of life, caused by multiple factors such as socio-economic conditions, maternal nutrition during pregnancy, infant illnesses, and inadequate nutritional intake in infants. According to data collected by the World Health Organization (WHO), Indonesia ranks third in the Southeast Asian Region with a stunting prevalence of 36.4%[1]. The 2021 Indonesian Nutritional Status Survey (SSGI) indicated that 24.4% of toddlers in Indonesia were classified as stunted, a decrease from 27.67% in 2019. The Bangka Belitung Province has a relatively low stunting rate among children aged 0-59 months, at 4.6%[2]. However, several villages and sub-districts in Bangka Belitung still have prevalence rates above 20%. Specifically, since 2022, Serdang Village has been a stunting locus in the South Bangka Regency with a prevalence of 10%[3].

Various risk factors for stunting in Indonesia can originate from maternal, child, and environmental factors. Early marriage, which leads to teenage pregnancies, is suspected to be one of the risk factors for stunting in children. Stunting results

Correspondencia:
Ade Devriany
ade.devriany@gmail.com

from complex nutritional issues in toddlers that begin during pregnancy[4,5], one of which is teenage pregnancy where physical and psychological immaturity affects child growth, leading to stunting[6]. Child marriage stems from various aspects, including individual, family, community, and structural factors. Several factors underlie early marriage, such as financial needs, low education levels, the culture of early marriage, arranged marriages, and premarital relationships among teenagers that result in premarital pregnancies[7].

South Bangka Regency still has demographic indicators based on the 2021 Family Data Collection with relatively low achievements. The proportion of couples of childbearing age who married below the required age is quite high in South Bangka Regency. Specifically, 65.01% of males married under the age of 25, and 40.22% of females married under the age of 19 in South Bangka Regency. Based on the considerations mentioned earlier, this research examines the relationship between early marriage and the proportion of stunting in Serdang Village, South Bangka Regency.

METHOD

Research Design and Location

This study was observational with the quantitative research design used a cross-sectional design. This study was conducted from August 2023 to November 2023 in Serdang Village, South Bangka Regency.

Research Sample

The population of this study consisted of mothers with stunted toddlers aged 0-59 months, recorded in February 2023 in Serdang Village, South Bangka Regency, totalling 28 individuals. The research sample was selected using total sampling. All stunted toddlers aged 0-59 months recorded in February 2023 were chosen as cases. Control selection was based on the availability of E-PPGBM (Electronic Community-Based Nutrition Status Monitoring) data, using a 1:2 ratio (28:56) for cases and controls. Therefore, the sample size in this study was 84 mothers with toddlers aged 0-59 months.

Types and Methods of Data Collection

Data collection in this study utilized both primary and secondary data. Primary data were collected using questionnaires to obtain maternal and infant characteristics information. Secondary data were obtained from the Rias Community Health Centers in South Bangka Regency, including maternal characteristics, toddler characteristics, stunting status of toddlers measured in February 2023, and the number of stunted toddlers measured in August 2022.

The stunting variable was obtained using data from the E-PPGBM for the February 2023 period, which was subsequently analyzed using the WHO Anthro application. The measurement results utilized the Height-for-Age index with the following criteria: Severely stunted if the z-score value is < -3 SD; Stunted if the z-score value is between -3 SD and < -2 SD; Normal if the z-score value is between -2 SD and 2 SD; Tall, if the z-score value is > 2 SD. The early marriage variable was collected using a questionnaire by identifying the child's age using the Maternal and Child Health (KIA) book, subtracting the gestational age, and interpreting it with the age of marriage. The criteria for early marriage are as follows: Early marriage, if the mother married at age < 20 years; Not early marriage if the wife married at age ≥ 20 years and the father married at age ≥ 25 years.

Ethics committee approval

Ref. no: KE/FK/1495/EC/2023 from Medical and Health Research Ethics Committee (MHREC) Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada – Dr. Sardjito General Hospital, data of Approval: 20 September 2023.

Data Processing/Analysis

The statistical method used by the researchers to determine the relationship between two influencing variables is the Chi-square test with a significance level of $p < 0.05$.

RESULTS

Characteristics of Toddlers

Table 1 shows that this study's proportion of female toddlers (51.2%) is higher than that of male toddlers (48.8%). The toddlers in this study had an average birth weight of 2.89 kg and an average birth length of 47.8 cm. There were 9 toddlers (10.7%) born with a birth weight of less than 2,500 grams. The nutritional status of the toddlers in this study had an average z-score for weight-for-age (W/A) of -1.14 SD, height-for-age (H/A) of -1.38 SD, and weight-for-height (W/H) of -0.39. In terms of nutritional status, 23.8% of the toddlers were underweight. In the H/A category, 27.4% of the toddlers were classified as stunted, and 6% were severely stunted. Additionally, in the W/H category, most toddlers had good nutrition (97.6%), but there were still 1.2% undernourished and 1.2% at risk of being overweight. Furthermore, the proportion of toddlers who did not receive exclusive breastfeeding (51.2%) was higher than those who did (48.8%).

Characteristics of Mothers

Table 2 shows that the average age of mothers at marriage was 19.27 years, with the youngest being 14 years old. The general characteristics of the mothers in this study indicate that the majority engaged in early marriage (59.9%) and were not employed (95.2%). Additionally, the highest level of education among the mothers was elementary school graduation (41.7%), with the lowest being college graduation (9.5%). During pregnancy, almost all mothers underwent complete antenatal care (98.8%).

Table 1. Characteristics of Toddlers in Serdang Village, South Bangka Regency

Gender	**n**	**%**	
Female	43	51.2	
Male	41	48.8	
Birth Weight and Length	**$\bar{x}$ ± SD**	**Min – Max**	
Birth Weight (kg)	2.89 ± 0.39	1.8 – 3.8	
Birth Length (cm)	47.80 ± 1.96	38 – 51	
Incidence of low birth weight (LBW)			
LBW	9	10.7	
Normal	75	89.3	
Z-Score	**$\bar{x}$ ± SD**	**Min – Max**	
Weight/Age (W/A)	-1.14 ± 0.92	-2.96 – 0.52	
Height/Age (H/A)	-1.38 ± 1.09	-4.11 – 1.39	
Weight/Height (W/H)	-0.39 ± 0.79	-2.04 – 1.24	
Nutritional Status of Toddlers	**W/A (%)**	**H/A (%)**	**W/H (%)**
Severely Underweight		6	
Underweight	23.8	27.4	1.2
Normal	76.2	66.7	97.6
Overweight			1.2
History of Exclusive Breastfeeding			
Yes	41	48.8	
No	43	51.2	

Note: LBW=Low Birth Weight; W/A=Weight-for-Age, H/A=Height-for-Age, W/H=Weight-for-Height; Source: Secondary data, 2023.

Table 2. Characteristics of Mothers with Toddlers in Serdang Village, South Bangka Regency

Variable	**$\bar{x}$ ± SD**	**Min – Max**
Age at Marriage	19.27 ± 3.81	14 – 35
Early Marriage		
Early Marriage	50	59.5
Not Early Marriage	34	40.5
Employment		
Employed	4	4.8
Unemployed	80	95.2
Education		
Did Not Complete Elementary School	3	3.6
Elementary School	35	41.7
Junior High School	18	21.4
Senior High School	20	23.8
Higher Education	8	9.5
Antenatal Care Check-up During Pregnancy		
Complete	83	98.8
Incomplete	1	1.2

Based on Table 3, that the average age of stunted toddlers who were respondents in this study was 31.43 months, and their mothers married at an average age of 19.32 years. These values are higher compared to toddlers with normal nutritional status. This result contrasts with birth weight and height variables, which showed lower results; stunted toddlers had an average birth weight of 2.75 kg and a birth length of 47 cm.

Table 4 shows that among 50 mothers who married under the age of 21, 18 children (64.3%) were stunted. In contrast, mothers who did not marry early had a stunting rate of 35.7% or 10 children. The chi-square test results showed a p-value of 0.694 and an odds ratio (OR) of 0.7. This indicates that there is no significant relationship between the age at which mothers married and the incidence of stunting and that mothers who married early are 0.7 times more likely to have stunted children compared to those who did not marry early.

In the group of working mothers, 1 child (3.6%) experienced stunting. This result differs from the group of non-working mothers, where 27 children (96.4%) were stunted. The chi-square test showed a p-value of 1.000 with an OR of 0.7. This indicates that there is no significant relationship between the mother's employment status and the incidence of stunting and that non-working mothers are 0.7 times more likely to have stunted children compared to working mothers. Table 4 also shows that among mothers with elementary school education, the highest number of stunted children was found, with 12 children (42.9%). The lowest number was among mothers with higher education, with 1 child (3.6%). The chi-square test results showed a p-value of 0.541, indicating no significant relationship between the mother's education level and the incidence

Table 3. Results of Bivariate Analysis of Variables

Variable	Normal		Stunting	
	$\bar{x}$	SD	$\bar{x}$	SD
Age of Toddlers (months)	27.52	14.89	31.43	16.65
Birth Weight of Toddlers (kg)	2.95	0.37	2.72	0.40
Birth Length of Toddlers (cm)	48.20	1.98	47.00	1.67
Age of Mothers at Marriage (years)	19.25	3.98	19.32	3.94

Table 4. Results of Chi-Square Analysis

Variable	Normal		Stunting		Total		*p*	OR
	n	%	n	%	n	%		
Age of Mothers at Marriage								
Early Marriage	32	57.1	18	64.3	50	59.5	0.694	0.7
Not Early Marriage	24	42.9	10	35.7	34	40.5		
Employment status of Mothers								
Employed	3	5.4	1	3.6	4	4.8	1.000	0.7
Unemployed	53	94.6	27	96.4	80	95.2		
Education of Mothers								
Did Not Complete Elementary School	1	1.8	2	7.1	3	3.6	0.541	N/A
Elementary School	23	41.1	12	42.9	35	41.7		
Junior High School	12	21.4	6	21.4	18	21.4		
Senior High School	13	23.2	7	25.0	20	23.8		
Higher Education	7	12.5	1	3.6	8	9.5		
Antenatal Care Check-up During Pregnancy								
Complete	31	55.4	12	42.9	43	51.2	0.396	1.7
Incomplete	25	44.6	16	57.1	41	48.8		
Exclusive Breastfeeding								
Yes	28	50	13	46.4	41	48.8	0.758	1.1
No	28	50	15	53.6	43	51.2		
Gender of Children								
Female	31	55.4	12	42.9	43	51.2	0.396	1.7
Male	25	44.6	16	57.1	41	48.8		

of stunting. Educational initiatives targeting mothers with less than 9 years of formal education can significantly improve their knowledge of nutrition and childcare practices[8]. Other research results indicate that additional factors influencing poor infant nutritional status include maternal education level, employment, exclusive breastfeeding, use of breast milk with supplementary formula, and economic income level[9]. These programs should emphasize the importance of a well-balanced diet, particularly focusing on increasing the consumption of animal-based protein sources. Such interventions can potentially lead to better nutritional outcomes for children and reduce the risk of stunting.

Additionally, among mothers who did not undergo complete antenatal care, there were more stunted children, with 16 children (57.1%), compared to mothers who had complete antenatal care, with 12 children (52.9%). The chi-square test showed a p-value of 0.396 (p>0.05) with an OR of 1.7. This indicates that complete antenatal care does not significantly affect the incidence of stunting and that mothers who did not undergo complete antenatal care are 1.7 times more likely to have stunted children compared to those who did.

Table 4 also shows that among toddlers who received exclusive breastfeeding, 13 children (46.4%) were stunted. In contrast, among those who did not receive exclusive breastfeeding, there were more stunted children, with 15 children (53.6%). The chi-square test results showed a p-value of 0.758 (p>0.05). It means that exclusive breastfeeding does not have a significant relationship with the incidence of stunting and that toddlers who did not receive exclusive breastfeeding are 1.1 times more likely to be stunted compared to those who did. Male toddlers were more likely to be stunted compared to female toddlers, with a rate of 57.1%. The chi-square test results showed a p-value of 0.396 (p>0.05) with an OR of 1.7. Therefore, the gender of the toddler does not have a significant effect on the incidence of stunting, and male toddlers are 1.7 times more likely to be stunted compared to female toddlers.

DISCUSSION

The results of this study indicate that the majority of mothers who engaged in early marriage had a higher number of stunted children compared to mothers who did not marry early. Early marriage is defined as marriage conducted by individuals below the productive age, specifically women under 21 years and men under 25 years. The mother's age plays a role in psychological factors during pregnancy and child-rearing[10]. Women who marry under the age of 21 are considered not yet mentally mature enough to handle pregnancy, childbirth, and child-rearing. This can affect the growth and development of the child[11–13]. Bivariate analysis in this study showed no significant relationship between early marriage and the incidence of stunting (p>0.05). This result aligns with the survey by Niswah H (2023)[14], which stated that the mother's age at marriage does not significantly differ with the incidence of stunting. There is a tendency to show that the younger the age at marriage, the higher the percentage of short and undernourished children.

Parental education is one of the factors influencing the incidence of stunting in toddlers. In this study, mothers with elementary school education had the highest number of stunted children compared to other education groups, with 12 stunted children (42.9%). Mothers play a crucial role in child health, including food management. Mothers with higher education levels tend to behave positively toward fulfilling their children's nutritional needs[15]. The study by Husnaniyah D (2020)[16] stated that the mother's education level significantly influences the incidence of stunting in children.

Additionally, this study states that the group of mothers who did not undergo complete Antenatal Care (ANC) had more stunted children, with 57.1%, compared to the group of mothers who had a complete ANC history. ANC aims to optimize the health of both the mother and the fetus, both physically and mentally, during pregnancy. Pregnant women are advised to have at least four ANC visits during pregnancy. During these visits, the mother's pregnancy will be examined, and nutritional counseling, supplements, and vitamins needed by pregnant women will be provided. This service is conducted to prevent anemia in mothers, premature births, and to ensure adequate nutrition for the baby from the womb. The irregularity of pregnant women in undergoing ANC is due to a lack of awareness about the importance of antenatal care[17]. Lack of access to information can be one of the factors causing this negative attitude. According to Camelia V (2020)[18], there is a relationship between the number of ANC visits and stunting in toddlers aged 24-59 months in Pujon District, Malang Regency.

Exclusive breastfeeding also contributes to the incidence of stunting in toddlers[19,20]. In this study, toddlers who did not receive exclusive breastfeeding experienced more stunting compared to those who did. Breast milk supports infants' growth, including height[21–23]. The calcium content in breast milk is more easily absorbed by infants compared to formula milk. Therefore, infants who receive exclusive breastfeeding have heights that align with growth curves or are taller than non-exclusively breastfed children. Windasari DP (2020) stated that exclusive breastfeeding influences the incidence of stunting at Tamalate Health Center. Insufficient frequency of breastfeeding can also lead to malnutrition and increase the risk of stunting[24].

CONCLUSION AND RECOMMENDATIONS

The majority of mothers in Serdang Village engaged in early marriage (59.9%) and were not employed (95.2%), with the highest education level being elementary school graduation (41.7%). During pregnancy, almost all mothers underwent complete antenatal care (98.8%), and 51.2% of toddlers did not receive exclusive breastfeeding. 23.8% of toddlers were underweight. In the height-for-age category, 27.4% of toddlers

were stunted, and 6% were severely stunted. Additionally, in the weight-for-height category, most toddlers had good nutrition (97.6%), but there were still 1.2% undernourished and 1.2% at risk of being overweight. In Serdang Village, South Bangka Regency, it was shown that variables such as the age of the mother at marriage, mother's employment, mother's education, complete antenatal care, exclusive breastfeeding, and the gender of the toddler did not have a significant effect on the incidence of stunting ($p>0.05$).

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