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Factors Affecting the Incidence of Anemia in Pregnant Women at Ampel and Gladagsari Public Health Center Boyolali Regency in 2019

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ABSTRACT

Background: Anemia is a condition where the blood hemoglobin level is <11 g/dl. Anemia is often experienced by mothers during pregnancy. The main cause of anemia in pregnant women is due to iron deficiency in the body. This study aims to determine what factors are the main causes of anemia in the working area of Ampel Health Center and Gladagsari Health Center. Poor nutritional status, parity, short pregnancy intervals are believed to be the biggest contributors to the incidence of anemia in pregnant women.
Methods: This study used secondary data with a cross sectional design. Chi Square test is used in statistical testing. Study involved Ampel Health Center (193 samples) and Gladagsari Health Center (246 samples). The variables studied were the age of pregnant women, distance between pregnancies, parity, nutritional status, Antenatal Care and adherence to Fe tablet consumption.
Results: The results showed that nutritional status (0.001), gestational distance (0.003), parity (0.032) and age of pregnant women (0.032) had a significant relationship with the incidence of anemia in Ampel Health Center < (0.05). Gladagsari Health Center samples showed different results where nutritional status (0.003), gestational distance (0.007), parity (0.005), adherence to Fe tablet consumption (0.049) and age of pregnant women (0.046) had a significant relationship with the incidence of anemia < (0, 05). Maternal nutritional status during pregnancy is the highest cause of anemia, many steps can be taken to improve the nutritional status of pregnant women, one of which is the provision of additional food.
Conclusion: Education of health workers about the importance of consuming Fe tablets for women of childbearing age (WUS) and pregnant women and self-compliance play an important role in preventing anemia during pregnancy.

Keywords: Anemia; Pregnant women; Iron deficiency

INTRODUCTION

World Health Organization (WHO) notes that the risk of death from anemia during pregnancy is doubled, especially in women of childbearing age (WUS). Anemia occurs as a result of hemoglobin (Hb) levels in the blood below the normal range. A low hemoglobin level <11 g/dl is a sign that the mother is anemic. The global prevalence of anemia in pregnant women affects at least 40.2% of the world's population[(1)]. The data show that in Southeast Asia the prevalence of anemia is 48.7%. If anemia during pregnancy does not get serious enough attention it can affect the health condition of the mother and fetus to the risk of death [(2)].

In developing countries the incidence of anemia during pregnancy is still high, which is based on data by Basic Health Research in Indonesia in 2018 the proportion of anemia occurred as much as 48.9%. This figure increased sharply when compared to the previous year, which was 37.1%[(3).] Data from the Central Java Provincial Health Office also noted that in 2015 the incidence of anemia in pregnant women in Central Java Province occurred as much as 57.1% with the highest incidence in the third trimester of pregnancy[(4)]. The Boyolali Regency annual report also states that in 2015, 23.2% of mothers experienced anemia during pregnancy. Data from the Boyolali Health Service in 2015 recorded a total of 21 cases of Maternal Mortality Rate (MMR) in all Puskesmas in Boyolali, with causes of death being eclampsia, anemia, and infection[(5)].

The most common type of anemia during pregnancy is iron deficiency anemia. WHO provides recommendations to mothers to increase their iron intake through food and oral *supplements*. Foods rich in iron content (spinach, red meat, beans, eggs) are highly recommended for consumption pregnancy. Consumption of foods containing iron at least as much as 30-60 mg / day, especially in the third trimester of pregnancy[(6)]. Potential diseases that can attack the mother during pregnancy can be prevented through the regularity of the mother in following the Antenatal Care (ANC) process. The ANC activity aims to provide *screening* in the form of anthropometric measurements, as well as measurements of maternal health status which are carried out at least 4 times until the third trimester of pregnancy. Mothers who routinely check their health during pregnancy can reduce the risk of giving birth tobabies *premature* or low birth weight (LBW)[(7)].

The highest contributor to anemia cases during pregnancy is caused by low intake of iron, both heme and non-heme, which is called iron deficiency anemia. However, it is possible that there are other anemias that have the potential to attack pregnant women during pregnancy, including anemia due to folic acid deficiency and anemia due to lack of Vitamin B12. Many factors cause the mother developing health problems during pregnancy, especially anemia are caused by socio-demographic and economic conditions, the lack of compliance in taking iron supplements, spacing pregnancies, nutritional status, gravida, parity, and irregularities in antenatal Care [(9)].

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parity, and irregularities inantenatal Care [10].

Age is an important factor in pregnancy, a person's safe reproductive age ranges from 20-35 years. At this age are considered optimal and stable trend in the physical and psychological conditions expectant mothers [11]. In addition to age parity is also considered to affect maternal anemia during pregnancy, the number of births (parity) is a condition that describes the number of live births during the reproductive period. Parity is classified into three groups: *primiparous* that gave birth to one *child, Multipara* gave birth to five*times,* and *Gradenmultipara* that gave birth to six times or more [12].

To see the development of maternal nutritional status during pregnancy, anthropometric measurements are usually carried out. The measurement parameter to see the degree of maternal health is by measuring the Upper Arm Circumference (LILA). If LILA shows a score of < 23.5 cm, the mother is categorized as having Chronic Energy Deficiency (CED) during pregnancy [13]. Mothers who experience CED during pregnancy can increase the occurrence of anemia which can cause the mother to give birth to babies *premature* [14].

Due to the high Maternal Mortality Rate (MMR), especially in Public Health Center in Boyolali Regency, one of the factors caused by anemia during pregnancy, a study was finally carried out with the title "Factors Influencing the Incidence of Anemia in Ampel Health Center and Gladagsari Health Center Boyolali Regency in 2019". The purpose of this study is to provide information and provide an overview of the risk determinants of anemia in the working area of the Ampel Health Center and Gladagsari Health Center. Through this research, it is hoped that it will increase the effectiveness of the role of health workers in tackling the problem of anemia during pregnancy.

METHODS

Research was conducted using a quantitative type of research through aapproach *Cross-Sectional*. The data used is a type of secondary data from the archives of the Ampel Community Health Center and the Gladagsari Health Center in 2019. The data collection locations are at the Ampel Health Center and the Gladagsari Health Center, Boyolali Regency, Central Java during October - December 2020. In the study, all pregnant women who were in The working areas of Ampel Health Center and Gladagsari Health Center were used as the population. Samples were obtained using the "*Purposive Sampling"* with condition pregnant women were in the working area of Ampel Health Center and Gladagsari Health Center during 2019. The total samples obtained at the Gladagsari Health Center were 246 samples. The samples were then grouped according to categories: 1) the incidence of anemia (anemia = Hb < 11 g/dl and not anemia = Hb 11 g/dl); 2) parity (at risk = pregnancy > 4 children and less risk = pregnancy < 3 children); 3) the age of pregnant women (at risk = age < 20 years and > 35 years, while less at risk = age 20-35 years); 4) pregnancy spacing (risk = gestational distance < 2 years and less risk = gestational distance > 2 years); 5) compliance level of Fe tablet consumption (routine = consuming Fe tablets 90 tablets and less routine = consuming Fe tablets < 90 tablets); 6) nutritional status (normal = LILA 23.5 cm and KEK = LILA < 23.5 cm); 7) antenatal visits (regular = attending ANC activities up to 4 times and irregular = participating in ANC activities < 4 times).

The criteria used as samples are pregnant women who are diagnosed with anemia and recorded in the archives or data of the Ampel Health Center and Gladagsari Health Center during 2019 and pregnant women whose gestational age is

in the third trimester with complete data. Furthermore, data analysis was carried out using univariate analysis to see the distribution of data and bivariate through test *Chi Square* (*p-value* <0.05) to see the factors causing anemia during pregnancy.

RESULTS

A. Characteristics of Respondents

Table 1. Characteristics of Respondents

Variable	PHC Ampel		PHC Gladagsari	
	n	%	n	%
Anemia Status				
Anemia	67	34,72%	82	33,33%
Non anemia	126	65,28%	164	66,67%
Distance Pregnancy (Year)				
High Risk (< 2)	47	24,35%	56	22,76%
Low Risk (> 2)	146	75,65%	190	77,24%
Nutritional Status				
KEK (<23,5 cm)	45	23,31%	62	25,21%
Normal (≥23,5 cm)	148	76,69%	184	74,79%
Parity (Number of Pregnancy)				
High Risk (≥ 4)	24	12,43%	41	16,67%
Low Risk (≤ 3)	169	87,57%	205	83,33%
Antenatal Care (ANC)				
Routine	160	82,90%	185	75,20%
Less	33	17,10%	61	24,80%
Compliance with Fe Tablet Consumption				
Routine	139	72,02%	156	63,41%
Less	54	27,98%	90	36,59%
Age of Pregnant Women				
Low Risk	147	76,17%	171	69,52%
High Risk	46	23,83%	75	30,48%
Total Sample	193	100%	246	100%

Information:
n = Number of events

In Table 1 shows that based on the data obtained, the number of cases of anemia at Ampel Health Center was 34.72% while at Gladagsari Health Center it was 33.33%, This shows that the frequency of anemia in Ampel Health Center and Gladagsari Health Center is high. In the variable distance pregnancy, the frequency of anemia in Ampel Health Center was 34.35% and Gladagsari Health Center was 22.76%. The frequency of mothers experiencing SEZ for Ampel Health Center was 23.31% and for Gladagsari Health Center it was 25.21%. The number of mothers who are at high risk of anemia based on parity data at Ampel Health Center is 12.43% while for Gladagsari Health Center is 16.67%. The number of mothers who are less regular in participating in *Antenatal Care* (ANC) activities for Ampel Health Center is 17.10% and for Gladagsari Health Center as much as 24.80%. The frequency of mothers who consume Fe tablets less frequently for Ampel Health Center is 27.98% and for Gladagsari Health Center is 36.59%. Mothers classified as potentially affected by anemia by age were at high risk in the Ampel Community Health Center sample as much as 23.83% and for the Gladagsari Health Center it was 30.48%.

B. Cross Tabulation of Factors Causing Anemia Pregnancy

Table 2. Determinants of Anemia in Pregnant Women at Ampel PHC

Research Variables	P-value	Ampel PHC OR (Odds Ratio)	Ampel PHC Convidence Interval (CI 95%)
Nutritional Status	0,001*	2,976	1,505-5,884
Pregnancy Distance	0,003*	0,405	0,220-0,745
Parity (total	0,032*	2,517	1,059-5,981

pregnancy)			
ANC (Antenatal Care)	0,155	0,578	0,270-1,237
Compliance consumption Tablet Fe	0,673	0,868	0,451-1,671
Age Pregnancy	0,032*	0,481	0,245-0,947

Table 3. Determinants of the Occurrence of Anemia in Pregnant Women at the Gladagsariat PHC

Research Variables	Gladagsari PHC		
	P-value	OR (Odds Ratio)	Convidence Interval (CI 95%)
Nutritional Status	0,003*	0,414	0,230-0,746
Pregnancy Distance	0,007*	0,476	0,277-0,818
Parity (Number of Pregnancy	0,005*	0,410	0,217-0,773
ANC (Antenatal Care)	0,404	1,293	0,707-2,363
Compliance consumption Tablet Fe	0,049*	0,581	0,337-1,001
Age Maternal	0,046*	0,559	0,315-0,992

Table 2 shows the results of cross-tabulation testing, between the incidence of anemia and the variables studied (nutritional status, gestational interval, parity (number of pregnancies), ANC, Fe tablet consumption compliance and age of pregnant women) using the Chi Square test with the help of SPSS tools with 95% confidence level conducted at Ampel Health Center and Gladagsari Health Center. The results showed that nutritional status 0.001 (CI=1.505-5.884), gestational interval 0.003 (CI=0.220-0.745), parity 0.032 (CI=1.059-5.981), and maternal age 0.032 (CI=0.245-0.947) had a significant relationship. significantly with the incidence of anemia in Ampel Health Center < (0.05). Data from the Gladagsari Health Center showed that from the tests carried out the nutritional status variable was 0.003 (CI=0.230-0.746), gestational distance 0.007 (CI=0.277-0.818), parity 0.005 (CI=0.217-0.773), compliance with Fe tablet consumption 0.049 (CI = 0.337-1.001) and the age of pregnant women 0.046 (CI = 0.315-0.992) had a significant relationship with the incidence of anemia < (0.05).

DISCUSSION

This study found that there was a significant difference between nutritional status and the risk of anemia during pregnancy, both at Ampel Health Center (0.001) and Gladagsari Health Center (0.003) < (0.05). The results of this study are in line with the research conducted by Widya (15) where the results of his research showed that from a total of 193 samples, 37 of them had SEZ and 6 samples had anemia (*p*= 0.003). A person's nutritional status is strongly influenced by food intake during pregnancy, the need for nutrients will increase, this is because it is an energy supply for the fetus. Lack of nutrients can have an impact on the health and growth of the fetus. The impact of malnutrition or Chronic Energy Deficiency (KEK) can make the mother potentially anemic during pregnancy. KEK also increases the risk of low birth weight babies and fetal death. LILA is used as a method used to measure the nutritional status of mothers. If LILA shows numbers < 23.5 cm, it can be said that the mother has KEK(16).

Research conducted in South Africa states that nutritional deficiencies that occur during pregnancy can increase maternal morbidity and risk increasing fetal growth problems. Malnutrition

during pregnancy can also increase the risk of preterm birth. Thus, mothers are encouraged to increase their intake of macronutrients (protein, fat, carbohydrates) and micronutrients (minerals and vitamins) during pregnancy to support fetal growth and prevent bleeding during labor through proper diet [(17)]. During pregnancy it is also recommended to increase foods rich in folic acid (eggs, fish, milk and green vegetables). Folic acid deficiency during pregnancy can cause damage to the baby's neural tube [(18)].

Undernutrition status, namely KEK during pregnancy at the Ampel Health Center has a 2,976 times greater risk of developing anemia during pregnancy compared to mothers who have normal nutritional status. Pregnant women who experience KEK conditions at the Gladagsari Health Center have a 0.414 times risk of increasing the risk of anemia than those with normal nutritional status.

Tests carried out to see the relationship between gestational distance and increased risk of anemia during pregnancy found a significant difference in both Ampel Health Center (0.003) and Gladagsari Health Center (0.007) (<0.05). Through the research conducted, it is concluded that there is a relationship between the distance of pregnancy and the risk of anemia. The same result was also reported by Redowati [(19)] where the results of her research showed that out of a total of 12 samples, 8 of them had anemia due to a gestational distance of < 2 years (*p*= 0.033).

In a study conducted by Sumiaty et al [(20)] also said in his writings that the distance between pregnancies can affect the health of pregnancy and the future of the baby. Very short pregnancy intervals (< 2 years) can cause the mother to lose the opportunity to recover or regenerate due to previous pregnancies, so the risk that can arise if the pregnancy interval is less than 2 years is postpartum. bleeding, because this blood loss can increase the mother's risk of developing anemia.

The risk of a relatively short pregnancy interval in the working area of the Ampel Community Health Center affects as much as 0.405 times higher experiencing anemia. The results of the study at the Gladagsari Health Center found that a short pregnancy interval increased the potential for anemia by 0.476 times compared to those with a gestational interval of more than 2 years.

The results of the study between parity and the risk of anemia during pregnancy found a significant relationship between the two Puskesmas, namely Ampel Health Center (0.032) and Gladagsari Health Center (0.005) < (0.05). This study is in line with the research conducted by Riyani et al [(21)] in their research results which found that 55.2% of the total respondents studied were at risk parity and had anemia (*p*= 0.003). Other studies also state that parity of more than 3 children has a high risk of developing anemia. After the third pregnancy, the risk of anemia in pregnant women increases due to damage to organs, blood vessels and uterus due to repeated pregnancies that have the potential to disrupt the circulation of nutrients to the fetus. Parity 1 to 3 is the safest parity based on maternal health. Recurrent pregnancies can be prevented through the Family Planning program [(22)].

The potential risk of anemia during pregnancy also increases in mothers who have parity of more than 3 children. In the Ampel Community Health Center sample the OR value (2.517), Gladagsari Health Center obtained an OR (0.410), this result shows that parity of more than 3 children can increase maternal anemia by 2.517 and 0.410 times compared to mothers who gave birth to 1-3 children. A study in a study in Bangladesh, India reported that mothers who gave birth to >2 children were associated with an increased risk of pregnancy complications including anemia, this risk also increased when the mother was >45 years old [(23)].

There was no significant relationship between adherence to ANC activities and the risk of anemia at Ampel Health Center (0.155). Research at the Gladagsari Health Center also found the same results (0.404) > (0.05) where obstetrical examination compliance did not have a significant relationship with the risk of anemia. The research conducted is different from the research conducted by Antono (24) where in his research it was stated that there were 33% of respondents who experienced anemia due to irregularity in participating in ANC activities (p = 0.013).

Findings conducted in Ethiopia stated that as many as 92.3% of the sample performed ANC and only 25.1% did ANC in the first trimester, this shows that there are still many women who do not routinely perform ANC [25] with the intention of taking a history related anthropometric measurements, Hb examination, and administration and education of Fe tablets. Pregnant women who regularly participate in ANC are also safer during pregnancy because they receive counseling related to pregnancy [(26)].

The test samples conducted at the Ampel Health Center and the Gladagsari Health Center showed that there was no relationship between the regularity of participating in ANC activities and the incidence of anemia. However, the risk of anemia in mothers who do not follow ANC regularly still appears with the OR value at the Ampel Health Center of 0.578. Research at the Gladagsari Health Center found an OR value of 1.293. It was concluded that although the regularity of following ANC and the proportion of anemia incidence were not significantly related, mothers still had the opportunity to experience anemia.

The results of the study at the Ampel Health Center showed that there was no relationship between regular consumption of Fe tablets and the incidence of anemia (0.673). The results of a different study were carried out by Rizki et al (27) where his research showed that from the total sample studied, 20 of them experienced a significant relationship with abnormal hemoglobin (Hb) levels due to irregular consumption of Fe tablets (*p*= 0.000). Different results were shown at the Gladagsari Health Center where the consumption of Fe tablets had a strong relationship with the risk of anemia (0.049). This study is in line with the results of Nursani's study (28) where from a totals of 62 respondents 39 (62.9%) of them did not comply in consuming Fe tablets (*p*= 0.001).

Anemia is often found during pregnancy, this is because during pregnancy the need for iron increases as vital fulfillment, placenta and increased erythrocyte mass. One of the efforts made to support iron deficiency is through the provision of Fe tablet supplementation. The iron tablet itself contains a formula in the form of an essential micronutrient that the body needs to synthesize hemoglobin [(29)].

Research conducted in West Africa reported that pregnant women are recommended to consume iron at a dose of 50-100 mg / day, because daily consumption of certain foods (tea) can limit the absorption of iron into the body [(30)]. Therefore, oral Fe supplementation plus Vitamin C intake is an approach that is quite effective in restoring iron levels in anemic patients, especially pregnant women [(31)].

The findings of this study also reported that consumption of Fe tablets had an effect on anemia where the OR value of Ampel Health Center was (0.868), while research conducted at Gladagsari Health Center obtained an OR value of (0.581) this indicates that the risk of anemia increased by (0.868) and (0.581) higher in mothers who do not routinely take Fe tablets than mothers who during pregnancy routinely consume Fe tablets. Anemia is often caused by iron deficiency, so additional iron supplementation

is needed to increase Hb (Hemoglobin) levels, good maternal knowledge about nutrition can increase adherence to consuming iron supplements. In addition, the role of health workers is needed to assist mothers in complying with themselves [(32)].

There is a significant difference between maternal age and the risk of anemia in Ampel Health Center (0.032) and Gladagsari Health Center (0.046) < (0.05). Through this study, it can be seen that anemia is closely related to the age of pregnant women. This opinion is supported by the results of a study conducted by Guspaneza et al [(33)] which showed that of the 117 samples whose pregnancies were < 20 and > 35 years, 73.5% had a risk of anemia (*p*= 0.001).

The age of the mother who is under 20 years of age, her reproductive organs are still not ready. Ages over 35 years are at risk for anemia due to a decrease in iron stores caused by the fertilization process and increasing age. A healthy age for pregnancy and childbirth is when you are 21-35 years old. This is because the reproductive system is at an optimal stage [(34)].

Based on the research conducted, it was found that age can affect maternal anemia and the OR value of Ampel Health Center (0.481) and Gladagsari Health Center was (0.559). with a gestational age of 20-35 years. Research conducted by Widiyanto & Lismawati (35) reported in a study conducted that ages < 20 and > 35 years increased the incidence of LBW infants by 16.2 times and increased the risk of anemia which had an impact on maternal and fetal health.

CONCLUSION

The conclusion of this study is that there are many factors that cause mothers to experience anemia during pregnancy at Ampel Health Center and Gladagsari Health Center. Factors causing anemia in pregnancy at the Ampel Health Center were nutritional status (0.001), gestational interval (0.003), parity (0.032), and age of pregnant women (0.032). While at the Gladagsari Health Center anemia during pregnancy was caused by nutritional status (0.003), gestational distance (0.007), parity (0.05), compliance with Fe tablet consumption (0.049) and the age of pregnant women (0.032) to anemia (<0.05). at the Gladagsari Health Center. Through this research, it is hoped that further health workers can create programs or education based on improving the quality of health services for pregnant women to overcome the problem of anemia and reduce MMR due to anemia. Educational programs are also needed from Women of Childbearing Age (WUS) as a preparatory and preventive step before pregnancy. The advice given by the author is expected that pregnant women can implement efforts to prevent anemia from an early age by routinely consuming blood-boosting tablets (Fe). In addition, for the health sector, especially the Ampel Health Center and Gladagsari Health Center, it is hoped that they can provide complete education to pregnant women, both in terms of recommended food during pregnancy, education to increase nutritional awareness of pregnant women and routine care during pregnancy until delivery. In addition, the role of health workers is needed in order to educate the public about the importance of Fe tablets in overcoming pregnancy problems, especially anemia. Suggestions for further research are expected to look at complications of certain diseases that can arise during pregnancy.

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