

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District



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ABSTRACT: *Stunting* is a condition of failure to thrive in toddlers due to long-term malnutrition, exposure to repeated infections, and lack of stimulation. *Stunting* is influenced by the health status of adolescents, pregnant women, toddler's diet, as well as economic, cultural, and environmental factors such as sanitation and access to health services. Abang District is the subdistrict with the highest number of stunted children under five in Bali Province in 2022 with 17,523 children under five. The aims of this study were 1) to analyze the partial effect of family income, education and age of mother's first marriage on the chances of a child born with *stunting* in Abang District. 2) To analyze whether the mother's education reduces the influence of the mother's first marriage age on the chances of a child born with *stunting* in Abang District. The sample in this study were 99 toddlers and the sample was taken using a non-probability sampling method, namely purposive sampling. The data analysis technique used was Logistic Regression and Moderated Regression Analysis (MRA) using the STATA tool. Based on the results of the study it can be concluded that 1) Family income, education and age of mother's first marriage have a significant negative effect on the chances of a child born with *stunting* in Abang District. 2) Mother's education reduces the effect of mother's first marriage age on the chance of a child born with *stunting* in Abang District.

KEYWORDS: Stunting, family income, mother's education, mother's age at first marriage

I. INTRODUCTION

Indonesia still faces nutritional problems that greatly affect the quality of human resources. Currently, one of the nutritional problems that is of particular concern is the high number of stunted children. Stunting is a condition of failure to thrive in toddlers due to malnutrition for a long time, exposure to repeated infections, and lack of stimulation. Stunting is influenced by the health status of adolescents, pregnant women, the diet of toddlers, as well as economic, cultural, and environmental factors such as sanitation and access to health services [1]. In accordance with Presidential Regulation no.18 on RPJMN 2020-2024 that the problem of maternal mortality and stunting is a National Major Project, in addition to the government's commitment to the achievement of SDG's goal no 2 on efforts to end hunger, achieve food security and better nutrition, and support sustainable agriculture provides a strong enough basis to pay more attention to efforts to reduce stunting in Indonesia [2]. Factors causing stunting are also influenced by family income, maternal age during pregnancy, exclusive breastfeeding, age of breastfeeding, adequate levels of zinc and iron, history of infectious diseases and genetic factors [3].

Children can be classified as stunted if the measurement of height or body length at each age is less than -2 SD (Standard Deviation) and very short if less than -3 SD [4]. The high rate of stunting can be a burden on the future of a country. It can be assumed that stunting is one of the indicators of a country's progress. Children with developmental delays (stunting) may experience pathological changes such as physical decline, cognitive ability, neurodevelopment, and an increased risk of metabolic diseases in adulthood. Such changes will put pressure on the family economy and can lead to the loss of skilled human resources in a country. [5].

Compared to ASEAN countries, the prevalence of stunting in Indonesia is still higher than Myanmar at 35 percent, but still higher than Vietnam at 23 percent, Malaysia at 17 percent, Thailand at 16 percent and Singapore at 4 percent. In some developing countries, moderate stunting rates among children under five are 26 percent in Bangladesh, 24.3 percent in India and 24.3 percent in Nepal. Bangladesh, the rate of severe stunting in children under five is 15.2 percent, India at 23.7 percent and 15.9 percent in Nepal [2].

Nutritional problems are currently a concern in several countries, one of which is Indonesia. According to Riskesdas, the national stunting prevalence reached 30.8 percent in 2018. Meanwhile, according to SSGBI 2019 data, it fell to 27.67 percent, and the estimated national stunting rate in 2020 was 26.92 percent. Although the stunting rate is expected to decrease to 26.92 percent by 2020, the high prevalence of stunting still occurs in some provinces [6]. Toddlerhood is the most important period in a child's life cycle because at the age of 0 to 5 years, toddlers will experience physical, mental and behavioral development.

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

where children experience growth and development failure which results in incompatibility of height with age in toddlers due to chronic nutritional problems, namely lack of nutritional intake [7].

The impact of stunting needs to be taken seriously because it will affect children's survival, educational performance and economic productivity. Once a child's cognitive growth and development is stunted, it is difficult for them to catch up and have fewer opportunities to regain lost opportunities [8].

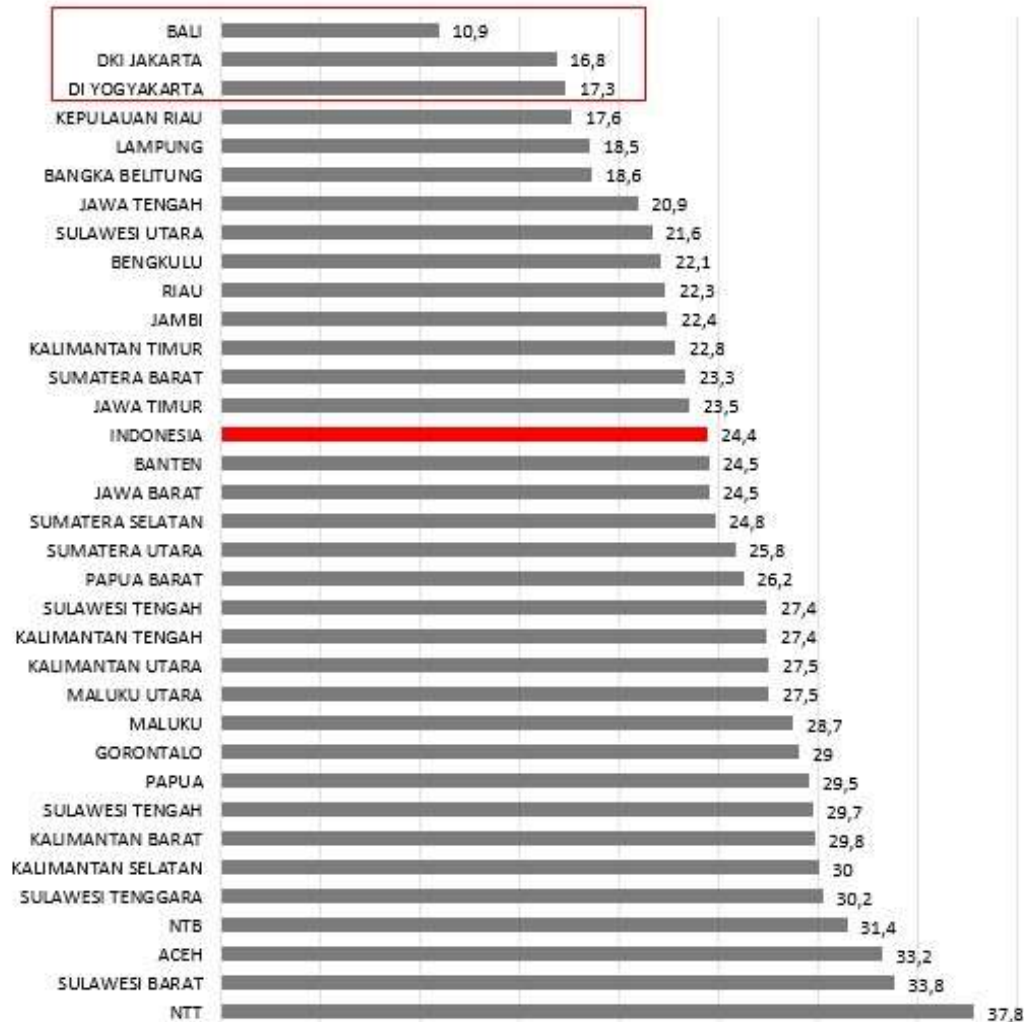
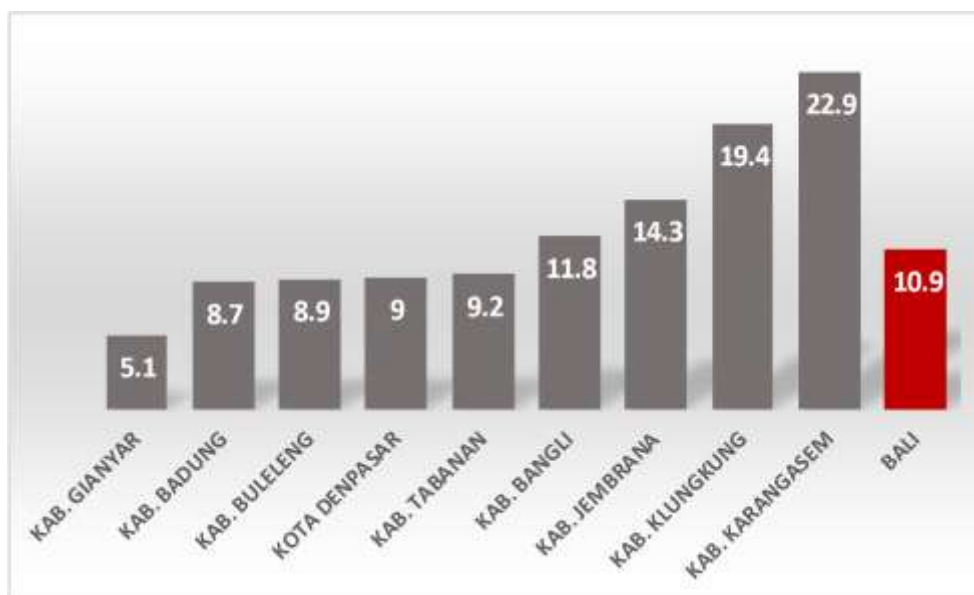


Figure 1. Prevalence of Stunting Toddlers by Province in Indonesia in 2021

When viewed in Figure 1.1 which shows that in Indonesia the stunting rate is still quite high. The province with the highest prevalence of stunting toddlers in 2021 is NTT Province at 37.8 percent, followed by West Sulawesi Province and Aceh Province at 33.8 percent and 33.2 percent respectively. According to [9] the prevalence of stunting toddlers in Indonesia is 24.4 percent. When compared to Riskesdas in 2013, over the last eight years there has been a decrease in stunting prevalence by 12.8 percent or around 1.6 percent per year. But the figure is still very high when compared to the threshold set by the WHO which is 20 percent.

To overcome stunting in Indonesia, the government has targeted a stunting reduction program of 14 percent by 2024. In the midst of this pandemic, this achievement is a big challenge for the government and people of Indonesia. In addition, the current posyandu activities are not ideal. In fact, Posyandu is a major milestone in monitoring early childhood growth and development in smaller areas. In addition, Indonesia's economy is not doing well during the pandemic. In the midst of increasing poverty and unemployment, it is undeniable that the prevalence of stunting in Indonesia tends to increase. Family economic factors are closely related to the occurrence of stunting in children. This is because a person's economic status affects his nutritional intake and the nutrients he receives.

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District



Source: (Ministry of Health, 2021)

Figure 2. Prevalence of Stunted Toddlers (Height According to Age) by Regency / City in Bali Province

When viewed nationally, the stunting rate in Bali is quite low but varies greatly from district to district. The problem of stunting is still found in several districts with a fairly large number and still requires serious attention. Figure 1.2 shows the prevalence of stunting toddlers in districts / cities in Bali Province. Gianyar Province is the province with the smallest prevalence of stunting toddlers at 5.1 percent. The district with the highest stunting prevalence is Karangasem Regency at 22.9 percent, followed by Klungkung Regency with a stunting prevalence of 19.4 percent. Therefore, Karangasem Regency is currently the focus of the Bali Provincial government in reducing stunting rates in Bali Province.

Table 1. Stunting Data for Karangasem Regency for Each Puskesmas in 2021

NO	PUSKESMAS	SANGAT PENDEK		PENDEK		STUNTING	%
		0-2 Tahun	0-5 Tahun	0-2 Tahun	0-5 Tahun		
1	RENDANG	2	4	9	18	22	2,44
2	SIDEMEN	7	21	42	128	149	7,78
3	MANGGIS I	4	25	15	80	105	7,40
4	MANGGIS II	4	9	17	64	73	9,13
5	KARANGASEM II	5	14	6	44	58	5,57
6	KARANGASEM I	1	10	16	74	84	10,17
7	ABANG I	21	63	101	337	400	18,58
8	ABANG II	22	71	63	185	256	17,67
9	BEBANDEM	9	24	14	66	90	5,70
10	SELAT	0	4	9	74	78	6,82
11	KUBU II	22	47	53	140	187	10,04
12	KUBU I	13	55	30	111	166	18,80
TOTAL		110	347	375	1321	1668	10.44

Source: February 2021, Karangasem Regency Office

Table 1.1 shows the number of stunting toddlers in each sub-district in Karangasem Regency in 2021. The highest number of stunting toddlers is found in Abang District, which is 656 toddlers. Abang District has 2 puskesmas, namely Puskesmas Abang I and Puskesmas Abang II, of which the two puskesmas have the highest stunting rates in 2021 in Karangsem Regency.

Family characteristics are one of the indirect factors such as family income, maternal education and also the age of the mother's first marriage can affect the risk of stunting. Family income is one of the factors that has a relationship with children's nutritional status. Families with high economic status have a better ability to meet their intake needs compared to families with low incomes [10].

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

The next characteristic of the family is the education of the mother. Mothers with higher education will have good nutritional knowledge and insight into information related to how to care and provide good nutritional intake as well. Children with poor parenting will be more at risk of having short nutritional status compared to children with good care [10]. This is in line with research from [11] that is, there is a significant relationship between the level of maternal education and the incidence of stunting in the Sampang Puskesmas work area where mothers with low education levels have a 0.254 times greater risk of stunting events when compared to mothers with higher education levels. In addition, family characteristics found a relationship between the age of the mother at the first marriage and the incidence of stunting, where mothers who marry at the age of < 20 years (early marriage) are at greater risk for their toddlers to experience stunting than if married according to a healthy age, namely > 20 years and less than 35 years [12].

Based on the background and problem formulation described above, the objectives of this study are as follows. 1) To analyze the partial effect of Family Income, Education and Age of First Marriage of Mothers on the chances of children born stunting in Abang District. 2) To analyze whether maternal education reduces the effect of mother's first marriage age on the chances of children being born stunted in Abang sub-district

II. LITERATURE REVIEW

Stunting is a condition in which a toddler fails to thrive due to chronic malnutrition, so that the child is too short for his age. The effects of stunting can be divided into short-term and long-term effects. The short-term effects are increased morbidity and mortality, suboptimal cognitive, motor and language development in children, and increased health costs. Long-term effects include suboptimal posture in adulthood (shorter than average), increased risk of obesity, decreased reproductive health, decreased learning ability, and suboptimal productivity and work ability [13].

Research results [14] shows that there is a strong relationship between maternal age and the incidence of stunting where women aged less than or equal to 20 years have a greater chance of having stunted children than those over 30 years old. Agree with research [13] which shows that the respondent's first marriage age most occurred in the age range of 21-29 years with a percentage of 44.8 percent. This shows that most respondents have met the requirements of the marriage law for the age of marriage for women. However, mating that occurs under the age of 20 years is 41.6 percent. The data showed 41.6 percent of respondents had not met the marriage law requirements for women's marriageable age.

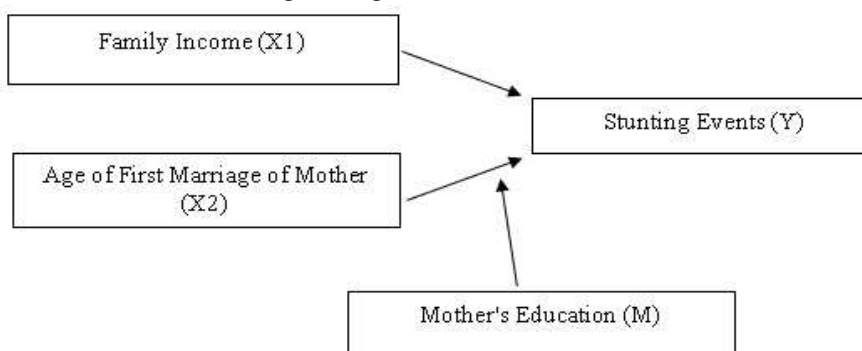


Figure 3. Conceptual Framework

The hypotheses in this study are as follows:

- H1. Family Income, Education and Age of First Marriage of Mothers have a partial effect on the chances of children born stunting in Abang District.
- H2. Maternal education reduces the effect of the mother's first marriage age on the chances of children being born stunted in Abang sub-district

III. RESEARCH METHODS

This study is an associative study, which is used to analyze the effect of Family Income, Education and Age of First Marriage of Mothers on the Incidence of Stunting in Abang District. This research took place in Abang District, Karangasem Regency. Abang District was chosen because it has the highest number of stunting in Karangasem Regency in 2022 at 17,523 children under five. In addition, Abang District, located in Karangasem Regency, is also included in 154 districts/cities where stunting reduction is prioritized in 2022, so this location is relevant to be used as a research location. In addition, the rate of stunting reduction that has not met the target to be achieved is the reason why this location was chosen. Where the prevalence of stunting in Karangasem Regency is above the target number applied by WHO. The object of this study is Family Income, Education and Age of First Marriage of Mothers and stunting in toddlers aged 0-60 months in Abang District.

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

The population in this study is stunted toddlers in Abang District in 2022 as many as 17,523 toddlers. The following is a population table in the study based on districts / cities in Bali Province. In this study using the Slovin technique. Based on the calculation of the Slovin formula, the population of 17,523 stunted toddlers aged 0-60 months in Abang District and the critical value limit of 10 percent, a sample of 99 toddlers was obtained.

To get the desired respondent, a Non Probability Sampling technique is used, namely Purposive Sampling, which is the taking of sample members with certain considerations specifically selected that meet predetermined criteria (Sugiyono, 2019 : 67). The criteria to be sampled in this study are 1) Families have toddlers aged 0-60 months; 2) toddlers are active in weighing at posyandu; 3) and the family is a permanent resident. The purpose of setting this criterion is that the results of the study provide a representative picture of the effect of independent variables, namely family income, education and mother's first marriage age on the incidence of stunting in toddlers. The analytical techniques used to answer this research hypothesis are logistic regression analysis and Moderated Regression Analysis (MRA)

IV. RESULTS OF RESEARCH AND DISCUSSION

The respondents in this study were 99 toddlers according to TB/U in Abang District. In the process of disseminating data in the form of questionnaires that have been carried out in this study, all respondents interviewed are families who have toddlers residing in Abang District, then will be described in detail about the characteristics of respondents based on family income, maternal education, mother's first marriage age and the incidence of stunting.

Table 2. Respondent Characteristics

	Kriteria	Freq.	Percent	Cum.
Pendapatan Keluarga	0	48	48.48	48.48
	1	51	51.52	100.00
	Jumlah	99	100.00	
Pendidikan Ibu	0 Tahun	3	3.03	3.03
	1 Tahun	21	21.21	24.24
	2 Tahun	12	12.12	36.36
	3 Tahun	19	19.19	55.55
	4 Tahun	12	12.12	67.67
	5 Tahun	3	3.03	70.70
	6 Tahun	2	2.02	72.72
	7 Tahun	1	1.01	73.73
	8 Tahun	7	7.07	80.80
	9 Tahun	2	2.02	82.82
	10 Tahun	1	1.01	83.83
	11 Tahun	2	2.02	85.85
	Jumlah	99	100.00	
Umur Kawin Pertama	15	2	2.02	2.02
	17	4	4.04	6.06
	18	8	8.08	14.14
	19	13	13.13	27.27
	20	22	22.22	49.49
	21	1	1.01	50.50
	22	7	7.07	57.57
	23	7	7.07	64.64
	24	9	9.09	73.73
	25	8	8.08	81.81
	26	4	4.04	85.85
	27	2	2.02	87.87
	28	2	2.02	89.89
29	1	1.01	90.90	
30	2	2.02	92.92	
35	1	1.01	93.93	
Jumlah	99	100.00		
Balita	Normal	52	52.53	52.53
	Stunting	47	47.47	100.00
Jumlah	99	100.00		

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

Data shows the monthly income of the family (husband and wife). It can be seen in the table that families with high income (>UMK Karangasem) are given a value of 0 and family income that is categorized as low (<UMK Karangasem) is given a value of 1. A total of 66 high-income families and as many as 33 low-income families per month are in Abang District. Data shows the formal education pursued by mothers who have toddlers in Abang District. The most maternal education was taken in elementary education (6 years) as many as 21 respondents and junior high school (9 years) as many as 19 respondents. While mothers who took the highest education were S2 for as many as 2 respondents. Furthermore, the data shows the characteristics of the mother's first marriage age in Abang District. It can be seen that the age of mothers when married for the first time is the most in the productive age category (20-35 years), which is 72 respondents and 27 respondents are included in the unproductive age category (<20 years) in Abang District. Then data related to the characteristics of toddlers in Abang District shows that toddlers with stunting categories in Abang District are 47 toddlers, this indicates that Abang District must pay more attention and improve the health of mothers and children, because the number of stunting toddlers in Abang District still dominates than normal toddlers, which is 52 respondents.

Table 3. Logistic Test Results and Regression Moderation

Stunting	Coef.	Odds Ratio	Std.Err.	P> Z
X1	-2.518328	.0805943	1.149357	0.028
M	-.2764945	.7584378	.1419503	0.051
X2	-1.092353	.3354261	.2636353	0.000
X2M	-.0083925	.9916426	.0036208	0.020
_cons	29.06171	4.18e+12	6.32151	0.000
Observations	99			
LR chi2 (4)	102.77			
Prob > chi2	0.0000			
Pseudo R2	0.7502			
Log likelihood	-17.111416			

The results of the logistic regression test show that variable X1, namely family income, has a coefficient value marked (-), it can be interpreted that there is a negative relationship when there is an increase in family income that will reduce the incidence of stunting in Abang District. The results of the logistic regression test show that variable M, namely maternal education, has a coefficient value marked (-), it can be interpreted that there is a negative relationship when there is a higher maternal education will reduce the incidence of stunting in Abang District. The results of the logistic regression test show that the variable X2, namely the mother's first marriage age has a coefficient value marked (-), it can be interpreted that there is a negative relationship when there is a greater age of first marriage of mothers will reduce the incidence of stunting in Abang District. The results of the moderation regression test, namely maternal education and mother's first marriage age (X2M) on the incidence of stunting (Y) have a coefficient value marked (-), it can be interpreted that the higher the mother's education and the mother's first marriage age (X2M), it will reduce the chances of children being born stunting (Y) and the significance value of the maternal education variable (M) by $0.020 < 0.05$ which means that the maternal education variable (M) has a significant effect on the chances of children born stunted (Y).

The test was performed by comparing the statistics of the Wald test with the standard normal distribution at the level of significance of α . H_0 is rejected if value $|W| > Z_{\alpha/2}$ or $p\text{-value} \leq \alpha$. Partially, the independent variables that affect the incidence of stunting are variables that have a p-value of < 0.05 with a significance level of five percent, namely family income (X1), maternal education (M) and mother's first marriage age (X2).

Based on the results of the study, the variable Family Income (X1) has a p-value of $0.028 < 0.05$. This means that H_0 is rejected and H_1 is accepted, meaning that the results of the analysis that have been found explain that Family Income has a negative and significant effect on the chances of children being born stunted in Abang District. Variable family income with an Odds Ratio value of 0.0805, families with low income (\leq UMK Karangasem) are more at risk of giving birth to stunted children as much as 0.0805 times than families with high income (\geq UMK Karangasem). The results of this study are in line with research conducted by [16] which explains that family income has a negative and significant influence on the incidence of stunting in Makassar. This result means that a low income level is a risk factor for stunting, where families with low incomes have a 7 times greater risk of having stunted children than families with sufficient income. Family income is related to the ability of the household to meet the needs of life both primary, secondary and tertiary. High family income makes it easier to meet the needs of life, on the other hand, low family income has more difficulty in meeting the needs of life. Low income will affect the quality and quantity of food consumed by the family. Low income levels and weak purchasing power make it possible to overcome eating habits in certain ways that hinder effective nutritional improvement especially for their children [17].

Based on the results of the study, the variable Maternal Education (M) has a p-value of $0.051 < 0.06$. This means that H_0 is rejected and H_1 is accepted, meaning that the results of the analysis that have been found explain that maternal education has a negative and significant effect on the chances of children being born stunted in Abang District. The variable education of mothers with an Odds

The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

Ratio value of 0.7584 then mothers with low education (< high school) are more at risk of giving birth to stunted children as much as 0.7584 times than mothers with higher education. These results are in line with research conducted by [18] which explains that maternal education has a negative and significant influence on the incidence of stunting. Where mothers with basic education have a 2,885 times higher risk of stunting, compared to mothers with higher education. The mother's education level is the last formal education to be completed. The function of education for mothers is to develop children's insight into themselves and the environment. The high and low level of education of mothers depends on the length of education taken. Mothers with a higher level of education will be more receptive to health information, especially about how to educate toddlers on a daily basis. Factors that can affect the development of toddlers are how to care and educate. Mothers with low education will find it difficult to receive information, so children who live in families with basic education levels tend to experience slow growth due to the parenting patterns given to children [19].

Based on the results of the study, the variable of the Mother's First Marriage Age (X2) has a p-value of $0.000 < 0.05$. This means that H0 is rejected and H1 is accepted, meaning that the results of the analysis that have been found explain that the mother's first marriage age has a negative and significant effect on the chances of children being born stunted in Abang District. The variable age of first marriage of mothers with an Odds Ratio value of 0.3354 then mothers with the age of first marriage under reproductive age (<20 years) are 0.3354 times more at risk than mothers who marry during reproductive age. These results are in line with research conducted by (Abdulah Azam, 2023) Explaining the mother's first mating age has a negative and significant influence on the incidence of stunting. The results showed that marrying children at the risk of stunting 1,984 times compared to marrying adults. The process of pregnancy is greatly influenced by the age of the mother when diagnosed with pregnancy. If the age of the mother during pregnancy is younger or older, it will be at risk of pregnancy complications. A woman who becomes pregnant in adolescence will get less early prenatal care. The lack of care obtained by inu due to teenage pregnancy is predicted to cause low birth weight (BBLR), short babies and infant mortality [21].

CONCLUSIONS

Based on data analysis and discussion that has been carried out in the previous chapter, the following conclusions can be drawn: 1) Family Income, Education and Age of First Marriage of Mothers have a significant negative effect on the chances of children being born stunted in Abang District. The results of this study show that the higher the family income, education and age of the mother's first marriage will reduce the risk of stunting birth toddlers in Abang District. 2) Maternal education moderates the effect of the mother's first marriage age on the chances of children being born stunted in Abang sub-district. The results showed that maternal education reduced the effect of the mother's first marriage age on the chances of children being born stunting in Abang sub-district.

For health workers in Abang District, it is hoped that the results of this study can be used as a distribution of information and evaluation materials to pay more attention to the development of mothers and children and are advised to be more aggressive in conducting counseling to provide information about healthy foods from local ingredients that are easy to find to help families overcome family nutrition problems, as well as pay special attention to toddlers who have the potential to experience stunting, especially in families low income. In addition, a nutrition improvement program is needed to improve the quality of the first 1000 days of life before pregnant women in order to prevent early children at risk of stunting and it is expected that stunting in toddlers will also decrease.

Roles Families with toddlers are advised to increase their family income in order to meet nutrition for mothers and children to prevent stunting. In addition, it is expected that families who have children, both girls and boys, will be given information about the risks of marrying young, which is expected later to reduce the risk of giving birth to stunted children due to the mother's age being too young.

The role of mothers who have toddlers is advised to add insight and pay attention to nutrition in children to prevent stunting, and is expected to increase enthusiasm in participating in posyandu which is held regularly to find out the development of children and find out the nutrition needed in children under five

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The Effect of Family Income, Education and Mother's First Marriage Age on The Incidence of Stunting in Abang Sub-District

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