The Relationship between Adolescent Pregnancy and Stunting among Toddlers Aged 12-36 Months in Bogor District, Indonesia

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Abstract

Background: Stunting is a serious problem that needs to be handled both in Indonesia and globally. Approximately 151 million, or 22.2%, of toddlers in the world are currently stunted. The purpose of this study is to assess the relationship between adolescent pregnancy and stunting in toddlers aged 12-36 months in Bogor District, Indonesia.

Method: A cross-sectional study design was employed, with primary data from a total sample of 500 toddlers in the District. Stunting status was assessed based on the height-for-age indicator <-2 z-score, while the categorization of adolescent pregnancies related to pregnant women age <20 years. The analysis of the relationship between adolescent pregnancies and stunting applied multivariate Cox regression analysis and the effect is expressed by the prevalence ratio (PR) with a 95% confidence interval (CI).

Result: Our study shows that the prevalence of stunting in toddlers aged 12-36 months in Bogor District is 39.2%. The Cox regression test results of the relationship between adolescent pregnancy and stunting show a PR of 1.42 (95% CI: 1.01-1.98), which means that pregnant women who are still teenagers (<20 years) display a prevalence of stunted toddlers 1.4 times higher than those who are adult (≥20 years), after being controlled by the "mother's education" and "mother's parenting pattern" variables.

Conclusion: Stunting can be prevented by raising the maternal gestational age by increasing the minimum marriage age in accordance with Indonesian marriage law limitations at age of 19 years and get first time pregnant at age of 20 years.

Keywords: *Stunting, 12–36 months, Toddlers, Adolescent Pregnancy, Bogor District Indonesia.*

Introduction

Stunting is a problem that must be prevented given its very broad impact. The most serious impacts are a decrease in children's intelligence level, vulnerability to disease, a decline in productivity and reduced economic growth, which ultimately increase poverty in Indonesia[1]. In more detail the impacts of stunting are divided into short- and long-term effects. Short-term impacts include decreased cognitive abilities, motor skills and language development, as well as increased morbidity and mortality, while examples of long-term ones are declining reproductive health, small stature when adult, obesity, decreased learning ability and reduced productivity and work capacity[2]. Stunting in toddlers is a serious problem in Indonesia. The prevalence of stunting in the world in children aged below five has reached 22.2%, or about 151 million toddlers[3]. Basic Health Research 2018 reported that the prevalence of stunting in toddlers in Indonesia in 2018 had reached 30.8%[4]. Similar results from the Monitoring Nutritional Status (PSG) survey conducted by the Director of Public Nutrition of the Indonesian

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Ministry of Health show that the prevalence of stunting in Indonesia increased from 29% in 2015 and 27.5% in 2016, to 29.6% in 2017[5,6,7]. One of the provinces in Indonesia that has a high prevalence of stunting is West Java, with a significant increase in cases from 25.1% in 2016 to 29.2% in 2017[6,7]. One District in West Java with a high number of stunting cases is Bogor, at 28.5%[7].

Factors causing stunting are grouped into three categories: immediate causes, underlying causes and basic causes. Basic causes are a result of aspects of the quantity and quality of human resources, such as caregiver education, social economic status and adolescent pregnancy[8]. Adolescent pregnancy has adverse effects on the mother's reproductive health; the nutritional adequacy condition of mothers who are still teenagers is not optimal to deal with pregnancy, leading to the risk of higher anthropometric failure, such as stunted growth of the child at birth[8,9]. Teenagers are at a vulnerable age in terms of education level, knowledge and the parenting of mothers of their children. A lack of these skills can lead to insufficient nutritional intake amongst toddlers and ultimately result in stunting. This study is highly recommended to look at the relationship between adolescent pregnancy and stunting among toddlers and to reach important conclusions in the efforts to reduce stunting in Indonesia.

Method

The type of research is a cross sectional design[10], using primary data taken from Tamansari District, Bogor District, Indonesia which was chosen as one of the districts with the highest prevalence of stunting. Tamansari has three community health centers, with 111 posyandu (integrated service posts)[11]. 46 of these were selected as sampling locations because of their active and routine carrying out of activities compared to other posyandu[12]. The study population was 10,447 toddlers aged 12-36 months[12], and the research sample 500 toddlers aged 12-36 months from 46 posyandu in Tamansari district, that were randomly probability proportional to size (PPS). The inclusion criteria were the availability of complete data according to the variables to be studied, that the toddlers lived with their parents, and had lived at the research area for at least one year. We excluded toddlers with abnormalities (disabilities), which hampered the process of anthropometric measurement, and mothers who refused to participate. Data collection was conducted from 2 to 18 July 2019 using questionnaires and by recruiting trained enumerators from Nutrition and Epidemiology Master's students. The data collected were verified by checking the instrument that has been filled in. The dependent variable was stunting status, while the independent variable was adolescent pregnancy, with the birth weight of toddlers, parents' income, mother's education, mother's parenting pattern, body mass index, and calorie and protein intake covariate. Anthropometric data for toddler height were measured using a Length Measuring Board (LMB) for those aged 12-24 months, and a microtoise for those aged 25-36 months. Toddlers' age data were obtained by checking birth certificates or maternal and child health books (MCH), while calorie intake data were based on a 24 hour recall questionnaire. Data on the age of adolescent pregnant mothers were obtained from the MCH handbook. Other data for the covariate variables were obtained from interviews using questionnaires. Data analysis was performed using the Stata program (v.13, StataCorp). Determination of stunting status was based on height-for-age z-scores using WHO Anthro software; calorie and protein intake status was based on Nutrisurvey software; and data on adolescent pregnancy variables were grouped into two categories, namely adult pregnancy if pregnant at age ≥20 years, and adolescent pregnancy if pregnant at age <20 years. Relationship analysis of the independent and dependent variables employed multivariate Cox regression analysis, and the interpretation of the effects was expressed by PR and a confidence interval of 95%[13].

Results

Table 1. Characteristics of the study sample

Variable	Frekuensi n=500	Proportion (%)
Stunting Status		
Stunting	196	39.2
Normal	304	60.8
Adolescent Pregnancy		
Adolescent Pregnancy (age <20 years)	81	16.2
Adult Pregnancy (age ≥20 years)	419	83.8
Toddler's Birth Weight		
LBW	49	9.80
Normal	451	90.2
Parents' Income		
Low (<2 million rupiah)	177	35.4
High (≥2 million rupiah)	323	64.6
Mother's Education		
Elementary School	262	52.4
Junior High School	114	22.8
Senior High School	115	23.0
University or College	9	1.8

Variable	Frekuensi n=500	Proportion (%)
Mother's Parenting Pattern		
Bad	277	55.4
Good	223	44.6
Maternal Body Mass Index		
Underweight (BMI <17.0)	54	10.8
Normal (BMI 18.5.0-25.0)	295	59.0
Overweight (BMI >25.0)	151	30.2
Toddler's Calorie Intake		
Poor	287	57.4
Satisfactory	213	42.6
Toddler's Protein Intake		
Poor	293	58.6
Satisfactory	207	41.4

The study involved 500 participants from Taman Sari District, Bogor District, Indonesia. Table 1 shows a description of the characteristics of some of the variables. The proportion of stunted toddlers aged 12-36 months was 39.20%, while the proportion of mothers who became pregnant in their teens was 16.20%.

Table 2. Bivariate analysis of adolescent pregnancy with stunting in toddlers aged 12-36 months

Variable	Stunting		Normal		Total	PR	95%CI	P-value
	n=500	%	n=500	%				
Adolescent Pregnancy								
Adolescent Pregnancy (age <20)	47	58.02	34	41.98	81	1.63	(1.30-2.04)	0.0002*
Adult Pregnancy (age ≥20)	149	35.56	270	64.44	419	[ref]		

Note: PR = Prevalence Ratio; *significant statistic p < 0.05

Table 2 shows the bivariate analysis of adolescent pregnancy and stunting. The prevalence of mothers who had teenage pregnancies and stunted toddlers was 58.02%, while those without stunted toddlers was 41.98%. In comparison, adult pregnancies resulting in stunted toddlers was 35.56%, while those without stunting was 64.44%. From the bivariate analysis the results have a PR value of 1.63, with p-value of 0.0002 < 0.05 (95% CI 1.30 – 2.04), which means that the prevalence of stunting in toddlers resulting from teenage pregnancies was 1.63 times higher than from adult pregnancies.

Table 3. Full multivariate model

Stunting Risk Factors	PR	95%CI	P-Value
Adolescent Pregnancy	1.41	1.00 – 1.98	0.048*
Parents' Income	1.28	0.95 – 1.71	0.099
Mother's Education	1.46	0.98 – 2.16	0.058
Toddler's Birth weight	1.41	0.94 – 2.11	0.090
Mother's Parenting pattern	1.41	1.04 – 1.90	0.025
Maternal Body Mass Index	1.14	0.90 – 0.44	0.254
Calorie Intake	1.02	0.68 – 1.51	0.911
Protein Intake	0.85	0.57 – 1.27	0.447

Note: PR = Prevalence Ratio; *significant statistic p < 0.05

Table 3 shows the full multivariate model consisting of the main variables, namely adolescent pregnancy and the other covariate variables that have the potential to be confounders.

Table 4. Final multivariate model

Stunting Risk Factors	PR	95%CI	P-Value
Adolescent Pregnancy	1.42	1.01 – 1.98	0.042*
Mother's Education	1.53	1.04 – 2.25	0.031*
Mother's Parenting Pattern	1.42	1.05 – 1.91	0.021*

Note: PR = Prevalence Ratio; *significant statistic $p < 0.05$

The final multivariate model can be seen in Table 4 the PR result is 1.42 (95% CI 1.01-1.98), which means that the prevalence of stunting resulting from adolescent pregnancy is 1.42 times higher than that from adult pregnancy, after being controlled by the "mother's education" and "mother's parenting pattern" variables.

Discussion

From this cross-sectional study, we have evaluated that adolescent pregnancies, controlled by mother's education and parenting pattern, pose a significant risk of stunting in Bogor District, West Java, Indonesia, with a result of 1.42 (95% CI 1.01-1.98). This is in line with research in Nepal, which found that teenage mothers had a prevalence of stunted toddlers 2.12 times higher than adult mothers (POR = 2.12 95% CI 1.01-4.44)[14]. In Indonesia, 54.01% of women pregnant for the first time are older than 20, but the remainder are under 20. This shows that half of the women who have been pregnant in Indonesia experience their first pregnancy at the age of <20 years[15]. Adolescent pregnancy is also inseparable from the high level of child marriage among adolescents in Indonesia. Early marriage in West Java is 30.5%. This makes West Java the province with the highest prevalence of early marriage on the island of Java and is ranked ninth nationally, while Tamansari, as the research location, is one of seven sub-districts in Bogor District which has a high prevalence of early marriage in West Java[16]. Research in India concluded that the prevalence of stunted toddlers with mothers who married at the age of <18 was 1.2 times higher than adult mothers (POR = 1.22 95% CI 1.12-1.33)[17], while research at Tamale Metropolis, Ghana, also concluded that mothers who were married at the age of > 18 years had a stunting prevalence 0.76 times higher than those aged <18 (POR = 0.76 95% CI 0.59-0.99)[18]. Adolescent pregnancy causes adverse effects on reproductive health and mothers are at great risk of giving birth to babies with a stunting condition. Maternal nutrition at that age (<20 years) has not developed optimally, and if it is forced nutrition it will result in higher anthropometric failures later, such as stunted growth of the child's body. Teenage pregnancy also has the potential to lead to babies with a low birth weight (LBW), which accounts for around 20% of stunting[15].

In this study, two confounder variables cause stunting: mother's education and mother's parenting pattern. Educational factors play a major role amongst mothers in terms of fulfillment of toddler nutrition intake during the growth process. Mothers with a low education are also at risk of having stunted children due to their lack of experience and correct knowledge about feeding intake. Studies in Brazil concluded that mothers with low education (<9 years) had a prevalence of stunted toddlers 1.7 times higher than mothers with higher education (≥9 years) (PR = 1.77 95% CI 1.10-2.86)[19]. In other studies in Rwanda, it was concluded that mothers with poor education had a prevalence of stunted toddlers 1.7 times higher than mothers with higher education (POR = 1.71 95% CI 1.25-2.34)[20]. while mothers' parenting patterns played an important role in terms of toddlers' food intake, personal hygiene practices and the environment; seeking treatment was also very relevant when associated with stunting[21]. Research in West Nusa Tenggara (NTB), Indonesia, concluded that mothers who had poor knowledge of malnutrition had a prevalence of stunted toddlers 2.2 times higher than those with good knowledge (p value = 0.001 PR = 2.28), and that children raised by two parents had a prevalence of stunted toddlers 1.6 times higher than those raised by big families (p value = 0.003 PR = 1.64)[22].

These overall results indicate that there are interrelated variables between adolescent pregnancy, education and mothers' parenting pattern. Promotes a woman to get pregnant for the first time in adulthood will open up opportunities for adolescents to study at a higher level. This is what will ultimately increase the knowledge and parenting of mothers related to toddlers. For further research, it would be beneficial to add other

variables related to wider maternal characteristics, such as the length of the mother's marriage, status of the mother's occupation, mother's height and mother's knowledge of how to care for toddlers. In addition, we recommend that future research be conducted on a wider population, not limited to the District.

Conclusions

Based on the results of the study, stunting can be prevented by increasing the maternal gestational age by raising the minimum age of marriage in accordance with Indonesian marriage law limitations at age of 19 years[23] and get first time pregnant at age of 20 years, because from this study there are still 16.2% of mothers who are pregnant aged <20 years. Moreover, it is also necessary to improve the education of adolescent girls, giving them knowledge about proper parenting before they get married and become pregnant.

Ethical Considerations: This study was approved by The Research and Community Engagement Ethical Committee Faculty of Public Health Universitas Indonesia (Ket-560/UN2. F10/PPM.00.02/2019).

Competing Interests: The authors declared that no competing interests exist.

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