Ketut Suarayasa, et. al. International Journal of Engineering Research and Applications
www.ijera.com
ISSN: 2248-9622, Vol. 13, Issue 10, October 2023, pp 83-89

RESEARCH ARTICLE OPEN ACCESS

The Influence of the Health Status of Pregnant Women on the Incident of Stunting Toddlers in the Mamboro Health Center Working Area, Palu City

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ABSTRACT
One of the sub-districts in the city of Palu which has a high prevalence of stunting is Taipa Sub-District with 24.7% or 108 cases out of 437 toddlers measured. This figure makes Taipa sub-district, which is in the Mamboro Health Center area, the sub-district with the highest stunting cases in Palu City.
The aim of the research is to analyze the relationship between the health status of pregnant women (quantity and quality of ANC, nutritional status of pregnant women and anemia in pregnant women) and the incidence of stunting in the Mamboro Health Center working area, Palu City.
The type of research used is quantitative research with a case control research design. The research begins by measuring the dependent variable, while the independent variable is measured retrospectively. The sample size was 102 stunted toddlers in the case group and 102 normal toddlers in the control group.
The results of the study showed that the quantity and quality of antenatal care examinations in both groups were good, however, pregnant women in the case group were more likely to experience CED and anemia. The results of the analysis show that there is no relationship between the quantity and quality of ANC and the incidence of stunting, but there is a significant relationship between KEK and anemia and the incidence of stunting.
Conclusion : Pregnant women with CED have a relationship with the incidence of stunting, where pregnant women with CED have a 4.85 times risk of giving birth to stunted toddlers compared to pregnant women without CED. Pregnant women with anemia have a relationship with the incidence of stunting, where pregnant women with anemia have a 5.93 times risk of giving birth to stunted toddlers compared to pregnant women who are not anemic (OR = 5.93).
Keywords **–** Anemia, Chronic Energy Deficiency, Quantity of Antenatal, Quality of Antenatal, Stunting

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Date of Submission: 03-10-2023 Date of acceptance: 15-10-2023

I. INTRODUCTION

Data from the 2021 Indonesian Nutritional Status Study shows that the prevalence of stunting (TB/Age) by province among children under five in Central Sulawesi Province is still quite high. Central Sulawesi is one of the 10 provinces that has the highest stunting prevalence rate in Indonesia, where Central Sulawesi ranks 8th with a stunting prevalence of 29.7%, quite far from the national prevalence of 24.4% (1) .

Meanwhile, the stunting rate in Palu City according to the results of the 2022 Indonesian Nutrition Status Survey (SSGI) is 24.7% or an increase of 0.7 digits compared to the 2021 figure of 23.9%. One of the sub-districts in the city of Palu which has a high prevalence of stunting is Taipa Sub-District with 24.7% or 108 cases out of 437 toddlers measured. This figure makes the Taipa sub-district in the Mamboro Health Center area the sub-district with the highest stunting cases in Palu City (2).

The problem of stunting is generally caused by several factors according to the WHO framework (3), one of which is maternal factors, such as: poor nutrition during pre-conception, inadequate food intake during pregnancy, health checks during pregnancy, infections in pregnant women, short maternal stature, teenage pregnancy, mental health, premature birth, short birth interval (4)(5).

Other causes are the mother's low knowledge about fulfilling children's nutrition, parents' wrong parenting patterns, poor sanitation and hygiene availability, and the low level of health services they receive (6). Apart from that, the cause of stunting in children occurs in the mother's womb. There are still many Indonesian people who do not realize the importance of providing adequate nutrition during the mother's pregnancy, which

contributes greatly to fulfilling the baby's nutrition later (7).

The aim of the research is to analyze the relationship between the health status of pregnant women (quantity and quality of ANC, nutritional status of pregnant women and anemia in pregnant women) and the incidence of stunting in the Mamboro Health Center working area, Palu City.

II. RESEARCH METHODS

The type of research used is quantitative research with a case control research design. The research begins by measuring the dependent variable, while the independent variable is measured retrospectively (8)(9). Place and time of research in May - July 2023 in the working area of the Mamboro Health Center. The sample size was 102 stunted toddlers in the case group and 102 normal toddlers in the control group. Control toddlers were taken according to the area of toddlers with stunting cases. Data analysis in the form of respondent characteristics in the form of distribution of father's and mother's education, father's and mother's occupation, father's and mother's income, parity and age of respondents. Bivariate analysis looked at the relationship between the health status of pregnant women including: quantity and quality of antenatal care, nutritional status of pregnant women (chronic energy deficiency) and pregnancy anemia with the incidence of stunting in the Mamboro work area using chi-square.

III. RESULTS

3.1. Respondent Characteristics

The respondents of this study were mothers of stunted toddlers (cases) and mothers of non-stunting toddlers (controls).

From the table 1, it can be seen that the characteristics of respondents in the case and control groups do not have significant differences. Prominent differences were seen in the characteristics based on maternal education (high school – university) in the case group at 49%, lower than the control group at 55.9%. Another difference is in parity, where in the group of parity cases > 2 children it is 68.6%. Meanwhile, in the control group, the majority of parity <= 2 children (56.9%).

Characteristics		Nutritional Status			
		Stunting (Case)		Normal (Control)	
		n	%	n	%
Father's Education	Risky (SD-SMP)	50	49.0	49	48.0
	Not risky (SMA - PT)	52	51.0	53	52.0
	Total	102	100.0	102	100.0
Mother's Education	Risky (SD-SMP)	52	51.0	45	44,1
	Not risky (SMA - PT)	50	49.0	57	55,9
	Total	102	100.0	102	100.0
Father's Job	Doesn't Work	6	5,9	8	7,8
	Work	96	94,1	94	92,2
	Total	102	100	102	100
Mother's Job	Doesn't Work	88	86,3	82	80,4
	Work	14	13,7	20	19,6
	Total	102	100	102	100
Father's Income	Low (< 1.500.000)	66	64,7	62	60,8
	Middle (1.500.000 - 3.500.000)	31	30,4	32	31,4
	High (> 3.500.000)	5	4,9	8	7,8
	Total	102	100	102	100
Mother's Income	Low (< 1.500.000)	96	94,1	95	93,1
	Middle (1.500.000 - 3.500.000)	6	5,9	4	3,9
	High (> 3.500.000)	0	0	3	2,9

	Total	102	100	102	100
Age Group	> 20 years	2	2.0	6	5.8
	20 - 35 years	70	68.6	67	65.7
	> 35 years	30	29.4	29	28.5
	Total	102	100.0	102	100.0
Parity	<= 2 chlidren	32	31.4	58	56.9
	> 2 chlidren	70	68.6	44	43.1
	Total	102	100.0	102	100.0

Source : primary data, 2023

3.2. Univariate Analysis

The health status of pregnant women studied includes: quantity and quality of antenatal care, nutritional status of pregnant women which is measured based on upper arm circumference, so that pregnant women with chronic energy deficiency (if upper arm circumference < 23.5 cm) and pregnant women with chronic low energy status are found. normal nutrition (if upper arm circumference > 23.5 cm). Another nutritional status of pregnant women is pregnancy anemia which is measured based on the Hemoglobin value (Anemia if Hb < 11 g/dL and normal if Hb > 11 g/dL. The results are as follows:

Table 2. Description of the Health Status of Pregnant Women in the Case and Control Groups in the Mamboro Community Health Center Area in 2023

	Nutritional Status			
	Stunting (Case)		**Normal (Control)**	
Variable	n	%	n	%
Quantity ANC				
Incomplete (< 6 x)	38	37,3	38	37,3
Complete (>= 6 x	64	62,7	64	62,7
Total	102	100,0	102	100,0
Quality ANC				
Incomplete (< 10 T)	9	8,8	6	5,9
Complete (10 T)	93	91,2	96	94,1
Total	102	100,0	102	100,0
Nutritional Status of Pregnant Women				
Chronic lack of Energy	59	57,8	22	21,6
Not Lacking Chronic Energy	43	42,2	80	78,4
Total	102	100	102	100
Pregnancy Anemia				
Anemia	71	69,6	29	28,4
Not Anemic	31	30,4	73	71,6
Total	102	100	102	100

source: primary data, 2023

Based on table 2, it appears that the health status of pregnant women based on the quantity and quality of antenatal care examinations in the case and control groups is almost the same (mostly complete). This shows that pregnant women's awareness of pregnancy checks is quite good. However, the health status of pregnant women based on Chronic Energy Deficiency (CED) and Anemia, the percentage is higher in pregnant women from the case group.

3.3. Bivariate Analysis

In the bivariate analysis, the relationship was sought between the health status of pregnant women (quantity and quality of pregnant women, nutritional status of pregnant women/CED and anemia of pregnancy) and the incidence of stunting. The results are as follows :

Table 3. Relationship between the health status of pregnant women and the incidence of stunting in the Mamboro Health Center Area, Palu City in 2023

Variable	Nutritional Status					OR (95% CI Lower - Upper)
	Stunting (case)		Normal (Control)			
	n	%	n	%	*p value*	
Quantity ANC						**1,000 (0,5 – 1,7)**
Incomplete (< 6 x)	38	37,3	38	37,3		
Complete (>= 6 x	64	62,7	64	62,7		
Total	102	100	102	100	**1,000**	
Quality ANC					**0,42**	**1,548 (0,5 – 4,5)**
Incomplete (< 10 T)	9	8,8	6	5,9		
Complete (10 T)	93	91,2	96	94,1		
Total	102	100	102	100		
Nutritional Status of Pregnant Women						**4,85 (2,7 – 8,7)**
Chronic lack of Energy	59	57,8	22	21,6		
Not Lacking Chronic Energy	43	42,2	80	78,4		
Total	102	100	102	100	**0,00**	
Pregnancy Anemia						**5,93 (2,5 – 13,7)**
Anemia	71	69,6	29	28,4		
Not Anemic	31	30,4	73	71,6		
Total	102	100	102	100	**0,00**	

source: primary data, 2023

Table 3 shows that ANC quantity and ANC quality have no relationship with the incidence of stunting in the Mamboro Health Center area (p value> 0.05), while chronic energy deficiency (KEK) and anemia in pregnant women have a relationship with the incidence of stunting. Pregnant women with CED have a 4.85 times risk of giving birth to stunted toddlers compared to pregnant women who do not have CED (OR = 4.85). Pregnant women with anemia have a 5.93 times risk (OR = 4.85) of giving birth to stunted toddlers compared to pregnant women who are not anemic (OR = 5.93).

IV. DISCUSSION

4.1. The relationship between the quantity and quality of ANC and the incidence of stunting

The process of stunting is a long process, starting with failure to thrive, both during pregnancy and after birth in the first two to three years of life (10). This failure to thrive results in a decrease in the proportion of bone and soft tissue growth in the body. Stunting that occurs in the critical period, namely from the womb until the age of two years, if not utilized properly it will have a permanent impact on development. Toddlers who experience stunting will have an impact on motor development, such as delays in walking(11)(12).

Therefore, adequate examination during pregnancy (Antenatal Care) is very important to pay attention to in order to prevent complications during pregnancy and childbirth and to maintain the health of the fetus (13). However, in reality, in society's behavior, especially in Indonesia, there are still many mothers who consider pregnancy to be normal, natural and natural. They feel that they do not need to have their pregnancy checked regularly at health services, which in the end causes risk factors that the mother may experience cannot be detected early (14)(15).

The results of the study showed that there was no relationship between the quantity and quality of antenatal care (ANC) and the incidence of stunting in the Mamboro Community Health Center area. The frequency distribution in the case and control groups was almost the same, between the quantity and quality of antenatal care that met standards and that which did not meet standards. The quantity of antenatal care for the majority (>60%) is above 6x, according to the 2021 Ministry of Health regulations. Meanwhile, the quality of antenatal care for the majority (>90%) is in accordance with standards (10 ANC standards).

A study states that mothers who undergo antenatal care less than three times and do not have their pregnancies checked by doctors, nurses or midwives may be at risk of stunting in their children. Regular ANC visits can detect early pregnancy risks for a mother and her fetus, especially those related to nutritional problems. Research conducted in three Latin American countries explains that ANC can be used as a risk factor for stunting whose value is not influenced by other variables. This research states that access to ANC is related to the incidence of stunting in children. It was found that access to antenatal care had a significant effect on reducing malnutrition in Colombia and Peru. However, in Bolivia, research results state that there is no relationship between ANC and stunting(16).

4.2. The relationship between chronic energy deficiency (KEK) and the incidence of stunting

Pregnant women who are at risk of Chronic Energy Deficiency (CED) are pregnant women who have an Upper Arm Circumference (LILA) of less than 23.5cm or a Body Mass Index (BMI) in pre-pregnancy or Trimester I below 18.5 kg/m2 (underweight). In this study, only upper arm circumference was used. The results showed a relationship between KEK and the incidence of stunting, with an OR = 4.85.

KEK pregnant women are at risk of giving birth to underweight (LBW) babies. Birth weight that is less susceptible to infectious diseases which will inhibit growth so that there is a greater risk of stunting. This condition can be prevented by adjusting your diet, controlling food portions, and eating nutritious foods as needed. Pregnant women need to take care of the foods they consume that are needed by the body so that nutrition during pregnancy is fulfilled. Mother's nutrition is good by eating foods rich in protein, fat, calcium, calories such as tempeh, tofu, fish, eggs, vegetables, fruit and nuts (17)(18).

The increase in maternal weight during pregnancy with an increase in LILA has a very important role for the baby she is carrying. Pregnant women who are undernourished or have CED affect their womb because food is also consumed by the unborn baby. The process of stunting is a long process, starting with failure to thrive, both during pregnancy and after birth in the first two to three years of life. This failure to thrive results in a decrease in the proportion of bone and soft tissue growth in the body (19).

4.3. The relationship between anemia and stunting

Another factor that is related to the incidence of stunting is pregnancy anemia ($p < 0.05$). The results showed that pregnant women with anemia had a 5.93 times risk (OR = 4.85) of giving birth to stunted toddlers compared to pregnant women who were not anemic (OR = 5.93).

Iron deficiency anemia is still a health problem that occurs in Indonesia, where iron deficiency anemia is one of the causes of high maternal and infant mortality. Based on the 2014 WHO report, the prevalence of iron deficiency anemia in Asia is >75% and it is estimated that around 35-75% of pregnant women in developing countries and 18% of pregnant women in developed countries experience anemia. Cases of iron deficiency anemia in Indonesia reach 50.5%. The 2018 Riskesdas results stated that in Indonesia 48.9% of pregnant women experienced anemia. As many as 84.6% of anemia in pregnant women occurs

in the 15-24 year age group (20). According to UNICEF, in 2019 the prevalence of LBW in Southeast Asia was 14.9 percent and the prevalence in Indonesia was 10 percent. Based on Basic Health Research (Riskesdas) data, the prevalence of LBW in Indonesia shows a decreasing trend, namely in 2010 it was 11.1 percent, in 2013 the prevalence was 10.2 percent, and in 2018 it decreased again to 6.2 percent (21).

Low hemoglobin levels in anemia cause chronic hypoxia, thereby activating the body's stress response and increasing circulating levels of corticotrophin-releasing hormone which can increase oxidative stress in the placenta so that fetal growth disorders, low birth weight and premature birth can occur. Procurement of Blood Supplement Tablets (TTD) is one of the efforts to prevent and control anemia in pregnant women. The government is making efforts to prevent anemia with a ferrous sulfate tablet supplementation program (22). Sulfas ferosus tablets are given for 90 days from the first time (K1) that pregnant women have their pregnancy checked. The Ministry of Health recommends that pregnant women consume at least 90 iron pills during pregnancy. When a mother consumes 60 mg of iron, it is expected that 6-8 mg of iron can be absorbed. If consumed for 90 days, the total iron absorbed is 720 mg and 180 mg of the mother's daily consumption. Iron requirements during pregnancy are an average of 800 mg – 1040 mg (23). The research results also did not find any relationship between compliance with TTD consumption and the incidence of stunting in the Mamboro health center area (p value> 0.05).

V. CONCLUSION

1. The quantity and quality of Antenatal Care has no relationship with the incidence of stunting in the Mamboro Health Center working area;
2. Chronic Energy Deficiency (CED) is related to the incidence of stunting, where pregnant women with CED have a 4.85 times risk of giving birth to stunted toddlers compared to pregnant women who do not CED (OR = 4.85).
3. Pregnant women with anemia have a relationship with the incidence of stunting, where pregnant women with anemia have a 5.93 times risk of giving birth to stunted toddlers compared to pregnant women who are not anemic (OR = 5.93).

VI. SUGGESTION

Massive education is carried out for pregnant women and adequate antenatal care checks to detect cases of CED and anemia in pregnant women, so that early intervention can be carried out.

ACKNOWLEDGEMENTS

Thanks are expressed to the leadership of the Mamboro Community Health Center and staff, the leadership of the Faculty of Medicine, Tadulako University, and Posyandu cadres who have helped collect research data.

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