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Multiple Logistic Regression Model, Relationship between Maternal Nutritional Status, Maternal Condition History, and Maternal Knowledge about 1000 HPK on the Incidence of Stunting in Toddlers in Pandan Lagan Village

Andy Amir, M. Ridwan, Arnild Augina Mekarisce, Aini Zulaikah

Public Health Science Study Program, Jambi University
E-Mail: andy_amir@unja.ac.id

Abstrak

One of the stunting locations in East Tanjung Jabung Regency is located in Geragai Sub-district, Pandan Lagan Village. According to data from the Puskesmas in 2019, the incidence of stunting in Pandan Lagan Village was 35 toddlers, in 2020 it was 17 stunting children out of a total of 70 children in Pandan Lagan Village. The purpose of this study was to determine the relationship between maternal nutritional status, history of maternal conditions, and maternal knowledge about 1000 HPK with the incidence of stunting in Pandan Lagan Village. This type of research is quantitative research, using a cross-sectional approach. The number of samples to be studied with the Lemeshow Formula is 45 respondents. The dependent variable is stunting and the independent variables are maternal nutritional status (pre-pregnant maternal BMI and weight gain during pregnancy), history of maternal conditions (maternal age during pregnancy, birth spacing), and maternal knowledge about 1000 HPK. The research instrument used a questionnaire sheet, then the data was processed through data editing, data coding, data entry, data cleaning, and data processing, then analyzed univariate, bivariate with a chi-square test, and multivariate with multiple logistic regression test.

Based on the results of the study, there is a relationship between pre-pregnancy maternal BMI with a risk of 4,464 times, weight gain with a risk of 3,75 times, maternal age during pregnancy with a risk of 3,0 times, and spacing of babies with a risk of 2,444 times with the incidence of stunting. There is no relationship between maternal knowledge about 1000 HPK and the incidence of stunting with a p-value = 0,114, and it is known that the pre-pregnancy mother's BMI variable is the variable that has the greatest influence on infants with stunting nutritional status (odds ratio = 15,943). For this reason, it is expected to be more intensive in educating couples of childbearing age, pre-pregnant mothers, or early on to adolescent girls to pay attention to factors that affect stunted children, especially to have an ideal BMI so that it will reduce the risk of having children with stunted nutritional status.

Keywords: Stunting, Maternal Nutritional Status, Maternal condition history

INTRODUCTION

Nutrition problems can include two aspects: overnutrition and undernutrition. Overnutrition is related to obesity (overweight) and undernutrition is grouped into stunting, wasting, and underweight. Stunting is a long-term nutritional problem in toddlers, characterized by a physique that is shorter than other children of the same age. According to the Ministry of Health (MOH), stunting is defined as children under 5 years of age whose z-scores are less than -2SD/standard deviation (stunted) and less than - 3SD (severely stunted). (1)

Stunting is one of the nutritional problems whose phenomenon has spread at all levels. Stunting has a worse impact on the quality of life of children in the future in terms of achieving appropriate developmental growth. Children who suffer from stunting have stunted growth and

development, especially at the age of five. Stunting also affects children's cognitive abilities and intelligence.(2)

In 2018, 149 million children under five in the world were stunted, with Indonesia among the countries with the highest incidence of stunting. In 2013, the prevalence of stunting in Indonesia was 37,2%. Nutritional Status Monitoring (PSG) in 2015 showed that the prevalence of stunting in Indonesia was 29%, and decreased in 2016 to 27,5%, but again increased to 29,6% in 2017, in 2018 the prevalence of stunting was 30,8% and decreased in 2019 to 27,67%. Although the prevalence of stunting is decreasing, this figure shows that stunting is still a serious problem in Indonesia, because the prevalence is still above 20%.(3)

Jambi Province has a fairly high prevalence rate of stunting, in 2013 the prevalence was 39,1% and then fell to 30,1% in 2018. In 2020, there were 4 districts that became the locus of stunting in Jambi Province, namely, Kerinci Regency, East Tanjung Jabung Regency, West Tanjung Jabung Regency, and Merangin Regency with a target of 10 villages in each district. East Tanjung Jabung District had a stunting prevalence rate of 48,5% in 2013 and decreased to 40,9% in 2018.(4)

One of the stunting hotspots in East Tanjung Jabung Regency is located in Geragai Sub-district, Pandan Lagan Village. Pandan Lagan village is one of the working areas of Pandan Jaya community health center. Pandan Lagan village consists of 700 households, which consist of various ethnic groups and the majority of Pandan Lagan residents are Javanese. According to data from the puskesmas in 2019, the incidence of stunting in Pandan Lagan Village was 35 toddlers, in 2020 it was 17 stunting children out of a total of 70 children in Pandan Lagan Village.

Stunting can occur due to various problems experienced by mothers during pregnancy. One important factor that can affect the incidence of stunted babies born is the nutritional status of pregnant women. The nutritional status of the mother during the pregnancy process which plays an important role and needs to be considered is the mother's weight before pregnancy, weight gain during pregnancy, the mother's age during pregnancy and the baby's birth spacing. In addition, the mother's knowledge about 1000 HPK also affects the final birth outcome because it will be related to the ability to maintain and care for the womb during pregnancy. (5)

METHODS

This type of research uses a cross sectional design. This research was conducted in Pandan Lagan Village, Geragai District, East Tanjung Jabung Regency. This research was conducted on February 02 - April 27, 2021. The population of this study amounted to 70 baduta. The number of samples to be studied using the Lemeshow Formula (1997) is 45 respondents. Inclusion criteria include babies under two years old, native residents in Pandan Lagan Village, and have a KIA book. Exclusion criteria include mothers of infants not willing to be respondents. The dependent variable was the incidence of stunting and the independent variables were maternal nutritional status (pre-pregnant maternal BMI and weight gain during pregnancy), history of maternal conditions (maternal age during pregnancy, birth spacing, maternal knowledge about) and 1000 HPK. The research instrument used a questionnaire sheet, then the data was processed through data editing, data coding, data entry, data cleaning, and data processing, then analyzed univariate, bivariate with chi-square test, and multivariate with multiple logistic regression test.

RESEARCH RESULTS

Table 1. Distribution of Respondent Characteristics

Research Variables	n	%
Mother's Education		
Elementary school	4	8,9
Junior High School	10	22,2
Senior High School	27	60
College	4	8,9
Mother's Occupation		
Not Working	18	40
Laborer/Farmer	15	33,3
Civil servants/Military/Police	4	8,9
Trader/Self-employed	8	17,8

Source: Primary Data Processed, 2021

Based on Table 1. It is known that most mothers' education is high school, totaling 27 people (60%) and the majority of mothers' jobs are not working, namely 18 people (40%).

Table 2. Relationship between maternal BMI before pregnancy and stunting

BMI of Pre-Pregnant Mother	Stunting		Normal		Total		*P-Value*	PR (95%CI)
	n	%	n	%	n	%		
<18,5	14	60,9	9	39,1	23	100	0,001	4,464 (1,484-13,430)
18,5-24,9	3	13,6	19	86,4	22	100		
Total	17	37,8	28	62,2	45	100		

Source: Primary Data Processed, 2021

Based on Table 2. Above, it is known that as many as 23 people have pre-pregnancy BMI less than 18,5 and there are as many as 14 people (60,9%) who have babies with stunting nutritional status and as many as 9 people (39,1%) who have babies with normal nutritional status. Pre-pregnancy BMI 18,5-24,9 was experienced by 22 people, of which 3 people (13,6%) had babies with stunted nutritional status and as many as 19 people (86,4%) had babies with normal nutritional status. The statistical test results using the Chi square test showed that there was a relationship between the BMI of pre-pregnant women and the incidence of stunting. The BMI of pre-pregnant mothers who are less than 18,5 will increase the risk of stunting 4,464 times greater than the BMI of pre-pregnant mothers 18,5-24,9 (PR = 4,464; CI = 1,484-13,430).

Table 3. Relationship between Maternal Weight Gain During Pregnancy with Stunting

Weight Gain During Pregnancy	Stunting		Normal		Total		*P-Value*	PR (95%CI)
	n	%	n	%	n	%		
<10 KG	15	50	15	50	30	100	0,017	3,750 (0,983-14,306)
>10 KG	2	13,3	13	86,7	15	100		
Total	17	37,8	28	62,2	45	100		

Source: Primary Data Processed, 2021

In Table 3. Above, it can be seen that there are 30 people who experience weight gain during pregnancy less than 10 KG, of which 15 people (50%) have babies with stunting nutritional status and 15 people (50%) of them have babies with normal nutritional status. While the number of mothers who experienced weight gain during pregnancy more than 10 KG was 15 people, 2 people (13,3%) of whom had babies with stunted nutritional status and 13 people (86,7%) had babies with normal nutritional status. The results of statistical tests using the Chi square test show that weight gain during pregnancy has a significant relationship with the incidence of stunting, where weight gain <10 KG during pregnancy increases the risk by 3.75 times to the incidence of stunted babies (PR = 3,75; CI = 0,983-14,306).

Table 4. Relationship between Maternal Age at Pregnancy and Stunting

Mother's Age at Pregnancy	Stunting		Stunting Normal		Total		*P-Value*	PR (95%CI)
	n	%	n	%	n	%		
<20 Years or >35 Years	12	60	8	40	20	100	0,006	3,000 (1,267-7,102)
20-35 Years	5	20	20	80	25	100		
Total	17	37,8	28	62,2	45	100		

Source: Primary Data Processed, 2021

Table 4. Above shows that of the 20 people who had a mother's age during pregnancy less than 20 years or above 35 years, there were 12 people (60%) who had babies with stunting nutritional status and as many as 8 people (40%) who had babies with normal nutritional status. In 25 mothers with a pregnancy age of 20-35 years, there were 5 people (20%) who had babies with stunted nutritional status and as many as 20 people (80%) had babies with normal nutritional status. The chi square test found that there is a relationship between maternal age during pregnancy and the incidence of stunted babies, where maternal age less than 20 years or above 35 years will have a 3.0 times greater risk of causing stunted babies compared to maternal age 20-35 years (PR = 3,00; CI - 1,267 - 7,102).

Table 5. Relationship between Birth Spacing and Stunting

Birth Distance	Stunting		Stunting Normal		Total		*P-Value*	PR (95%CI)
	n	%	n	%	n	%		
<2 Years	8	66,7	4	33,3	12	100	0,016	2,444 (1,231-4,854)
>2 Years	9	27,3	24	72,7	33	100		
Total	17	37,8	28	62,2	45	100		

Source: Primary Data Processed, 2021

Based on Table 5. Above, the results show that there are 12 people who have a birth spacing of fewer than 2 years, of which 8 people (66,7%) have babies with stunting nutritional status and 4 people (33,3%) have babies with normal nutritional status. While the birth spacing of more than 2 years amounted to 33 people, with 9 people (27,3%) of them having babies with stunted nutritional status and 24 people (72.7%) having babies with normal nutritional status. Statistically, the Chi-square test results show that there is a relationship between birth spacing and the incidence of stunting in infants, where the birth spacing of fewer than 2 years has a 2,444 greater risk of causing infants to become stunted compared to birth spacing of more than 2 years (PR = 2,444; CI = 1,231-4,854).

Table 6. The Relationship between Maternal Knowledge of 1000 HPK with Stunting

Mother's Knowledge	Stunting		Stunting Normal		Total		*P-Value*	PR (95%CI)
	n	%	n	%	n	%		
Bad	5	25	15	75	20	100		12,80
Good	12	48	13	52	25	100	0,000	(1,853-
Total	17	37,8	28	62,2	45	100		88,435)

Source: Primary Data Processed, 2021

Table 6. Above shows that there are 20 people who have poor knowledge, of which 5 people (25%) have babies with stunted nutritional status, and 15 people (75%) have babies with normal nutritional status. For good knowledge, there were 25 people, of which 12 people (48%) had babies with stunted nutritional status and 13 people (52%) of them had babies with normal nutritional status. Statistically, the Chi-square test showed that there was no significant relationship between maternal knowledge and the incidence of stunting in infants (PR=0,521; CI=0,220-1,233).

Table 7. Multiple Logistic Regression Model Candidates

Variables	P-*value*	Description
BMI of Pre-Pregnant Mothers	0,002	Model candidate
Weight Gain	0,026	Model candidate
Mother's Age at Pregnancy	0,008	Model candidate
Birth Distance	0,021	Model candidate
Knowledge	0,119	Model candidate

Table 7. Shows that after a simple regression between each independent variable and the dependent variable, it is known that there are 5 (five) variables included in the candidate model (P-value <0,25), namely the IMT variable (P-value: 0,002), weight gain (P-value: 0,026), age (P-value: 0,008), birth spacing (P-value: 0,021), and knowledge (P-value: 0,119).

Value *Pseudo R Square*

Table 8. *Pseudo R Square*

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	48,315[a]	0,223	0,304
2	39,516[b]	0,361	0,491

In Table 8. Above, it can be seen to what extent the ability of the independent variables to explain the dependent variable, namely by using the Nagelkerke R Square value, also known as the Pseudo R-Square. The Nagelkerke R Square value is 0,491, indicating that the ability of the independent variable to explain the dependent variable is 0,491 or 49,1%, and there are 50,9% other factors outside the model that explain the dependent variable.

Final Modeling

Table 9. Final Modeling of Multiple Logistic Regression

Variables	Unstandardized Cofficients					
	B	Std. Error	Wald	df	Sig.	Exp(B)
Mother's Age at Pregnancy	2,329	0,890	6,844	1	0.009	10,269
BMI of Pre-Pregnant Mothers	2,769	0,930	8,865	1	0,003	15,943

Table 9. Shows that mothers with a pre-pregnancy BMI of less than 20 years old or over 35 years old have a risk of 10,269 times having a baby with stunted nutritional status (odds ratio = 10,269), and mothers with a pre-pregnancy BMI of less than 18,5 have a risk of 15,943 times having a baby with stunted nutritional status (odds ratio = 15,943), so it is found that the pre-pregnancy mother's BMI variable is the variable that has the greatest influence on babies with stunted nutritional status.

DISCUSSION

In the pre-pregnant mother's BMI variable, it is known that there is an association with the incidence of stunting with a P-value = 0,001 (<0,05), and at the same time, it is the variable that has the greatest influence on babies with stunting nutritional status (odds ratio = 10,269). The category of prenatal BMI measurement is categorized into at risk and not at risk, said to be at risk if the BMI of prenatal women <18,5 and not at risk if the BMI = 18,5-24,9. How to measure prenatal BMI using the formula BMI = Weight before pregnancy (kg) divided by height (m). Prenatal BMI is considered to indicate the quality of maternal nutrition before pregnancy which will have an impact on maternal health and fetal growth during the womb. The results of this study are in line with research conducted by Young et al. (2018) which obtained the results that the body mass index of pre-pregnant mothers has a significant relationship with stunting babies (p<0,05), where low pre-pregnant BMI increases the risk of 1,3 times greater stunting. The mother's BMI before pregnancy can describe the current nutritional status of the mother during pregnancy and affect the availability of nutrients for fetal growth.[6] Good nutritional status before pregnancy will support good fetal conditions in early pregnancy, so that with good nutritional status and continued support with adequate balanced nutrition improvement will be able to improve the nutritional status of babies in the womb until the baby is born.

In the variable of maternal weight gain during pregnancy, it is known that there is a relationship with the incidence of stunting. This study is in line with research conducted by Vinda (2019) that maternal weight gain during pregnancy has a relationship with the incidence of stunting with a p-value = 0,001 (<0,05)[7]. Insufficient weight gain is triggered by maternal food insecurity and pregnancy illness that affects appetite and the environment. Decreased appetite will affect the nutrients received by the fetus so the intake of nutrients during the womb will be reduced and can have an impact on fetal development and the nutritional status of the baby at birth.[8]

In the variable of maternal age during pregnancy, it is known that there is an association with the incidence of stunting. The maternal age category in this study is divided into at-risk age and non-risk age in accordance with Cunningham's (2006) theory that women's reproductive age is at the age of 20-35 years, because at the age of <20 years the reproductive organs are not perfect and are not ready to accept the fetus, while at the age of >35 years, the reproductive organs have experienced reproductive decline[9]. The results of this study are

supported by research conducted by Ervince Manimbo (2020) with a p-value = 0,003, which means that maternal age has an association with the incidence of stunting[10]. Other studies similar to this study have similar results, namely maternal age has a relationship with the incidence of stunting. Where mothers who are too young <20 years old and too old >35 years old have a 4 times greater risk of giving birth to stunted babies than pregnant women at the ideal age of 20-35 years. In mothers aged <20 years, physical growth is still ongoing so there is a struggle for nutrients between the mother and fetus, as a result, the mother is at risk of carrying an Intrauterine Growth Restriction (IUGR) fetus which makes the fetus grow more slowly and give birth to a baby with low birth weight and short. If there is no increase in height in the first two years of the infant, the infant will grow up to be a short child. Moreover, psychologically, young mothers are not mature enough mentally and nutritionally so the parenting of children from teenage mothers is not as good as older mothers where mothers are psychologically prepared.[11]

In the variable of birth spacing, it is known that there is a relationship with the incidence of stunting. The results of this study are supported by research conducted by Lani (2015) which states that there is a relationship between birth spacing and the incidence of stunting with a p-value = 0,000 in North Halmahera Regency[12]. In line with research conducted by Azriful (2018) in Rangas Village, Majene Regency, which states that there is a significant relationship between birth spacing and the incidence of stunting with a p-value = 0,041. Too close a distance between pregnancy and birth will affect the nutritional status of the family because it will make it difficult for the family to care for and provide a good and strong pregnancy and parenting atmosphere for mothers at home.[13]

In the variable of maternal knowledge about 1000 HPK, it is known that there is no relationship with the incidence of stunting. This study is in line with research conducted by Ahmad Faridi with a p-value = 0,200, which means that there is no relationship between maternal knowledge about 1000 HPK and the incidence of stunting. This is because many factors affect the nutritional status of infants, both direct factors and indirect factors. Direct factors are diet and infectious diseases, both of which determine nutritional status, while indirect factors are parental education level, nutritional knowledge, and family economic status.[14]

CONCLUSIONS AND SUGGESTIONS

As for some of the conclusions obtained, namely, there is a relationship between pre-pregnant maternal BMI and the incidence of stunting which has a chance to increase the risk by 4,464 times, there is a relationship between weight gain during pregnancy and the incidence of stunting which increases the risk by 3,75 times, there is a relationship between maternal age during pregnancy and the incidence of stunting which has a chance to increase the risk of incidence by 3, 0 times, there is a relationship between the baby's birth spacing and the incidence of stunting which has the opportunity to increase the risk by 2,444 times, there is no relationship between maternal knowledge about 1000 HPK with the incidence of stunting with a p-value = 0,114, and it is known that the pre-pregnancy mother's BMI variable is the variable that has the greatest influence on babies with stunting nutritional status (odds ratio = 15,943). For this reason, it is expected to be more intensive in educating couples of childbearing age, pre-pregnant mothers, or early on to adolescent girls to pay attention to factors that affect stunted children, especially to have an ideal BMI so that it will reduce the risk of having children with stunted nutritional status.

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