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THE RELATIONSHIP BETWEEN UAC AND THE INCIDENCE OF ANEMIA IN PREGNANT WOMEN AT SIMPANG TIGA AND SIDOMULYO COMMUNITY HEALTH CENTERS, PEKANBARU CITY

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ABSTRACT

The prevalence of anemia in pregnant womenin Indonesia is 37.%, with the highest prevalence in countryside at 37.% and the lowest in urban areas at 36.%. Iron deficiency is negatively correlated with maternal and infant outcomes, including the risk of bleeding, sepsis, maternal mortality, prematurity, perinatal mortality, and low birth weight. Pregnant women who experience anemia have a higher risk of death compared to mothers who do not experience anemia.; Objective: This study aimed to identify the relationship between education, knowledge, social culture, employment, age and nutritional status (LILA) in the incidence of anemia in pregnant women at the Simpang Tiga and Sidomulyo Community Health Centers, Pekanbaru City; Method: A cross sectional study conducted in March 2024 on all pregnant women at the Simpang Tiga and Sidomulyo Health Centers, Pekanbaru City who met the inclusion criteria, namely being willing to take part in the research after signing informed consent. Univariate analysis to describe study characteristics, bivariate analysis using chi-square to see correlation and multivariate logistic regression analysis to see the most dominant risk factors; Result: The results of the chi square test show that all variables including sociodemographics, level of knowledge, age, education, income, gestational age, gestational age at K1, frequency of ANC visits, frequency of consuming iron tablets, LiLA have a significant relationship with the incidence of anemia in pregnant women in both health centers with p value < 0,05; Conclusion: The variables age, education, history of abortion, parity, knowledge, consumption of iron tablets, gestational age and frequency of ANC visits are significant factors influencing the incidence of pregnancy anemia at the Sidomulyo Community Health Center, Pekanbaru City.

Keywords: *Pregnancy, Anemia, Nutritional status, Upper arm circumference, UAC.*

ABSTRAK

Indonesia, prevalensi anemia pada ibu hamil sebesar 37,1%, dengan prevalensi tertinggi di wilayah pedesaan sebesar 37,8% dan terendah di wilayah perkotaan sebesar 36,4%. Kekurangan zat besi berkorelasi negatif dengan ibu dan bayi, termasuk risiko perdarahan, sepsis, kematian ibu, prematuritas, kematian perinatal, dan berat badan lahir rendah. Ibu hamil yang mengalami anemia memiliki risiko kematian lebih tinggi dibandingkan dengan ibu yang tidak mengalami anemia.; Tujuan: Penelitian ini bertujuan untuk mengindentifikasi hubungan Pendidikan, pengetahuan, sosial budaya, pekerjaan, usia dan status gizi (LILA) kejadian anemia pada Ibu hamil di Puskesmas Simpang Tiga dan Sidomulyo Kota Pekanbaru; Metode: Penelitian ini merupakan cross sectional study yang dilakukan pada bulan Maret 2024 pada seluruh ibu hamil di Puskesmas Simpang Tiga dan Sidomulyo Kota Pekanbaru yang memnuhi kriteria inklusi yaitu bersedia mengikuti penelitian setelah menandatangani informed consent. Analisis univariat untuk mendeskripsikan karakteristik penelitian, analisis bivariat menggunakan chi-square untuk melihat korelasi dan analisis multvariat

regresi logistik untuk melihat faktor risiko yang paling dominan; Hasil: Hasil uji chi square menunjukkan semua variabel baik sosiodemografi, tingkat pengetahuan, umur, pendidikan, pendapatan, usia kehamilan, usia kehamilan saat K1, frekuensi kunjungan ANC, frekuensi konsumsi tablet besi, LiLA memiliki hubungan yang bermakna dengan kejadian anemia pada ibu hamil di kedua puskesmas dengan p value < 0,05; Kesimpulan: Variabel usia, pendidikan, riwayat abortus, paritas, pengetahuan, konsumsi tablet besi, usia kehamilan dan frekuensi kunjungan ANC menjadi faktor yang signifikan mempengaruhi kejadian anemia kehamilan di Puskesmas Sidomulyo Kota Pekanbaru.
Kata Kunci: Kehamilan, Anemia, Status Gizi, Lingkar Lengan Atas, LiLA.

INTRODUCTION

One of the most common nutritional problems in the world is anemia. Malaria, parasitic infections, nutritional deficiencies and hemoglobinopathies are causes. The most common nutritional deficiency is anemia due to iron deficiency, which is a health problem in both rich and poor countries. Iron anemia is an indirect health indicator for preschool children and pregnant women.

Global data shows that 56% of pregnant women in low and middle income countries suffer from anemia. The highest prevalence of anemia occurs in pregnant women in Sub-Saharan Africa (57%), followed by pregnant women in Southeast Asia (48%) and the lowest prevalence (24.%) is found in pregnant women in South America. In Indonesia, the prevalence of anemia in pregnant women is 37.%, with the highest prevalence in rural areas at 37.% and the lowest in urban areas at 36.%. However, in 2018, the prevalence of anemia in pregnant women was still dominated in rural areas at 49.% and in urban areas at 48.%. According to the 2016 Performance Accountability report in Riau Province, the incidence of anemia in pregnant women is still high, namely 37.%. There was an increase in the rate of anemia in pregnant women in the city of Pekanbaru from 2017 to 2019 by 4.%, with the highest rate in 2020 occurring at the Sidomulyo inpatient health center at 39.%.

Iron deficiency is negatively correlated with mother and baby, including the risk of bleeding, sepsis, maternal death, prematurity, perinatal death, and low birth weight. Pregnant women who are anemic have a higher risk of death compared to mothers who do not have anemia.,5

The results of the 2020 Population Census Long Form show that the Maternal Mortality Rate in Indonesia is 189, which means there are 189 female deaths during pregnancy, childbirth or the postpartum period per 100,000 live births. When compared to the 2010 Population Census and the 2015 Inter-Census Population Survey, Indonesia's Maternal Mortality rate shows a downward trend. The decline in MMR from the results of the 2010 Population Census and the 2020 Population Census Long Form reached 45 percent. The lowest maternal mortality rate is in DKI Jakarta Province at 48 deaths of women during pregnancy, during childbirth or the postpartum period per 100,000 live births, and the highest is in Papua Province at 565 deaths of women during pregnancy, during childbirth or the postpartum period per 100,000 live births. The Infant Mortality Rate (IMR) is the number of deaths of infants aged under 1 year (0–11 months) per 1,000 live births in a particular year. In the span of 50 years (1971–2022 period), the decline in IMR in Indonesia was almost 90 percent. IMR decreased significantly from 26 deaths per 1,000 live births from the 2010 Population Census results to 16.5 deaths per 1,000 live births from the 2020 Long Form SP results.

Based on the 2022 Riau Province Health Profile, maternal deaths in 2022 reached 114 people, where this number has experienced a significant decrease compared to the number of deaths in 2021, namely 180 people. This is due to the Covid-19 pandemic increasing in 2021. The three biggest causes of maternal death in Riau Province in 2022 are bleeding

(43%), hypertension disorders (24%) and other causes including high (35%) where deaths due to the possibility of complications such as anemia, Diabetes Mellitus, HIV, STIs, Malaria, TB, worms, Hepatitis B, etc. that occur during pregnancy. Of the causes of maternal death that need to be considered is the high number of causes of death due to other diseases, where in 2022 (35%), 2021 (15%), 2020 (45%), 2019 (39%). Based on the Simpang Tiga and Sidomulyo Health Profiles, anemia is still the most common complication in this area.

METHODE

This research design uses cross sectional, namely research to study the dynamics of correlation between risk factors and influence. Data collection was carried out over a period of time (Notoatmodjo, 2014). This study aims to identify the relationship between education, knowledge, socio-cultural, employment, age and nutritional status (LILA) in the incidence of anemia in pregnant women at the Simpang Tiga and Sidomulyo Community Health Centers, Pekanbaru City during March 2024. The sampling method used the total sampling technique / total population , namely the entire population is taken as a sample. The sample in the study was the same as the total population at the Simpang Tiga and Sidomulyo Health Centers, Pekanbaru City, which met the inclusion criteria. The inclusion criteria for this study were all pregnant women who were willing to take part in this study by signing informed consent (PSP), being interviewed, filling out a questionnaire and having their Hb levels checked. Pregnant women who are suffering from infections (malaria or tuberculosis) and pregnant women who are experiencing bleeding are exclusion criteria.

Data collection was carried out by interview, asking the mother to fill out a knowledge questionnaire sheet and Hb examination assisted with a questionnaire sheet and Consent After Explanation (PSP) sheet. The instrument was developed by adapting the nutritional status assessment format by the Ministry of Health, a list of research questionnaire questions by Tambunan in 2011 and the PSP Riskesdas in 2018. Univariate analysis aims to explain or describe the characteristics of each research variable. This analysis produces a frequency and percentage distribution of each variable. Analysis of statistical test results using Chi Square. To see the significance of statistical calculations, a significance limit of 5% is used. Looking at the results of this statistical test, it can be concluded whether the relationship between these 2 variables is meaningful or not significant. From the results of this statistical test, it can happen, for example, that the two variables are percentage related but statistically the relationship is not significant.

The research was carried out after obtaining approval (ethical clearance) from the Head of the Simpang Tiga and Sidomulyo Community Health Centers.

RESULT AND DISCUSSION

In this study, 36 pregnant women experienced anemia. Based on the Minister of Health's 2023 reference, where the normal Hb level of pregnant women is 11 gr/dl, it is found that anemia in pregnant women is 26%. This figure is in accordance with that in the book Nutrition for Maternal and Child Health which states that seven out of ten pregnant women in Indonesia experience anemia. However, based on the 2017 Riskesdas reference where the Hb levels of pregnant women are declared normal with a lower threshold of 10. gr/dl, then 53.% of pregnant women experience anemia.

This figure is greater than the WHO report on the prevalence of anemia in pregnant women in the world in 2018, which was 41.%, the prevalence of anemia in Southeast Asia was 48.% and the 2017 Riskesdas report regarding anemia in pregnant women in Indonesia was 14% and based on the 2019 Minister of Health Decree of 24.%. This figure is also higher when compared to the results of the anemia survey in the city of Pekanbaru in 2018,

which was 16.%.0 The incidence of anemia in pregnant women in the work area of the East Sidomulyo and Simpang Tiga Health Centers was higher compared to the work area of the Siak Hulu Health Center in 2018 at 10.%.

Pregnant women who experience anemia at an older age are of no risk parity who have one to two children and have never had children before. In other words, mothers who give birth to only one or two children have a greater risk of bleeding during childbirth compared to mothers who give birth to more than two children. Therefore, age is not the main factor influencing anemia during pregnancy. Those who lack knowledge have more potential for pregnant women to experience anemia. Statistically, the difference in the proportion of knowledge is not significant. In their research, they found that there was a significant relationship between mothers' knowledge about blood supplement tablets and their knowledge about nutritional anemia in pregnant women. Other research states that nutritional knowledge can be obtained through experience, media, cultural influences, formal and non-formal education, and cultural influence. Pregnant women's knowledge about anemia influences how they choose food, which then has an impact on the patient's condition. Limited knowledge of families, especially pregnant women, about good nutrition contributes to the many anemia problems that arise in Indonesia.

Table 1. Description of the Characteristics of Research Respondents

Simpang Tiga Health Centers			
Characteristics	**Category**	**n**	**%**
Anemia	Not Anemia	35	40.
	Mild anemia	44	51.
	Moderate anemia	7	8.
	Severe anemia	0	0
Age	Risky	54	62.
	Not Risky	32	37.
Education	Low	51	59.
	High	35	40.
Family Income	Low	63	73.
	High	23	26.
Parity	Don’t have children	4	4.
	≤ 2 child	45	52.
	> 2 child	37	43.0
Birth Distance	Never given birth	4	4.
	< 2 years	58	67.
	≥ 2 years	24	27.
Abortus	Ever	57	66.
	Never	29	33.
Knowledge	Low	28	32.
	Moderate	20	23.
	Good	38	44.
Gestational Age	Trimester 1	16	18.
	Trimester 2	26	30.
	Trimester 3	44	51.
Gestational Age in Q1	Not Compliant with Standards	47	54.
	Standard Compliant	39	45.
Frequency of Pregnancy	Not Compliant with Standards	47	54.

Check Visits	Standard Compliant	39	45.
Consume Iron Tablets	Rarely	33	38.
	Often	53	61.
UAC	chronic lack of energy	37	43.0
	Not chronic lack of energy	49	57.0
History of Infectious Diseases	Ever	0	0
	Never	86	100
Sidomulyo Health Centers			
Characteristics	**Category**	**n**	**%**
Anemia	Not Anemia	27	57.
	Mild anemia	12	25.
	Moderate anemia	8	17.0
	Severe anemia	0	0
Age	Risky	19	40.
	Not Risky	28	59.
Education	Low	23	48.
	High	24	51.
Family Income	Low	34	72.
	High	13	27.
Parity	Don't have children	0	0
	≤ 2 child	20	42.
	> 2 child	27	57.
Birth Distance	Never given birth	0	0
	< 2 years	21	44.
	≥ 2 years	26	55.
Abortus	Ever	23	48.
	Never	24	51.
Knowledge	Low	12	25.
	Moderate	13	27.
	Good	22	46.
Gestational Age	Trimester 1	7	14.
	Trimester 2	19	40.
	Trimester 3	21	44.
Gestational Age in Q1	Not Compliant with Standards	27	57.
	Standard Compliant	20	42.
Frequency of Pregnancy Check Visits	Not Compliant with Standards	32	68.
	Standard Compliant	15	31.
Consume Iron Tablets	Rarely	17	36.
	Often	30	63.
UAC	chronic lack of energy	9	19.
	Not chronic lack of energy	38	80.
History of Infectious Diseases	Ever	0	0
	Never	47	100

Table 2. Relationship between Sociodemographics and Anemia in Pregnant Women

Simpang Tiga Health Centers				
Characteristics	**Category**	**Anemia**		**P Value**
		Anemia N (%)	**Not Anemia N (%)**	
Age	Risky	46 (53.)	8 (9.)	0.000
	Not Risky	7 (8.)	25 (29.)	
Education	Low	38 (44.)	13 (15.)	0.004
	High	15 (17.)	20 (23.)	
Family Income	Low	45 (52.)	18 (20.)	0.003
	High	8 (9.)	15 (17.)	
Parity	Don't have children	0	4 (4.)	0.015
	≤ 2 child	25 (29.)	20 (23.)	
	> 2 child	27 (31.)	9 (10.)	
Birth Distance	Never given birth	0	4 (4.)	0.016
	< 2 years	35 (40.)	23 (26.)	
	≥ 2 years	18 (20.)	6 (7.0)	
Abortus	Ever	40 (46.)	17 (19.)	0.034
	Never	13 (15.)	16 (18.)	

Sidomulyo Health Centers				
Characteristics	**Category**	**Anemia**		**P Value**
		Anemia N (%)	**Not Anemia N (%)**	
Age	Risky	15 (31.)	4 (8.)	0.000
	Not Risky	6 (12.)	22 (46.)	
Education	Low	16 (34.0)	7 (14.)	0.001
	High	5 (10.)	19 (40.)	
Family Income	Low	19 (40.)	15 (31.)	0.020
	High	2 (4.)	11 (23.)	
Parity	Don't have children	0	0	0.037
	≤ 2 child	5 (10.)	15 (31.)	
	> 2 child	16 (34.0)	11 (23.)	
Birth Distance	Never given birth	0	0	0.043
	< 2 years	13 (27.)	8 (17.0)	
	≥ 2 years	8 (17.0)	18 (38.)	
Abortus	Ever	18 (38.)	5 (10.)	0.000
	Never	3 (6.)	21 (44.)	

Anemia is a global threat among women of reproductive age (WRA), or women aged 15–49 years, in both developed and developing countries. Based on the results of the bivariate analysis research, it was found that the p value was <0.05, indicating that the difference in this proportion was statistically significant at both Simpang Tiga Health Center and Sidomulyo Health Center, which shows that sociodemographic conditions are related to the incidence of anemia in pregnancy. There are various factors that can cause anemia in pregnant women, such as socio-demographics, antenatal care, obstetrics and nutritional factors. Sociodemographic factors can increase the occurrence of anemia in pregnancy, consisting of age, education, family income and employment. Anemia in K1 is because when women start pregnancy, they are not economically prepared, which causes food supplies that do not meet the body's needs so that the woman's nutrition cannot be met,

which results in anemia.

Globally, the prevalence of anemia in women of childbearing age is 29.%; equivalent to more than half a billion women aged 15-49 years in 2019. The prevalence is relatively higher in pregnant women at 36.% compared to non-pregnant women (29.%). The prevalence of anemia in women of childbearing age in the South Asia region is 41%, namely 48% in pregnant women and 49% in non-pregnant women in 2019.

Table 3. Relationship between Knowledge and Anemia in Pregnant Women

Simpang Tiga Health Centers				
Characteristics	**Category**	**Anemia**		**P Value**
		Anemia N (%)	**Not Anemia N (%)**	
Knowledge	Low	24 (27.)	4 (4.)	0.000
	Moderate	14 (16.)	6 (7.0)	
	Good	15 (17.)	23 (26.)	
Sidomulyo Health Centers				
Characteristics	**Category**	**Anemia**		**P Value**
		Anemia N (%)	**Not Anemia N (%)**	
Knowledge	Low	10 (21.)	2 (4.)	0.003
	Moderate	6 (12.)	7 (14.)	
	Good	5 (10.)	17 (36.)	

Pregnant women's knowledge about anemia prevention is everything about anemia prevention that pregnant women know. Having knowledge about anemia prevention will cause people to have a positive attitude towards anemia prevention programs. In this study, the highest proportion of anemic pregnant women was found in the group of mothers who had low knowledge of anemia compared to the proportion of anemic pregnant women who had high knowledge of anemia. Then, if we look at the bivariate test, it is found that the p value is <0.05, so the difference in proportions is statistically significant in the two health centers. This happens because the majority of respondents in this study have a good level of anemia knowledge and the majority of respondents suffer from anemia.

Knowledge is the result of an effort to know and this occurs after people sense an object. The knowledge of pregnant women cannot be separated from the level of education, social culture, mass media/information, and environment, experience and age. Pregnant women's knowledge cannot be separated from the level of education, where education can influence a person's behavior, including lifestyle behavior in general, the higher the education, the easier it is to receive information both from other people and from the mass media. Insufficient knowledge about anemia has an influence on health behavior, especially for pregnant women, which will result in less than optimal health behavior for pregnant women to prevent anemia in pregnancy. Pregnant women who have insufficient knowledge about anemia can result in a lack of consumption of foods containing iron during pregnancy due to their ignorance, so knowledge about anemia is important for pregnant women to know.

Table 4. Relationship between Age and Anemia in Pregnant Women at Simpang Tiga Health Center

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		

Age	Risky	46 (53.)	8 (9.)	20.36	0.000
	Not Risky	7 (8.)	25 (29.)	(6. – 63.)	
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Age	Risky	15 (31.)	4 (8.)	17.0	0.000
	Not Risky	5 (10.)	23 (48.)	(3.79 – 74.)	

The incidence of anemia during pregnancy is influenced by several factors, one of the influencing factors is the mother's age during pregnancy. Pregnant women aged under 20 years increase the risk of anemia, because the organs in their body are still in the process of maturation and development, one of which is the reproductive system. To fulfill reproductive development, the body still needs a large supply of various nutrients, so if pregnancy occurs at this age, the need for nutrients will of course increase compared to women who are pregnant over 20 years. If the body does not fulfill the nutrients it needs, it will certainly result in anemia. Pregnant women aged over 35 years are also at risk of anemia because their immune system has begun to decline and they are at risk of experiencing various pregnancy problems, one of which is anemia.

In this study, the highest proportion of anemic pregnant women was in the group of mothers at risk. Then, if we look at the bivariate test, it is found that the p value is <0.05, so the difference in proportions is statistically significant in the two health centers. Research conducted by Rafika et al shows that from the Chi-Square statistical test at a significance level = 0.05, the p value = 0.004, which means there is a relationship between age and the incidence of anemia in pregnant women, so the hypothesis states that there is a relationship between age and the incidence of anemia in mothers. pregnancy is statistically proven (Rafika A et al., 2023). Sari et al also stated that there is a significant relationship between age and the incidence of anemia in pregnant women (p-value = 0.005).

Age is a risk factor for anemia in pregnant women. A mother's age is related to the female reproductive organs. A healthy and safe reproductive age is 20 – 35 years. Pregnancy aged < 20 years and > 35 years can cause anemia because in pregnancies aged < 20 years, biologically they are not yet optimal, their emotions tend to be unstable, they are mentally immature so they easily experience shock which results in a lack of attention to meeting nutritional needs during pregnancy. Meanwhile, at age > 35 years, it is associated with deterioration and decreased endurance as well as various diseases that often occur at this age.

Table 5. The Relationship between Education and Anemia in Pregnant Women

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Education	Low	38 (44.)	13 (15.)	3.7	0.004
	High	15 (17.)	20 (23.)	(1. – 9.1)	
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Education	Low	16 (34.0)	7 (14.)	11.29	0.000

High	4 (8.)	20 (42.)	(2.37 – 46.03)	

The level of education can influence a person's level of knowledge because a person's ability to accept and understand something is determined by the level of education they have. The level of education also greatly influences the ability to receive nutritional information, determines or influences whether or not a person will easily receive knowledge, the higher the education, the easier it will be for someone to receive nutritional information.

In this study, looking at the bivariate test, it was found that the p value was <0.05, so the difference in proportions was statistically significant in the two health centers, which shows that there is a relationship between education and the incidence of pregnancy anemia. Research conducted by Mariza stated that the majority of respondents had low education and the results of analysis using chi-square obtained a P-Value of 0.026. Education greatly influences a person's ability to understand nutritional information. The higher a person's level of education (years of schooling), the easier it is to live a healthy life independently, creatively and sustainably. Therefore, the level of education has an exponential relationship with nutritional and health status. Similar research conducted by Sanyoto also stated that there was a relationship between education level and anemia, with education level having 20 times the effect on anemia. For respondents with a low level of education, a comparable proportion was found between respondents who were anemic and those who were not, namely 20%. 20,21

Table 6. The Relationship between Income and Anemia in Pregnant Women

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Family Income	Low	45 (52.)	18 (20.)	4. (1.5 – 12.6)	0.003
	High	8 (9.)	15 (17.)		
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Family Income	Low	18 (38.)	16 (34.0)	6. (1. – 32.)	0.025
	High	2 (4.)	11 (23.)		

Anemia generally occurs throughout the world, especially in developing countries and in low socio-economic groups. Anemia occurs in women of reproductive age, especially pregnant and breastfeeding women because many suffer from iron deficiency.

In this study, the highest proportion of anemic pregnant women was found in the group of mothers with low incomes compared to the proportion of anemic pregnant women who had high incomes. Then, if we look at the bivariate test, it is found that the p value is <0.05, so the difference in proportions is statistically significant in the two health centers. This research is in line with Muhtar who stated that there is a relationship between family income and the incidence of anemia in pregnant women in Makassar City with a p value <0.05. Economic status is a position that is socially regulated and places a person in a certain. Low income and insufficient fulfillment of food needs will increase the risk factors for anemia due to reduced intake of nutrients containing iron. Insufficient intake of good nutrition in the form of iron in the food consumed daily is one of the causes of anemia.

Table 7. Relationship between Gestational Age and Anemia in Pregnant Women

Simpang Tiga Health Centers

Characteristics	Category	Anemia		P Value
		Anemia N (%)	Not Anemia N (%)	
Gestational Age	Trimester 1	13 (15.)	3 (3.)	0.000
	Trimester 2	5 (5.)	21 (24.)	
	Trimester 3	35 (40.)	9 (10.)	

Sidomulyo Health centers

Characteristics	Category	Anemia		P Value
		Anemia N (%)	Not Anemia N (%)	
Gestational Age	Trimester 1	5 (10.)	2 (4.)	0.033
	Trimester 2	4 (8.)	15 (31.)	
	Trimester 3	11 (23.)	10 (21.)	

Pregnancy results in increased iron requirements which are influenced by gestational age. In the first trimester of pregnancy, iron requirements in pregnant women are around 0. mg/day, increasing to 7. mg/day at the end of pregnancy. Increased needs that are not balanced with adequate iron intake will result in anemia in the third trimester. Based on the results of statistical analysis at the Simpang Tiga Community Health Center, it shows that the variable gestational age has a significant relationship with anemia in pregnant women because $p < 0.05$ ($p = 0.008$). Research conducted by Hardi et al stated that based on the results of statistical tests, P value = 0.037 was obtained, so it could be concluded that there was a proven relationship between gestational age and the incidence of anemia in pregnant women. This research is in line with Aksari et al who stated that gestational age is related to the incidence of anemia in pregnancy. As gestational age increases, the percentage of anemia occurs.

Physiologically, the process of anemia begins in the first trimester of pregnancy, where there is an increase in the amount of plasma which is disproportionate to the increase in the number of blood cells, the peak of which occurs at 24-32 gestational age. In pregnancy, red blood cell volume increases 20% to 30%, while plasma volume increases 45 to 55%. This disproportionate increase in volume results in a process of blood thinning or what is called hemodilution. This also results in a decrease in the Hb levels of pregnant women, resulting in anemia and a decrease in hematocrit.

Table 8. Relationship between Gestational Age in Q1 and Anemia in Pregnant Women

Simpang Tiga Health Centers

Characteristics	Category	Anemia		OR (CI)	P Value
		Anemia N (%)	Not Anemia N (%)		
Gestational Age in Q1	Not Compliant with Standards	45 (52.)	18 (20.)	4. (1.5 – 12.6)	0.003
	Standard Compliant	8 (9.)	15 (17.)		

Sidomulyo Health centers

Characteristics	Category	Anemia		OR (CI)	P Value
		Anemia N (%)	Not Anemia N (%)		
Gestational Age in Q1	Not Compliant with Standards	18 (38.)	16 (34.0)	6. (1. – 32.)	0.025

Standard Compliant	2 (4.)	11 (23.)

First pregnancy check-up or K1 when the gestational age is < 3 months or Trimester I is highly recommended, because many vital organs of the fetus are formed in the mother's womb at this gestational age, so that if disturbances occur during pregnancy such as anemia it will disrupt the growth and development of the fetus. Antenatal care services are one of the government's strategies used as an initial examination to determine whether a mother's pregnancy is at high risk or not, one of the risks being anemia, so that with routine antenatal care examinations it is hoped that anemia can be detected and intervention can be carried out.

In this study, if seen from the bivariate test, the p value was <0.05, so the difference in proportions was statistically significant in the two health centers, which means that there was a relationship between gestational age in K1 and the incidence of anemia in pregnancy. In this study, the OR value at the Simpang Tiga Health Center was 6.56, which shows that K1 gestational age has an influence of around 6 times on the incidence of anemia at Simpang Tiga Health Center and Sidomulyo Health Center. This research is in line with Gazali et al who stated that based on statistical tests there is a relationship between K1 gestational age and the incidence of anemia in pregnancy. The prevalence rate (OR) value of 23. indicates that pregnant women who had their first pregnancy examination at K1 > 3 months had a 23. times greater risk of developing anemia than pregnant women who had their first examination at K1 ≤ 3 months. K1 is the first contact between pregnant women and health workers who have good clinical/midwifery and interpersonal competence, to obtain integrated and comprehensive services according to standards. First contact should be made as early as possible in the first trimester, preferably before week 8. Pregnant women should do pure K1, so that if there are complications or risk factors they can be found and treated as early as possible.,27

Table 9. Relationship between Frequency of Iron Tablet Consumption and Anemia in Pregnant Women

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Consume Iron Tablets	Rarely	29 (33.)	4 (4.)	8.60 (2.00 – 28.)	0.000
	Often	24 (27.)	29 (33.)		
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Consume Iron Tablets	Rarely	11 (23.)	6 (12.)	4. (1.08 – 15.1)	0.032
	Often	9 (19.)	21 (44.)		

Consuming iron tablets is an iron tablet supplement that pregnant women consume during pregnancy. Adequate iron is needed to help supply oxygen throughout the body and fetus. Iron in pregnant women is around 20-30 mg every day, to help meet this need, iron tablet supplements are given to every pregnant woman, mothers consume at least 90 iron tablets during pregnancy regularly. Integrated ANC services and iron tablet supplementation have been implemented in Indonesia as an effort to deal with the problem of anemia. In this study, looking at the bivariate test, the p value was <0.05, so the difference in proportions was statistically significant in the two health centers, which means there is a relationship

between the frequency of consuming iron tablets and the incidence of anemia in pregnancy. Research conducted by Gazali et al stated that pregnant women who consumed iron tablets ≥ 90 tablets tended not to be anemic so that only 1 respondent (4.%) was affected by anemia and there was a relationship between consumption of iron tablets and the incidence of anemia in pregnant women. Pregnant women who adhere to consuming at least 90 Fe tablets during pregnancy and take at least 1 tablet/day can prevent anemia. Pregnant women's compliance with consuming Fe tablets can quickly restore the body's iron stores so that it can prevent the mother and fetus from experiencing serious problems or complications during pregnancy or childbirth.

Table 11. Relationship between Frequency of Visits and Anemia in Pregnant Women

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Frequency of Pregnancy Check Visits	Not Compliant with Standards	34 (39.)	13 (15.)	2.53 (1. – 6.44)	0.029
	Standard Compliant	19 (22.)	20 (23.)		
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
Frequency of Pregnancy Check Visits	Not Compliant with Standards	18 (38.)	14 (29.)	8. (1. – 43.2)	0.010
	Standard Compliant	2 (4.)	13 (48.)		

Antenatal Care is one of the preventive efforts of obstetric health service programs to optimize maternal and neonatal abnormalities through a series of examinations that can be carried out during pregnancy. Antenatal Care (ANC) examination is a pregnancy examination which aims to improve the physical and mental health of pregnant women optimally, so that they are able to face labor, postpartum, prepare for exclusive breastfeeding, and return to normal reproductive health.

From the examination regarding the frequency of Antenatal Care (ANC) during pregnancy, health workers will provide brief health information related to information during pregnancy such as information on nutritious food during pregnancy and mothers will be given blood supplement tablets or Fe tablets for free and will be given information. These blood supplement tablets can reduce the risk of anemia or a lack of red blood cells during pregnancy. The specific aim of this ANC frequency is to provide integrated, complete and quality antenatal examination services, provide health education and provide information regarding the nutritional status of mothers during pregnancy, health education regarding the use of contraceptives and breastfeeding, reducing the occurrence of "missed opportunities" in pregnant women to receive integrated, complete and quality antenatal care; early detection of abnormalities or diseases, especially anemia.

In this study, if seen from the bivariate test, the p value was <0.05, so the difference in proportions was statistically significant in the two health centers, which means there is a relationship between the frequency of visits and the incidence of anemia in pregnancy. Adriana et al's research states that there is a significant relationship between the frequency of ANC visits and the incidence of anemia in pregnancy.1 A literature review states that the

incidence of anemia in pregnant women is related to the mother's irregularity in making visits, as evidenced by the 10 journals examined, several journals explain that there is a big chance that pregnant women will experience anemia if the mother is not regular in making pregnancy visits.

Based on the results of statistical analysis, it can be stated that there is a significant relationship between upper arm circumference (LILA) and the incidence of anemia in pregnant women at Simpang Tiga Health Center. There is a statistically significant relationship. Meanwhile, the results of the analysis at the Sidomulyo Community Health Center, Pekanbaru City, showed that there was a relationship between LILA and the incidence of anemia in pregnant women with the OR results showing that the LILA condition in respondents had an influence of around 17 times on anemia, especially mild anemia.

The results of this study are in line with Adhelia et al who stated that out of 15 pregnant women (57.%) experienced anemia. Chi Square analysis found p-value = 0.000, which means there is a relationship between KEK and anemia in pregnant women (Adhelna et al., 2022). Research conducted by Fitriah et al also states that nutritional health status is influenced by the nutrition consumed so that it can show a person's nutritional status. Pregnant women, who are one of the groups vulnerable to nutritional problems, are expected to have adequate nutrition during pregnancy in order to avoid pregnancy nutritional problems, namely Chronic Energy Deficiency (CED) and Anemia. In assessing the nutritional status of pregnant women, anthropometric measurements can be carried out, namely measuring the upper arm circumference (LILA). If the LILA is more or equal to 23.cm, it means that the nutritional status of the pregnant woman is good. However, if the LILA size of a pregnant woman is less than 23.cm, it means that the mother has CED.

Nutritional health status is influenced by the nutrition consumed so that it can show a person's nutritional status. Pregnant women, who are one of the groups vulnerable to nutritional problems, are expected to have adequate nutrition during pregnancy in order to avoid pregnancy nutritional problems, namely Chronic Energy Deficiency (CED) and anemia. In assessing the nutritional status of pregnant women, anthropometric measurements can be carried out, namely measuring the upper arm circumference (LILA). If the LILA is more or equal to 23.cm, it means that the nutritional status of the pregnant woman is good. However, if the LILA size of a pregnant woman is less than 23.cm, it means that the mother has CED. Pregnant women with CED generally experience anemia more often than those without CED. This happens because KEK is caused by malnutrition (calories and protein) which lasts for a long time. Consuming foods that contain micronutrients and macronutrients is one way to prevent anemia apart from giving iron supplements.,35

Table 11. Relationship between nutritional status and anemia in pregnant women

Simpang Tiga Health Centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia N (%)**		
UAC	chronic lack of energy	28 (32.)	9 (10.)	2.87 (1.0 – 7.)	0.026
	Not chronic lack of energy	25 (29.)	24 (27.)		
Sidomulyo Health centers					
Characteristics	**Category**	**Anemia**		**OR (CI)**	**P Value**
		Anemia N (%)	**Not Anemia**		

		N (%)			
UAC	chronic lack of energy Not chronic lack of energy	8 (17) 12 (25.)	1 (2.) 26 (55.)	17. (1.43 – 154.44)	0.003

Table 12. Multivariate Analysis of Risk Factors Causing Anemia in Pregnancy

Simpang Tiga Healt Centers					
Variabel	**SE**	**Wald**	**Sig**	**Exp(B)**	**95% CI**
Knowledge	40192	8062	0.018	0.000	0.000
Age	1.	11.	0.001	0.002	0.001 – 0.070
Education	1.	4.5	0.037	0.034	0.001 – 0.
Family income	1.	6.	0.012	0.035	0.003 – 0.
Gestational Age	0.01	1.5	0.0	2.2	0.03 – 7.09
Gestational Age in Q1	0.	5.08	0.016	0.	0.068 – 0.58
Consume Iron Tablets	0.1	9.	0.002	0.	0.035 – 0.5
Frequency of Pregnancy Check Visits	0.05	0.000	0.88	1.009	0.08 – 3.03
Nutritional status	0.0	0.45	0.	0.01	0. – 1.
Parity	1.0	6.	0.012	0.052	0.005 – 0.
Birth Distance	1.09	2.33	0.087	0.06	0.008 – 1.2
Abortus	0.	1.4	0.	0.	0. – 1.00
Sidomulyo Health centers					
Variabel	**SE**	**Wald**	**Sig**	**Exp(B)**	**95% CI**
Knowledge	0.	0.080	0.	0.0	0. – 4.00
Age	1.09	5.023	0.025	0.043	0.003 – 0.3
Education	1.0	4.04	0.028	0.062	0.005 – 0.45
Family income	1.1	1.1	0.0	0.5	0.008 – 4.4
Gestational Age	1.39	7.	0.006	0.019	0.001 – 0.
Gestational Age in Q1	1.	0.	0.	3.1	0.1 – 46.3
Consume Iron Tablets	1.	3.4	0.058	0.092	0.008 – 1.088
Frequency of Pregnancy Check Visits	1.45	5.3	0.018	0.013	0.000 – 0.
Nutritional status	1.09	2.	0.	0.01	0.005 – 1939
Parity	1.2	0.050	0.	0.56	0.065 – 8.09
Birth Distance	1.2	0.6	0.	3.58	0. – 69.0

Abortus	1.	4.	0.030	0.058	0.004 – 0.56

The most common cause of anemia in pregnancy is iron deficiency in pregnant women which can result in anemia. This can cause fetal death in the womb at birth, prematurity, miscarriage (abortion), birth defects and result in the labor process taking a long time which causes bleeding and shock due to weak uterine contractions. Anemia in pregnancy can be caused by several factors, such as maternal age, gestational age, gravida status, parity, education, and family economic situation. Based on the results of the multivariate analysis, it can be seen that the variables age, education, history of abortion, parity, knowledge, consumption of iron tablets, gestational age and frequency of ANC visits are significant factors influencing the incidence of pregnancy anemia at the Sidomulyo Community Health Center, Pekanbaru City. Research conducted by Febriyanti shows that the dominant factor related to the incidence of anemia in pregnant women is the pattern of consumption of iron tablets with an 11. times chance of suffering from anemia compared to those who consume it regularly (POR = 11.4; CI95%: 1.-104.). Pibrianti's research also shows compliance with consuming iron tablets with an OR value of 5.050, meaning that pregnant women who adhere to consuming iron tablets on a non-routine basis have a 5 times higher risk of experiencing anemia compared to pregnant women who adhere to consuming iron tablets.

CONCLUSION

The variable birth spacing, K1 gestational age, knowledge and parity are the dominant variables resulting in anemia in pregnancy, then birth spacing is the variable with the most risk of developing anemia with Exp(B) 3.58, which means birth spacing influences the incidence of anemia in pregnant women approximately 3 times. then followed by the gestational age variable K1 which influences the incidence of anemia 3 times, knowledge and parity influences the incidence of anemia 1 fold.

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