Association beetween socio economic factor's, nutritional intake and Incidence of anemia in Pregnant Women in District Wedi, Klaten Regency

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ABSTRAK

Background: Anemia is caused by a lack of red blood cells to deliver oxygen to tissues and the fetus. Anemia can be detected if the Hb level is <11 mg. This study aims to determine the influence of socio-economic factors, nutritional intake and ANC visits on the incidence of anemia in pregnant women. **Subject and method**: The type of research is observational analytic with a case-control design. This research was conducted at the Wedi Community Health Center, Klaten Regency from January to February 2023. A sample of 100 pregnant women was selected using simple random sampling. The dependent variable is maternal anemia, the independent variables are maternal age, maternal parity, maternal education, family income, number of family members, food consumption patterns and ANC visits. Data collection techniques used questionnaires and were analyzed using logistic regression. **Results**: Pregnant women aged < 20 years increase the risk of anemia in pregnant women (b: 1.52; p= 0.178), parity of multigravida mothers increases the risk of anemia in pregnant women (b: 3.38; p= 0.011), maternal education <high school increases the risk of maternal anemia pregnant (b: 2.15; p= 0.056), low family income < average increases the risk of anemia in pregnant women (b: 2.44; p= 0.035), number of family members > 4 increases the risk of anemia in pregnant women (b: 1.70; p= 0.121), non-diverse food consumption patterns increase the risk of anemia in pregnant women (b: 4.83; p=0.002), the number of ANC visits < 4 times increases the risk of anemia in pregnant women (b: 2.83; p=0.010).

Keywords:
anemia, pregnant women, socio economic, nutritional intake, ANC visits

1. INTRODUCTION

Anemia due to iron deficiency is the main cause of anemia in pregnant women. This type of anemia is one of the disorders that most often occurs during pregnancy, where pregnant women experience iron depletion so they only provide a small amount of iron to the fetus for normal iron metabolism. Pregnant women tend to suffer from anemia in the last three months of pregnancy, because during this period there is expansion of maternal tissue and the formation of fetal red blood cells, and the fetus will stockpile iron reserves for itself as a supply for the first month after birth (Irwanti & Rohmawati, 2019).

World Health Organization(WHO) in 2012 reported that the prevalence of anemia in pregnant women in the world was around 14% on average, in industrialized countries 56% and in developing countries between 35%-75%. The results of the 2018 Basic Health Research Survey (Riskesdas) showed that

the prevalence of iron deficiency anemia in pregnant women increased by 48.9% compared to 2013, namely 37%. The increase was quite significant, namely 11%, this was mostly experienced by pregnant women between the ages of 15-24 years who experienced an incidence of anemia of 85%.

The prevalence of maternal anemia in Central Java is 57.1% and anemia is most common in TM III pregnant women. The prevalence of iron nutritional anemia in pregnant women in 2021 in Klaten Regency was 37.2%, while in Wedi Community Health Center it was 36% (Klaten Health Office, 2021).

Factors that influence the incidence of anemia in pregnant women include maternal nutritional status, maternal age, maternal education and employment. There are several other factors, namely gestational age, parity, pregnancy spacing, compliance with iron tablet consumption. The incidence of anemia is also closely related to maternal parity, based on research conducted by (Noviyanti et al., 2019) it was found that 55% of multigravida mothers experienced anemia compared to primigravida mothers.

The incidence of anemia is also closely related to maternal parity, based on research conducted by (Noviyanti et al., 2019) it was found that 55% of multigravida mothers experienced anemia compared to primigravida mothers. The risk of anemia in high parity pregnant women is related to the mother's nutritional status. This is related to iron reserves in the mother's body which are depleted during pregnancy to meet the needs of the fetus and placenta. This is also reinforced by the statement that the more often a woman experiences pregnancy and childbirth, the more iron she loses and the more anemia she becomes. The more often a woman becomes pregnant and gives birth, the greater the risk of developing anemia, because it depletes iron reserves in the body (Tanziha et al., 2016)

The incidence of anemia is also influenced by maternal education, mothers with higher education will usually act more rationally. Therefore, an educated mother will be more receptive to new ideas. Likewise, highly educated mothers will have regular pregnancy checks to maintain the health of themselves and their children in the womb. The higher the mother's education, the greater the awareness of learning and fighting to get good nutrition so as not to cause anemia in pregnancy. Anemic pregnant women with low education have a higher prevalence than mothers with higher education (Noviyanti et al., 2019).

Pregnant women from low socioeconomic classes have an increased risk of developing anemia compared to those from higher socioeconomic classes. This can happen because people with low socio-economic status do not have the ability to buy quality or quantity of food compared to people with high socio-economic status (Noviyanti et al., 2019)

Family size has an indirect relationship with anemia through nutritional intake. Larger family members will reduce the nutritional intake of pregnant women. The largest family size was <4 people (76%). Family size <4 represents a nuclear family consisting of mother, father and 2 children. Family number 5 is likely to be a large family consisting of grandparents living in the same house. Families with more than five members are at risk of anemia. Research in Ethiopia

states that family size of more than four people is related to anemia (Gefedaw et al., 2015)

There is a significant relationship between food intake and the incidence of anemia in pregnant women (p=<0.05). Insufficient food intake in pregnant women can be seen in terms of regulating the amount and type of food that is not in accordance with the balanced nutrition of pregnant women, the mother does not eat breakfast, the food is minimal, eating too little, eating only a little protein does not meet the needs of balanced nutrition, too lots of sugar and oil, never eating snacks, and consuming fast food too often (Irwanti & Rohmawati, 2019)

The number of antenatal care visits has an indirect relationship with anemia through the administration of iron tablets. This shows that the more frequently pregnant women visit prenatal check-ups at health facilities, the more iron tablets they receive and consume. This is in line with research by (Tanziha et al., 2016) which states that the number of iron tablets consumed increases with increasing gestational age by increasing visits. Older pregnancies consume 3 times higher than young pregnancies.

Based on the background above, the author is interested in studying more deeply the influence of socio-economic factors and nutritional intake on the incidence of anemia in pregnant women at the Wedi Primary Health Care, Klaten Regency.

2. METHOD

This research is an observational analytical research using a case-control approach. This research was conducted in pregnant women's classes in 10 villages, in the working area of the Wedi Health Center, Klaten Regency, which was carried out in January-February 2023. The source population in this study was pregnant women in 10 villages in the Wedi Health Center working area, the sample was selected randomly. using simple random sampling of 100 research subjects (Murti, 2013)

The dependent variable in this study is anemia in pregnant women. The independent variables in this study are maternal age, maternal parity, maternal education, family income, number of family members, food consumption patterns and number of antenatal care visits.

Anemia of pregnant women is a pregnant woman whose Hb is checked and the result is <11 mg/dL. Maternal age is the age when experiencing pregnancy and maternal parity is the number of times the mother experiences pregnancy and childbirth. Maternal education is the last level of formal education completed until graduation. Family income is the average monthly income or income in the last six months generated by the head of the family/other family members to meet daily needs and the number of family members is the number of members living in one house. Food consumption patterns are a balance in fulfilling family nutrition by assessing the diversity of food consumed by the family. The number of antenatal care visits is the number of antenatal care visits made by pregnant women during pregnancy.

The research instrument used for data collection was a questionnaire regarding maternal age, maternal parity, maternal education, family income, number of family members, number of antenatal care visits. The food consumption pattern questionnaire uses the Food Frequency Questioner (FFQ), to check Hb levels using an Hb stick.

Data analysis in this study used univariate analysis to obtain the frequency distribution and percentage characteristics of research subjects. Bivariate analysis to analyze the relationship between independent and dependent variables uses the Chi-Square test and Odds Ratio (OR) calculations with a CI of 95% and a significance level of $p < 0.05$. Multivariate analysis uses logistic regression analysis (Murti, 2016).

The ethics of this research include approval to be a research subject (informed consent), anonymity, confidentiality and ethical approval. Ethical clearance has been carried out at Kusuma Husada University with number: 007/UKH.L.02/EC/IX/2022 published on September 11 2022.

3. RESULTS

3.1 Univariate Analysis

The subjects of this research consisted of 100 pregnant women. Univariate analysis of variables including maternal age, maternal parity, maternal education, family income, number of family members, food consumption patterns and number of ANC visits is described in table 1.

Table 1. Univariate Analysis of Variables

Variable	n	%
Mother's Age		
>20 years	67	67.0
≤20 years	33	33.0
Maternal Parity		
Primigravida	68	68.0
Multigravida	32	32.0
Mother's Education		
Height > high school	69	69.0
Low < high school	31	31.0
Family Income		
Height>Average	64	64.0
Low < average	36	36.0
Number of Family Members		
<=4	62	62.0
> 4	38	38.0
Food Consumption Patterns		
Various	64	64.0
Not diverse	36	36.0
Number of ANC Visits		
>= 4 times	68	68.0
< 4 times	32	32.0

Table 1 shows that pregnant women aged > 20 years were 67 (67%), and < 20 years were 33 (33%). The parity of pregnant women with primigravida is 68 (68%) and multigravida 32 (32%). There were 69 (69%) mothers with high education > high school and 31 (31%) mothers with low education < high school. Pregnant women from high income families >= average were 64 (64%) and those with low income < average were 36 (36%). There were 62 (62%) pregnant women from family members <= 4 and 38 (38%) from family members >4. There were 64 (64%) pregnant women with diverse food consumption patterns and 36 (36%) pregnant women with non-diverse diets. Pregnant women who made ANC visits >4 times were 68 (68) and pregnant women who made ANC visits <4 times were 32 (32%).

3.2 Bivariate Analysis

Bivariate analysis uses the Chi Square test and Odds Ratio (OR) calculation with a confidence level of 95%. The results of the bivariate analysis in table 2 show the relationship between the independent variables (maternal age, maternal parity, maternal education, family income, number of family members, food consumption patterns and number of ANC visits) with the dependent variable (pregnant maternal anemia). The results of the analysis can be seen in table 2.

Table 2. Bivariate analysis of factors influencing anemia in pregnant women

Independent Variable	Anemia				Total		OR	CI (95%) (upper limit-lower limit)	p
	Not Anemic		Anemia						
	n	%	n	%	N	%			
Mother's Age									
> 20 years	98	79	25	21	123	100	2.7	0.96 - 7.51	0.032
≤20 years	33	42	44	58	77	100			
Maternal Parity									
Primigravida	93	77	27	29	120	100	9.6	3.14 – 30.53	<0.001
Multigravida	38	47	42	53	80	100			
Mother's Education									
Height > high school	103	78	28	22	131	100	6.2	2.14 – 18.73	<0.001
Low < high school	28	40	41	60	69	100			
Family Income									
Height>Average	108	81	24	19	132	100	2.2	0.80 – 6.0 8	0.083
Low < average	23	28	45	72	81	100			
Number of Family Members									
<=4	101	81	23	19	124	100	6.0	2.07 – 18.52	<0.001
> 4	30	39	46	61	76	100			
Food Consumption Patterns									
Various	102	78	28	22	130	100	9.1	2.96 – 29.47	<0.001
Not diverse	29	41	41	59	70	100			
Number of ANC Visits									
>= 4 times	102	80	25	20	127	100	7.4	2.4 – 22.6	<0.001
< 4 times	29	39	44	61	73	100			

Table 2 presents a bivariate analysis of the relationship between the age of pregnant women and the incidence of anemia, obtaining a calculated chi-square value with an odds ratio (OR) of 2.7 and a p value = 0.032; CI (95%) = 0.96 to 7.5 1. The influence between maternal parity and the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 9.6 and a p value <0.001; CI (95%) = 3.14 to 30.53. The influence between maternal education and the incidence of anemia in pregnant women was obtained by calculating the chi-square value with an odds ratio (OR) of 6.2 and a p value <0.001; CI (95%) = 2.14 to 18.73. The influence between family income and the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 2.2 and a p value = 0.083; CI (95%) = 0.80 to 6.08. The influence between the number of family members and the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 6.0 and a p value <0.001; CI (95%) = 2.07 to 18.52 . The influence of non-diverse food consumption patterns on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 9.1 and a p value <0.001; CI (95%) = 2.96 to 29.47. The effect of <4 ANC visits on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 7.4 and a p value <0.001; CI (95%) = 2.49 to 22.60 . The influence of non-diverse food consumption patterns on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 9.1 and a p value <0.001; CI (95%) = 2.96 to 29.47. The effect of <4 ANC visits on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 7.4 and a p value <0.001; CI (95%) = 2.49 to 22.60 . The influence of non-diverse food consumption patterns on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 9.1 and a p value <0.001; CI (95%) = 2.96 to 29.47. The effect of <4 ANC visits on the incidence of anemia in pregnant women was obtained by calculating a chi-square value with an odds ratio (OR) of 7.4 and a p value <0.001; CI (95%) = 2.49 to 22.60 .

3.3 Multivariate analysis with logistic regression

Multivariate analysis is an analysis that can explain the influence of more than one independent variable on one dependent variable. The multivariate analysis used in this research is logistic regression analysis using the STATA 13 program.

Table 3 Multivariate Logistic Regression Analysis

Independent Variable	b	p
Fixed Effects		
Maternal age (< =20 years)	1.52	0.178
Maternal Parity (Multigravida)	3.38	0.011
Mother's education (<high school)	2.15	0.056
Family income (< average)	2.44	0.035
Number of family members (> 4)	1.70	0.121
Food consumption patterns (not diverse)	4.83	0.002
Number of ANC Visits (< 4 times)	2.83	0.010

Table 3 can be interpreted to mean that there is a positive and statistically significant influence. The young age of pregnant women (<= 20 years) increases the logodd (b=1.52; p=0.178) to experience anemia by 2.15 units compared to pregnant women aged > 20 years. The parity of multigravida mothers increases the logodd (b=3.38; p=0.011) to experience anemia by 3.38 units compared to the parity of primigravida pregnant mothers.Low education of pregnant women (< high school) increases the logodd (b=2.15; p=0.056) to experience anemia by 2.15 units compared to pregnant women with high education > high school. Pregnant women from low income families (< average) increased the logodd (b=2.44; p=0.035) to experience anemia by 2.44 units than pregnant women from families with high income (> average). Pregnant women with non-diverse food consumption patterns have an increased logodd (b=4.83; p=0.002) to experience anemia by 4.83 units compared to pregnant women with diverse food consumption patterns. Pregnant women who rarely make ANC visits (< 4 times) have an increased logodd (b=2.82; p=0.010) to experience anemia by 1.79 units compared to pregnant women who make ANC visits > 4 times.

4. DISCUSSION

A woman's age during pregnancy has an influence on the incidence of anemia in pregnant women. The increased risk of anemia in adolescents is due to the need for iron during the growth and development phase which has not yet been completed. A study in America stated that as many as 9–13% of teenagers suffered from anemia in the 1st trimester, and this increased to 57–66% in the 3rd trimester (Wibowo et al., 2021).Pregnant women aged less than 20 years are at risk of experiencing anemia because teenagers want an ideal body so strict diets are encouraged without paying attention to nutritional balance, so that when they enter pregnancy they are undernourished (Noviyanti *et al.*, 2019). This is in line with research results, namely that pregnant women aged < 20 years have a risk of increasing the incidence of anemia in pregnant women by 1.52 times compared to pregnant women aged > 20 years. Pregnant women in their teenager, namely < 20 years, are still in the growth phase, so that when a teenager is pregnant, she will share her nutrition for the growth of herself and the fetus, therefore pregnant women aged < 20 years are vulnerable to anemia.

In this study, it was stated that mothers who have multigravida parity can increase the incidence of anemia in pregnant women by 3.38 times greater than mothers who are primigravida. This is in line with research conducted by (Katmini & Yunita, 2020), multiparous mothers have a risk of experiencing anemia during pregnancy that is 8.25 times greater than mothers who are primiparous or primigravida. Maternal parity can affect pregnancy because anemia is often influenced by pregnancy and childbirth, the more frequently a woman experiences pregnancy and childbirth, the more iron she loses and becomes anaemic. The more frequently a woman becomes pregnant and gives birth, the greater the risk of developing anemia because pregnancy depletes iron reserves in the body.

Maternal education has an indirect influence on the incidence of anemia in pregnant women. A mother's high education can have an influence on the mother's decision in determining food consumption patterns, the need to consume Fe Tablets, as well as the decision to make ANC visits. In this study, mothers who had low education <high school were at risk of experiencing anemia 2.15 times greater than mothers who had high education > high school. The results of this research are in line with what was stated by(Katmini & Yunita, 2020) it was found that low education <high school has a risk of anemia in pregnant women that is 5.76 times greater than mothers with higher education > high school.

The results in this study showed that pregnant women from families with low income < average can statistically and significantly increase the risk of developing anemia by 2.44 times greater than pregnant women from families with income > average. The results of this study are in line with previous research conducted by (Katmini & Yunita, 2020)low income increases the risk of anemia in pregnant women 1.05 times greater than in pregnant women from high-income families.

Food consumption depends on the type and amount of food purchased, cooked, and distributed to family members. Family members of more than five have higher food insecurity (Bekele et al., 2016)This is in line with research results, namely that pregnant women with a large number of family members >4 have a 1.70 times greater risk of developing anemia compared to mothers with a number of family members <4.

Based on research conducted by (Katmini & Yunita, 2020)it was found that non-diverse food consumption patterns increase the risk of anemia in pregnant women by 3.98 times greater than mothers who consume diverse foods. The results of this research are in line with this research, namely that pregnant women with diverse food consumption patterns have a risk of anemia that is 4.83 times greater than pregnant women with diverse food consumption patterns. Fulfilling balanced nutrition during pregnancy is useful for overcoming nutritional problems such as malnutrition. Based on balanced nutrition guidelines, the nutritional needs of pregnant women are increased, namely macronutrients and micronutrients. Foods that are good for consumption to increase hemoglobin levels are foods with high iron content, namely hemetat found in meat and non-heme found in vegetables.

The number of ANC visits made by pregnant women has an influence on the incidence of anemia in pregnant women through the administration of Fe tablets, because the more frequently pregnant women visit pregnancy checks at health facilities, the more iron tablets they receive and consume. Based on research conducted by (Sinawangwulan1 et al., 2018) mothers who do not routinely make ANC visits to health facilities have a 1.59 times greater risk of anemia compared to mothers who regularly make ANC visits at least 4 times during the pregnancy period. This research is in line with research conducted by the author, that pregnant women who make ANC visits < 4 times have a 2.83 times greater risk of developing anemia compared to pregnant women who make ANC visits > 4 times.

5. CONCLUSION

In this study, a conclusion can be drawn that there is an influence of maternal age on the incidence of anemia in pregnant women. Young maternal age (< 20 years), multigravida mothers, low maternal education, low family income, large family members (> 4), food consumption patterns that are not diverse and the number of ANC visits less than 4 times will increases the risk of anemia in pregnant women. Finally, the author would like to thank all parties who have helped carry out this research. Hopefully it can provide benefits to education and pregnant women in preventing anemia

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