International Journal of Current Science Research and Review
ISSN: 2581-8341
Volume 06 Issue 07 July 2023
DOI: 10.47191/ijcsrr/V6-i7-12, Impact Factor: 6.789
IJCSRR @ 2023
www.ijcsrr.org

Effect of Mother Knowledge and Household Food Security on Anemia of Pregnant Women (Study in North Buton Regency)

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ABSTRACT
Background: Anemia in pregnancy can cause disruption of pregnancy continuity, disruption of the birth process, disorders during the puerperium, and disturbances to the fetus. World data shows the prevalence of anemia in pregnant women is 41.8% with a maternal mortality rate due to anemia of 303,000 people or around 216/100,000 live births. This study aims to analyze the determinants of anemia in pregnant women in North Buton Regency.
Method: This study used a cross-sectional design. The population in this study were all pregnant women aged <21 years who came to check their pregnancies at all Health Centers in North Buton Regency in January 2023 as many as 97 people with a total sample of 77 people who were taken using the proportional sampling technique.
Results: The research data was analyzed using using the chi-square test. The results showed body mass index (p-value = 0.002), food consumption level (p-value = 0.023), food security (p-value = 0.002), adherence to consumption of Fe tablets (p-value = 0.002), knowledge (p-value = 0.827), income (p-value = 0.015).
Conclusion: It can be concluded that body mass index, level of food consumption, food security, consumption of Fe tablets, and income are related to the incidence of anemia in pregnant women, while knowledge is not related to the incidence of anemia in pregnant women.

KEYWORDS: Anemia, body mass index, income, food security, pregnant women.

INTRODUCTION

World Health Organization (WHO) in 2019, it is estimated that there will be 303,000 maternal deaths or around 216/100,000 live births worldwide. Globally the prevalence of anemia in pregnant women is 41.8%. About half of the incidence of anemia is caused by iron deficiency. The prevalence of anemia in pregnant women in Africa is 57.1%, Asia is 48.2%, Europe is 25.1% and America is 24.1%. A person is said to suffer from anemia if the hemoglobin (Hb) level is below 11g% in the first and third trimesters or the level is below 10.5g% in the second trimester [1]

The prevalence of anemia in pregnancy in Indonesia in 2019 was 48.9% and this figure has increased quite high compared to the 2013 Basic Health Research results of 37.1%. Anemia in pregnancy which is most common in Indonesia is caused by iron deficiency as much as 62.3% which can cause miscarriage, premature parturition, uterine inertia, prolonged parturition, uterine atony and cause bleeding and shock. The impact that can be caused by iron deficiency anemia in pregnant women is 12% - 28% fetal mortality, 30% perinatal mortality and 7% - 10% neonatal mortality [2]

The direct impact of anemia in pregnant women during childbirth is the occurrence of bleeding of 17.24%. This condition certainly requires special attention to be able to reduce maternal and child mortality. Even though the government has carried out a program to combat anemia in pregnant women by giving 90 tablets of Fe (iron) to pregnant women during the gestation period, the incidence of anemia is still high[3]. The incidence of anemia in Indonesia is still quite high. Based on the 2018 Basic Health Research data, the prevalence of anemia in adolescents is 32%, meaning that 3-4 out of 10 adolescents suffer from anemia. This is influenced by the habit of nutritional intake that is not optimal and lack of physical activity. In fact, the 2018 Basic Health Research found quite good results, because it succeeded in capturing a decrease in Lack of Energy Calories rates in women of childbearing age. The 2013 Basic Health Research recorded 24.2% of pregnant women with Lack of Energy Calories and 20.8% of women with non-pregnant lack of energy calories, Meanwhile, the 2018 Basic Health Research noted that 17.3% of Women of Reproductive Age Lack of Energy Calories were pregnant and 14.5% of women of reproductive age lack of energy calories were not pregnant. However, there is a wrong assumption among adolescents regarding the size of beauty which is identified with thin body, which is a big challenge in

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efforts to prevent stunting. Not to mention the challenge of anemia in young women from 37.1% in Riskedas 2013 which actually increased to 48.9% in Basic Health Research 2018, with the proportion of anemia in the age group 15-24 years and 25-34 years. Some of the effects of anemia on female adolescents (rematri) are quite concerning, such as declining health and school achievement. In adulthood, anemia is exacerbated during pregnancy which causes non-optimal growth and development of the fetus, complications of pregnancy and childbirth, and results in maternal and child mortality[4]

Based on the results of the 2018 Indonesian Demographic Health Survey (IDHS), it was found that 0.7% of female adolescents aged 15-19 years had active sex before marriage, while 1.8% of female adolescents aged 20-24 years. The survey results from the Central Bureau of Statistics in 2012 revealed that the number of teenage pregnancies at the age of 15-19 reached 48 out of 1,000 pregnancies. Premarital active sex in adolescents is at risk of teenage pregnancy and transmission of sexually transmitted diseases. Unplanned pregnancies in teenage girls which lead to unsafe abortions and teenage marriages. Both will have an impact on the future of the teenager, the fetus he is carrying and his family [5]

Data from the Southeast Sulawesi (Southeast Sulawesi) National Family Planning Coordinating Board stated that of the total marriage rate data in Southeast Sulawesi, around 20% of them were young marriages. Based on BPS data for 2021 the percentage of women aged 10 years and over who have ever been married by Regency/City and the age at first marriage in 2019 in North Buton Regency, namely age ≤ 16 years was 11.67%, aged 17-18 years was 24.43 %, ages 19-20 years of 23.95%[6]. From these data it is possible that teenage pregnancy is very high. Adolescence is a period of transition from childhood to adulthood marked by a number of biological, cognitive and emotional changes. Biological changes, namely height gain, hormonal changes, and sexual maturation. Cognitive changes that occur are increased abstract, idealistic, and logical thinking. Socio-emotional changes include demands to achieve independence, conflicts with parents and the desire to spend time with peers[7]. The characteristic of adolescence is curiosity in various ways, including aspects of sexual behavior. In adolescence, the reproductive organs experience development and will eventually experience maturity. During puberty, hormones that begin to function apart from causing physical/body changes also affect sex drive in adolescents. Adolescents begin to clearly feel an increase in their sex drive, for example, they appear attracted to other people and the desire for sexual satisfaction[8].

Rismawati and Rohmatin's research (2018) concerning the Analysis of Factors Affecting Anemia in Teenage Pregnancy is adherence to taking Fe tablets, diet, and regular pregnancy check-ups (Antenatal Care visits)[9] .In line with Dania's research, et al (2022) concerning Pregnancy in Adolescents with Anemia concluded that factors that influence anemia in teenage pregnancies are adherence to taking Fe tablets, diet and regular pregnancy checks[10]. As well as Sari et al's research (2021) concluded that there is a relationship between middle adolescent age and moderate anemia (61.11%). Suggestions are expected to carry out health promotion regarding the age of mothers at risk for pregnancy and conduct safe motherhood to reduce the incidence of 4 too (too young, too old, too close, and give birth too often). It is hoped that health workers can inform reproductive health to adolescents and parents.[11]

Based on the results of Detty Afriyanti S's research on the risk factors associated with the incidence of anemia in pregnant women in the city of Bukittinggi, it was concluded that there was a significant relationship between the incidence of anemia and economic status, education, employment, age, parity and nutritional status. In line with Lilik Hartati and Sri Wahyuni's research on the Socio-Economic Relationship with the Incidence of Anemia in the 3rd Trimester Pregnant Women at the Jatinom Health Center concluded that there is a relationship between Socio-Economy and the Incidence of Anemia in the 3rd Trimester Pregnant Women [12]

Based on data taken from the Kulisusu Health Center in the working area of the North Buton District Health Office, it was found that 10 pregnant women aged <21 years had their hemoglobin levels checked. There were 4 pregnant women who identified Hb <11 g/dL, namely 2 pregnant women in the second trimester and 2 pregnant women. third trimester. Data on pregnant women <21 years from January - October 2022 as many as 117 people[12] (North Buton District Health Office, 2022).

METHOD

This type of research is quantitative with a cross-sectional study approach, namely research that seeks to find relationships between one variable and another by collecting data (measurements) on independent (independent) and dependent (bound) variables at one time at the same time. In this case the researcher measured household food security variables and the dependent variable anemia of pregnant women simultaneously. This research was carried out in North Buton Regency from December 2022 to January 2023.

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The population in this study were all pregnant women aged <21 years for the January-March 2023 period, totaling 99 people, while the sample was 77 people who were determined based on the lameshow formula. The sampling technique in this study was proportional random sampling, because the study locations were spread across all health centers in North District.

Anemia of pregnant women was measured using the Digital Analyzer hemoglobin method with the Easy Touch brand digital device with categories: not anemia, if the Hb test result is ≥ 11 gr/dL and Anemia, if the Hb test result is <11 gr/dL. Meanwhile, food security was measured using the USDA United Stated-Household Food Security Survey Module (US-HFSSM) questionnaire which has been adopted in Indonesia. The results of variable measurements were then processed and analyzed using the chi-square test with the help of the SPPS version 25.0 application

RESULTS

Characteristics of Respondents

Table 1. Distribution of Respondents by Age in North Buton Regency in 2022

No	Characteristics of Respondents	Frequency (n)	Percentage (%)
1.	**Age**		
	≤ 18 years old	17	22.1
	≥ 19 years old	60	77.9
2.	**Education**		
	Elementary school	3	3.9
	Junior high school	34	44.2
	Senior High School	40	51.9
3.	**Pregnancy**		
	First	64	83.1
	Second	13	16.9
4.	**Income**		
	<UMR	50	64.9
	>UMR	27	35.1
5.	**Gestational Age at First Visit**		
	Trimester 1	60	77.9
	Trimester 2	17	22.1
	Trimester 3	0	0
6.	**Current Gestational Age**		
	Trimester 1	37	48.1
	Trimester 2	37	48.1
	Trimester 3	3	3.9
7.	**Ethnicity**		
	Kulisusu	71	92.2
	Other	6	7.8
8.	**Religion**		
	Islam	77	100
9.	**Marital status**		
	Married	77	100
10.	**Respondent's Occupation**		
	Housewife	76	98.7
	Trader	1	1.3
11.	**Husband's Occupation**		
	Self-employed	46	59.7
	Fisherman	26	33.8
	Farmer	4	5.2
	Government employees	1	1.3

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12.	**Income/month (Rp)**		
	>Rp.2.758.948,-	15	19.5
	<Rp.2.758.948,-	62	80.5
13.	**Number of Family Members**		
	> 5 people	5	6.5
	< 5 people	72	93.5
14.	**Pregnancy Distance**		
	>1 year	64	83.1
	<1 year	13	16.9
15.	**Hb Value (gr/dL)**		
	>11 gr/dL	63	81.8
	<11 gr/dL	14	18.2
16.	**Anemia status**		
	Anemia	14	18.2
	Not anemia	63	81.8
17.	**Number of Visits to Health**		
	Facilities	26	33.8
	≥3 times	51	66.2
	<3 times		
18.	**History of Infectious Diseases**		
	Malaria	6	7.8
	Pulmonary Tuberculosis	10	13
	Worms	11	14.3
	There isn't any	50	64.9

The table above shows that the highest age of the respondent is ≥19 years, namely 60 respondents (77.9%), and the lowest age is ≤18 years, namely 17 respondents (22.1%), the highest is Senior High School with 40 respondents (51.9%)) and the lowest was elementary school with 3 respondents (3.9%), the most respondents with the first (first) pregnant status were 64 respondents (83.1%), while the second pregnancy was only 13 respondents (16.9%), with an income 50 respondents (64.9%) have low incomes, while those with high incomes are 27 respondents (35.1%). The highest gestational age at first visit was during trimester 1, namely as many as 60 respondents (77.9%), while for trimester 3 no one visited. The ethnicity of the respondents was dominated by the Kulisusu ethnic group with 71 respondents (91.2%), while other ethnicities only 6 respondents (6.8%) and all respondents were Muslim as many as 77 respondents (100%), with married status of 77 respondents (100 %). Respondents generally work as IRT with 76 respondents (98.7%), and 1 respondent is a trader (1.3%), with the highest respondent's husband's occupation being self-employed with 46 respondents (59.7%) while the lowest is civil servant with 1 respondent (1.3%). The number of family members who are dependents of >5 people is 5 respondents (6.5) while <5 people are 72 respondents (93.5%), with non-anemia status as many as 63 respondents (81.8%) while those with anemia are 14 respondents (18.2%), with the most history of infectious diseases were intestinal worms with 11 respondents (14.3%) while the lowest was malaria with 6 respondents (7.8%).

Relationship between Food Security and Anemia in Pregnant Women

Table 2. The Relationship between Food Security and Anemia in Pregnant Women in North Buton Regency in 2023

No	**Food security**	**Anemia Incidence**				**Total**		***ρ-value***
		Anemia		**Not Anemia**				
		n	**%**	**n**	**%**	**n**	**%**	
1	Low	6	50,0	6	50,0	12	100,0	0,002
2	High	8	12,3	57	87,7	65	100,0	
Total		**14**	**18,2**	**63**	**81,8**	**77**	**100**	

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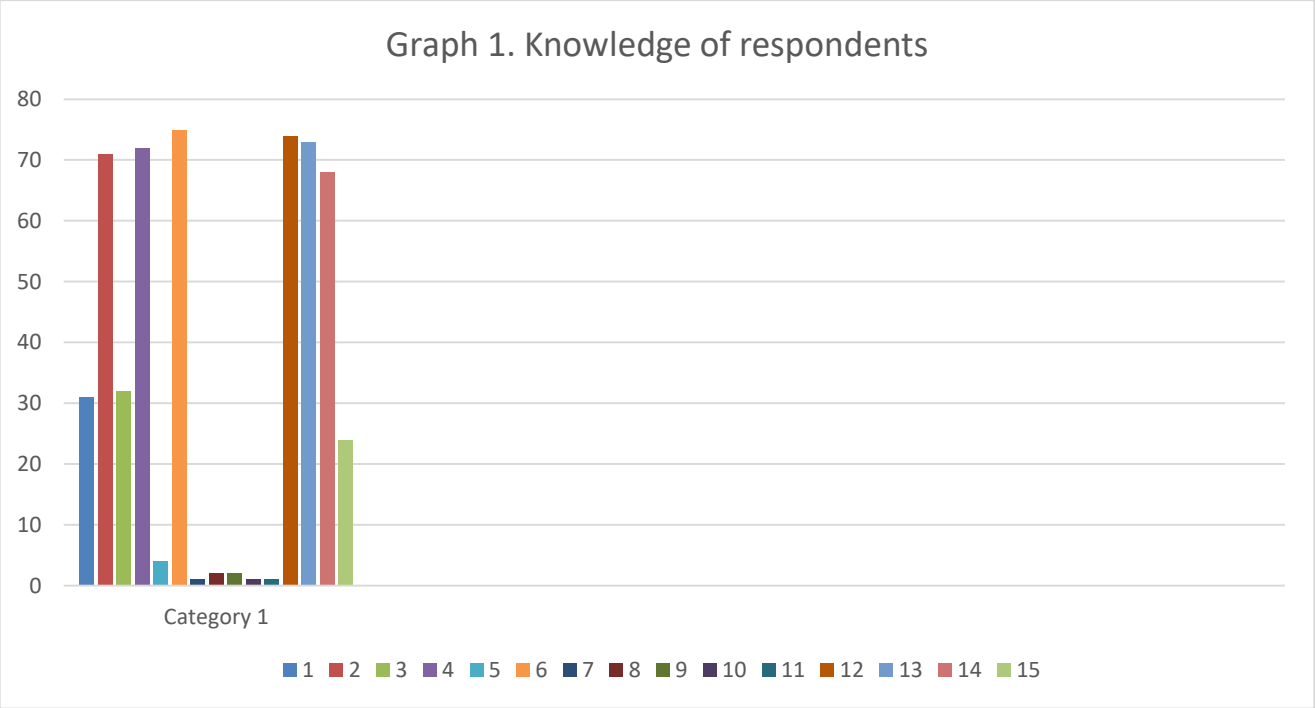
Table 2 shows that of the 12 respondents with low food security, 6 respondents (50.0%) had anemia and 6 respondents (50.0%) were not anemic. Meanwhile, out of 65 respondents with high food security, 8 respondents (12.3%) had anemia and 57 respondents (87.7%) were not anemic. The results of statistical tests using Chi-Square at the 95% level of confidence show a ρ-value = 0.002 (ρ-value <0.05), so that H0 is rejected and H1 is accepted, which means that there is a significant relationship between food security and the incidence of anemia in pregnant women in North Buton Regency in 2023

Relationship between Knowledge and Anemia in Pregnant Women



In Graph 1. It shows that the highest correct answer is question no.6 as many as 75 respondents (97.4%), while the lowest is question no. 7, 10, and 11 respectively 1 respondent (1.3%) who answered correctly.

Table 3. Relationship between Knowledge and the Incidence of Anemia in Pregnant Women in North Buton Regency in 2023

No	Knowledge	Anemia Incidence				Total		*ρ-value*
		Anemia		Not Anemia				
		n	%	N	%	N	%	
1	Not good	8	17,4	38	82,6	46	100,0	0,827
2	Good	6	19,4	25	80,6	31	100,0	
Total		**14**	**18,2**	**63**	**81,8**	**77**	**100**	

Table 3 shows that of the 46 respondents with poor knowledge, 8 respondents (17.4%) had anemia and 38 respondents (82.6%) were not anemic. Meanwhile, from 31 respondents with good knowledge, 6 respondents (19.4%) experienced anemia and 25 respondents (80.6%) were not anemic.

The results of statistical tests using Chi-Square at the 95% level of confidence show a ρ-value = 0.827 (ρ-value > 0.05), so that H0 is accepted and H1 is rejected, which means that there is no relationship between knowledge and the incidence of anemia in pregnant women. North Buton Regency in 2023.

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DISCUSSION

Relationship between Food Security and Anemia in Pregnant Women

Food security is the ability of a family to provide food to meet their daily food needs. The results of this study indicate that the majority of respondents have a high level of food security (84.4%). This is evidenced by the results of filling out the questionnaire by respondents who found the fact that only a few respondents felt they lacked food and even experienced hunger in a day. A household's food security can be influenced by several factors, in particular access to food which incidentally is influenced by a person's income level. This is of course associated with spending on food shopping out of the total income they have [13]. This is reinforced by the results of research related to the low level of income of respondents (64.9%), however, if you look at the average nominal income of the respondent's family of Rp. 2,000,000. this certainly can meet the needs of daily life, especially in the research area there are still many natural resources (local food) obtained from the respondent's house yard.

The results of the bivariate analysis found that out of 12 respondents with low food security, there were 6 respondents (50.0%) who did not experience anemia. This is because respondents who have low family income, but still have large tracts of land planted with local plants such as sweet potatoes, rice, moringa, spinach and even fish are abundant which can be obtained very easily and cheaply. This certainly allows respondents to consume food for their daily needs without feeling hungry. While 8 respondents (12.3%) experienced anemia despite having high food security, this was because the respondents were not compliant with immunizations, did not consume Fe tablets regularly and even some respondents did not consume pregnant women's milk.

The results of statistical tests using Chi-Square at the 95% confidence level show a ρ-value = 0.002 meaning that there is a significant relationship between food security and the incidence of anemia for pregnant women in North Buton Regency in 2023. It can be concluded that the more food secure a household is, the the better the food intake of the clown. This is due to the better access of households to food so that the ability of families to provide food to meet the nutritional needs of pregnant women and family members is increasingly fulfilled so as to avoid anemia.

This study is in line with the results of a study conducted by Ghose et.al (2016), which found that there was a significant relationship between household food insecurity and the incidence of anemia in pregnant women with significance ($p < 0.001$; 95% CI = 1.348–1.830). Women who report food insecurity are about 1.6 times more likely to suffer from anemia compared to their food insecure counterparts in Bangladesh. [14]

Dametrio's study (2017), also showed the same thing that the prevalence of anemia in the population studied was 21.8%, and the average hemoglobin was 12.06 g/dL (standard deviation. Food insecurity was identified in 28.16% of pregnant women The mean age of the mother was 25.82. After ranking, the variables positively related to anemia remained significant: FI (odds ratio [OR] = 3.63; 95% confidence interval [95% CI]: 1.77- 7.45); not undergoing prenatal care (OR = 5.15; 95% CI: 1.43-18.50); multiparity (OR = 2.27; 95% CI: 1.02-5.05); and non-supplementation of iron drugs (OR = 2.45; 95% CI: 1.04-5.76) This means that food insecurity is closely related to the incidence of anemia in pregnant women [15]

This is also in line with research conducted by Sudaryanti, et.al (2023), which found that pregnant women intervened for 12 weeks with regular local food intake. Pregnant women consumed an average of 1926.3 calories before intervention; 2315.2 calories were consumed after the intervention. Before the intervention, there were 19 pregnant women who experienced anemia (63.3%); after the intervention, there were only 4 (13.3%). There were 20 breastfeeding mothers (66.7%) on the first day. It was concluded that household food security had an effect on the treatment of anemia in pregnant women[16]

Households with a high food security category will have family members who have access to food, both in quantity and quality, and this will have an impact on meeting the nutritional needs of pregnant women so that optimal nutritional status is achieved. Pregnant women who are in a food secure household have a good level of energy and protein adequacy. In contrast to mothers from food insecure families who experience anemia because they lack access to food, so the portion of food is reduced to share with other family members.

In line with the theory which states that pregnant women are said to have less access to food if the quality and quantity of the composition of their daily menu is incomplete and the frequency of side dishes with iron is more dominant. In line with this, household food insecurity, menu composition that is not nutritious, unbalanced and does not vary both in quality and quantity can cause growth delays and malnutrition in children under five and trigger anemia in pregnant women[17].

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Relationship between Knowledge and Anemia in Pregnant Women

The results showed that respondents who had less and sufficient knowledge were almost as large, namely 46 respondents (59.7%) had low knowledge, 31 respondents (40.3%) had sufficient knowledge. This happened because seen from the education level of the respondents, the majority were elementary and junior high school, namely 48.1%, and those with high school education were 51.9%. It is known that the higher a person's education, the higher the person's knowledge.

The results of the bivariate analysis found that 38 respondents (82.6%) were not anemic even though they had poor knowledge. This is because the respondents routinely carry out posyandu, where in posyandu Fe tablets are given free of charge by health workers. In addition, the availability of local food that can be consumed makes pregnant women fulfill their needs. In addition, this study also found that as many (19.4%) experienced anemia even though they had good knowledge. This is because the side effects of Fe tablets make pregnant women lazy to consume Fe tablets themselves. In addition, respondents also rarely consume milk for pregnant women, apart from limited funds, access to the city to get milk is also very far.

The results of statistical tests using Chi-Square at the 95% level of confidence show a ρ-value = 0.827 (ρ-value > 0.05), so that H0 is accepted and H1 is rejected, which means that there is no relationship between knowledge and the incidence of anemia in pregnant women in North Buton Regency in 2023.

This research is in line with the results obtained by Purwaningtyas and Praneswari (2017), who found that there was no relationship between knowledge, education, and the incidence of anemia in pregnant women, there was a relationship between nutritional status and the incidence of anemia in pregnant women in the Working Area of the Karanganyar Health Center, Semarang City [18].

In contrast to the results obtained by Susilowati, et al (2021), at the Ngarip Community Health Center, Tanggamus Regency, where her research proved that mother's knowledge of the benefits of consuming Fe tablets had an influence on the incidence of anemia in pregnant women, where mothers who did not have good knowledge of the benefits of consuming Fe tablets , there will be a risk of non-adherence in consuming Fe tablets, which will eventually cause anemia during pregnancy [19].

In contrast to the results obtained by Susilowati, et al (2021), at the Ngarip Public Health Center, Tanggamus Regency, where her research proved that mother's knowledge of the benefits of consuming Fe tablets had an influence on the incidence of anemia in pregnant women, where mothers who did not have good knowledge of the benefits of consuming Fe tablets , there will be a risk of non-adherence in consuming Fe tablets, which will eventually cause anemia during pregnancy [20]. Just like the research conducted by Balcha and Tola (2023), who found that. Less than half, 184 (44.9%) had less knowledge and suffered from anemia and almost half, 216 (52.7%) pregnant women had good knowledge of anemia. The results of the regression analysis concluded that maternal knowledge had an influence on the incidence of anemia in pregnant women in Ethiopia [21].

Although this study proves that knowledge is not related to the incidence of anemia, it should also be noted that knowledge is the most important factor in changing public health behavior. Like Lawrence Green's theory in (Notoatmodjo, 2014), a person's knowledge of health is one of the predisposing factors that influence a person's behavior, so if pregnant women do not get information or counseling about anemia, it can affect how pregnant women prevent themselves from anemia. Knowledge is an important factor for the formation of one's behavior, because from experience and research it is proven that behavior based on knowledge will be more lasting than behavior that is not based on knowledge. By increasing the knowledge of pregnant women about anemia, it is hoped that there will be a change in behavior in a direction that supports health [22].

Based on the results of the research analysis, the researchers assumed that lack of knowledge about anemia has an influence on health behavior, especially when a woman is pregnant, which will result in less optimal health behavior of pregnant women to prevent anemia in pregnancy. Pregnant women who have less knowledge about anemia can result in a lack of consumption of iron-containing foods during pregnancy due to their ignorance

CONCLUSION

The conclusion in this study is that household food security influences the incidence of anemia in adolescent pregnant women aged less than 21 years.

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Cite this Article: Rini Mulyasari, Devi Savitri Effendy, Mubarak (2023). Effect of Mother Knowledge and Household Food Security on Anemia of Pregnant Women (Study in North Buton Regency). International Journal of Current Science Research and Review, 6(7), 3954-3961