ORIGINAL RESEARCH

Parity and anemia among pregnant women at a public health center in Bojonegoro, Indonesia

Toto Siswantoro, Masfuah Ernawati🆔*
Diploma Program of Bojonegoro Midwifery
Poltekkes Kemenkes Surabaya, Indonesia

Article Info	ABSTRACT
  	Objective: The purpose of this study was to analyze the factors that influenced anemia in pregnant women at the Public Health Center of Kedewan, Bojonegoro, Indonesia. **Materials and Methods**: This was an analytic study using a retrospective approach. The population of this study was all pregnant women in 2018 at Public Health Center in Kedewan, Bojonegoro, Indonesia, involving 173 pregnant women, consisting of 117 anemic pregnant women and 56 non-anemic pregnant women. The sample of this study consisted of 119 pregnant women in 2018 consisting of 80 anemic pregnant women and 39 non-anemic pregnant women, who were selected using proportional stratified random sampling and simple random sampling. Bivariate and multivariate analyses were performed using multiple logistic regression. **Results**: Variables that did not significantly affect anemia in pregnant women were age (p=0.384), education (p=0.460), occupation (p=0.234), income (p=0.482), food abstinence (p= 0.465), and ANC examination (p=0.319), while variables that significantly affected anemia in pregnant women were knowledge (p=0.002), parity (p=0.000) and the regularity of consuming blood-booster tablets (p=0.041). **Conclusion**: The most influential variable on anemia in pregnant women was parity.

Highlights:

1. One of the most common maternal health problems is anemia during pregnancy.
2. Factors that lead to anemia incidence were analyzed to be able to provide adequate precautions.
3. It was found that knowledge, parity, and consistency in taking blood supplement tablets during pregnancy are factors that influence the incidence of anemia in pregnant women.

INTRODUCTION

Anemia is one of the major causes of maternal mortality. Anemia that occurs until the third trimester may affect the condition of the fetus and the continuity of labor.[1] Anemia is a clinical syndrome characterized by the reduction of hematocrit, hemoglobin, and erythrocyte count in the blood.[2] Anemia in pregnancy is the condition of pregnant women with hemoglobin (Hb) levels less than 11 g/dL in the first and third trimester of pregnancy, while in the second trimester, the hemoglobin level is less than 10.5 g/dL.[3]

Based on data from the World Health Organization (WHO), 15-20% of maternal deaths, either directly or indirectly, are caused by anemia. The frequency of anemia in pregnancy in the world ranges from 10% - 20%.[3] According to the 2018 Basic Health Research (Riskesda), the prevalence of anemia for pregnant women in Indonesia in 2018 was 48.9%, higher than the prevalence of anemia for pregnant women in 2013, which was 37.1%.[4] The incidence of anemia for pregnant women in Bojonegoro Regency, Indonesia, in 2018 was 8.77% of the pregnant women. Meanwhile, the prevalence of anemia in the working area of the Public Health Center in Kedewan, Bojonegoro, in 2018 was 67.63%. This percentage was the highest compared to all anemia cases in 37 other public health centers in the district of Bojonegoro.[5]

Anemia occurs relatively often in pregnancy because pregnant women need more iron for the process of pregnancy and childbirth. Several factors that may cause anemia in pregnancy include the level of knowledge, socio-economic level, culture, gravidas, age, parity, level of adherence to the consumption of blood-booster tablets, and diet. The effects of anemia in pregnancy can be fatal if it is not immediately treated. Those effects are including miscarriage, preterm labor, uterine inertia, prolonged labor, uterine atony, bleeding, and shock, while the effects of anemia on the outcome of conception include miscarriage, fetal death in the womb, fetal death at birth, high perinatal mortality, prematurity, and congenital defects.[6]

To prevent nutritional anemia in pregnant women, supplementation of blood-booster tablets is carried out with a daily dose of one tablet of 60 mg of elemental iron and 0.4 mg of folic acid in a row for at least 90 days during pregnancy.[7] Prevention of anemia deficiency in pregnant women can be conducted with iron and folic acid supplementation. WHO recommends providing 60 mg of iron for 6 months to meet the physiological needs during pregnancy. However, many literatures recommend 100 mg of iron for 16 weeks or more during pregnancy.[8] The government has been conducting various ways as efforts to prevent and control efforts of anemia in Indonesia. Various efforts have been conducted in the context of preventing and overcoming anemia. Pregnant women should increase their consumption of Fe tablets, increase their intake of foods containing iron and vitamin C, improve their diet, as well as eradicate worms to avoid iron loss.[9]

The authors were interested in the characteristic factors of pregnant women (knowledge, age, and parity), socio-economic (education, work, and income), food abstinence factor, regularity of ANC visits, consumption of blood-boosting tablets against anemia in pregnant women at the Kedewan Health Center, Bojonegoro.

MATERIALS AND METHODS

The type of research used was quantitative analytic research with a case-control study design. The population of this study was all pregnant women in 2018 at the Kedewan Health Center, a total of 173 pregnant women consisting of 117 anemic pregnant women and 56 non-anemic pregnant women. The samples in this study were enrolled using proportional stratified random sampling. The sample for this study was a portion of pregnant women in 2018, totaling 119 pregnant women. Using the proportionate formula, there were 80 anemic pregnant women and 39 non-anemic pregnant women.

Data collection from the independent variables was carried out using a closed questionnaire, by inviting respondents to the local village midwife who acted as an enumerator, while data collection from the dependent variable used the mother's cohort register. The collected research data were then edited, entered, and tabulated. The data analysis used in this study was a multiple logistic regression test using SPSS version 16 computer program. Univariate analysis was used to determine the frequency distribution of the variable characteristics of pregnant women (knowledge, age, parity), mother's socio-economic factors (education, occupation, income), food abstinence culture, regular ANC check-ups, and consumption of iron tablets. Bivariate analysis was used to determine the effect between two variables, then multivariate analysis was used to determine the joint effect of several factors of pregnant women on anemia in pregnant women.

RESULTS AND DISCUSSION

Effect of each variable on anemia in pregnant women

Bivariate analysis results of the multiple logistic regression test on the maternal factors of anemia in pregnancy that affected the occurrence of anemia in pregnant women can be seen in Table 1.

Table 1 shows that variables that have a significant effect on anemia in pregnant women (p<0.05) are knowledge of pregnant women, maternal parity, and regular consumption of blood-booster tablets. Variables that did not significantly affect anemia in pregnant women (p>0.05) were the pregnant women's age, education, occupation, income, culture of abstinence from food, and ANC regularity.

The results of this study indicated that the knowledge of pregnant women about anemia significantly affected anemia in pregnant women (p=0.000). This was in line with research conducted by Roni et al. (2020)[10] that there was a strong correlation between knowledge and the incidence of anemia (p=0.021; r=0.781). Pregnant women with low knowledge of the importance of iron in pregnancy have problems with their nutritional intake patterns and consumption of iron tablets, so they are at risk for anemia.[11]

The results of this study indicated that the age of pregnant women had no significant effect on anemia in pregnancy. This was not in line with the research conducted by Astriana (2018), who studied the incidence of anemia in pregnant women in terms of their parity and age, and found that maternal age had an effect on the incidence of anemia in pregnant women.[12] It was also not in line with a study by Amallia et al. (2017), who studied the risk factors of anemia in pregnant women, in which there was a relationship between age and parity of pregnant women with the incidence of anemia in pregnant women and there was no relationship between the level of education and work with the incidence of anemia in pregnant women.[13] In this study, as many as 102 or 85.7% of pregnant women were found not to have the risk of having anemia during pregnancy. This indicated that maternal age did not affect anemia in pregnant women.

The results of this study indicated that maternal parity has a significant effect on anemia in pregnant women. This was also found in a research conducted by Anggraeni (2018) on factors associated with the incidence of anemia in pregnant women. She found that parity affected anemia in pregnant women. It was also revealed in a research conducted by Astriana (2018) studying the incidence of anemia in pregnant women in terms of parity and age. She found that parity affected the incidence of anemia in pregnant women. Likewise, according to Amallia et al. (2017), who studied the risk factors of anemia in pregnant women, there was a relationship between the age and parity with the incidence of anemia in pregnant women and there was no relationship between the level of education and work with the incidence of anemia in pregnant women.

Parity is the number of pregnancies that produce a fetus that can live outside the womb. The number of children born greatly affects the health of the mother and the children themselves. Women who often experience pregnancy and childbirth are increasingly anemic because of a lot of iron loss. This is because during pregnancy a woman uses the iron reserves in her body. The more often a woman gives birth, the greater the risk of blood loss and the impact on decreasing Hb levels. Each time a woman gives birth, the amount of iron lost is estimated at 250 mg.[14]

Table 1. Bivariate analysis results of the effect of maternal factors of anemia in pregnant women

No	Variables	values
1.	Characteristics of the pregnant women	
	a. Knowledge	0.000
	b. Age	0.384
	c. Parity	0.000
2.	Socioeconomic factors of the pregnant women	
	a. Education	0.460
	b. Occupation	0.234
	c. Income	0.482
3.	Culture of abstinence for pregnant women	0.465
4.	ANC regularity	0.319
5.	Blood-booster tablet regularity	0.007

Parity of more than four can increase the frequency of complications in pregnancy and childbirth, such as the increased risk of fetal death in the womb and bleeding before and after childbirth that can be fatal. because women who have often given birth can result in damage to blood vessels and uterine wall vascularization due to past deliveries, resulting in insufficient blood flow to the placenta, which ultimately can reduce its function and affect the circulation of nutrients to the fetus. Having a history of bleeding a lot can cause anemia in subsequent pregnancies.[15] In this case, the government has attempted to reduce high parity by activating the family planning program. Apart from that, to prevent anemia for pregnant women, the government has created a program to provide supplements to pregnant women. The administration of iron tablets or supplementation of blood-boosting tablets is an effort to prevent anemia in pregnant women who are given as many as 90 tablets consumed a day (60 mg elemental iron and 0.25 mg folic acid) consecutively for at least 90 days during pregnancy.[16]

The results of this study indicated that the education of pregnant women had no significant effect on anemia during pregnancy. This was in line with a study by Amallia et al. (2015) on the risk factors for anemia in pregnant women, stating that there was no correlation between education and anemia in pregnant women.[13] In contrast to other studies conducted by Purba et al. (2018) analyzing the risk factors of anemia in pregnant women, a significant relationship was found between education and the incidence of anemia.[17]

Education is the process of changing behavior towards maturity and the perfection of life. The level of education of pregnant women also affects the occurrence of anemia during pregnancy.[11] In this study, it was found that pregnant women with a higher level of education were 31.1%, indicating that education did not affect anemia in pregnant women.

The results of this study indicated that the work of pregnant women has no significant effect on the anemia of pregnant women (p=0.234). This was in line with the results of research by Amallia et al. (2017) who studied the risk factors for anemia in pregnant women, where there was a relationship between age and parity of pregnant women and the incidence of anemia in pregnant women and there was no relationship between education and occupational level with the incidence of anemia in pregnant women.[13]

Pregnant women who work have challenges in keeping the health condition of their pregnancy. Moreover, working condition that takes time and energy may have an impact on their physical and mental health. However, pregnant women can still carry out their work activities by maintaining physical condition so they are not tired and able to avoid stress.[11] In this study, it was found that most pregnant women who did not work reached 91.6%, indicating that work did not affect anemia in pregnant women.

The results of this study indicated that the income of pregnant women had no significant effect on anemia in pregnancy (p=0.482). However, a study by Purba et al. (2017) found a significant relationship between income and the incidence of anemia. A person's income is a description of the family's economic position in the society. Therefore, everyone who is involved in a certain type of work, including work in the informal sector or trade, may have a chance to increase their income to meet the needs of their family to improve their standard of living.[18]

The results of this study showed that the culture of abstinence from food for pregnant women had no significant effect on anemia in pregnancy, while Sunarti et al. (2019) found that dietary restrictions were associated with the incidence of anemia in pregnant women.[19] Many myths and false beliefs have developed into a culture in the society about maternal intake during pregnancy, such as the prohibition to eat fish during pregnancy. This often causes problems for the health of pregnant women and their fetuses. It also leads to the risk of anemia in pregnant women. In this study, it was found that the majority of pregnant women who did not abstain from food reached 96.6%, which possibly indicated that the culture of abstaining from food did not affect anemia in pregnant women.

This study found that the regularity of ANC visits did not significantly affect anemia in pregnant women. This finding was different from the research conducted by Roni et al. (2020) who found a strong correlation between antenatal care visits and the incidence of anemia in pregnant women.[9] The implementation of ANC activities has an important role in enhancing the health of mothers and children because ANC visits are one of the main sources for mothers to obtain iron tablets and their education about important nutritional needs during pregnancy.[20]

Table 2. Results of multivariate analysis on the effect of maternal factors of anemia on pregnancy

| No | Variables | B | Wald | Sig. | OR | CI 95% | |
						Lower	Upper
1	Knowledge	1.747	10.075	0.002	5.740	1.951	16.884
2	Parity	3.246	20.822	0.000	25.699	6.373	103.634
3	BBT	1.357	4.158	0.041	3.884	1.054	14.311

In this study, it was found that the majority of pregnant women, reaching 86.6%, implemented regular ANC visits. However, those pregnant women who did not regularly consume blood-booster tablets were about 23.5%. This could be a contributing factor that the regularity of ANC visits did not affect anemia in pregnant women.

The results of this study indicated that the consumption of blood-booster tablets had a significant effect on anemia in pregnant women. A study by Putri Dwi Anggraeni (2018) on the factors associated with the incidence of anemia in pregnant women found that the consumption of Fe tablets affected anemia in pregnancy.[21] Another study conducted by Purba et al. (2017) found that there was a significant relationship between the consumption of Fe tablets and the incidence of anemia in pregnant mothers.[17] Consumption of iron tablets is very important for pregnant women to avoid anemia. Pregnant women should consume at least 90 Fe tablets during pregnancy because food intake is still insufficient to meet their needs.[22]

The combined effect of maternal factors of anemia on pregnancy

Table 1 shows that variables with p<0.25 are knowledge, parity, occupation, and regularity of consumption of blood-booster tablets, so these four variables met the requirements for being subjected to multivariate analysis. The results of the multivariate logistic regression analysis on the combined effect of maternal anemia factors on pregnancy are shown in Table 2.

Table 2 shows that the variables of maternal knowledge (p=0.002), maternal parity (p=0.000), and consumption of blood supplement tablets have a significant effect on anemia in pregnant women. The mother's parity variable was the variable that had the highest influence on anemia in pregnant women with the largest odds ratio of 25.699.

The results of this study indicated that the factors that had a significant combined effect on anemia in pregnant women were knowledge, maternal parity, and the regularity of consuming blood-added tablets. The most influential factor on anemia in pregnant women was maternal parity (OR=25.699), then the second one was knowledge (OR=5.740) and the last was the regularity of consumption of blood-booster tablets (OR=3.888). Knowledge, maternal parity, and regularity of blood-booster tablet consumption were proved to be the independent variables of anemia in pregnancy, while occupation served as a confounding variable. Rismawati & Rohmatin (2018), however, found that Fe consumption had the highest influence on the incidence of anemia in pregnancy.[22]

Primiparous pregnant women do not have much experience in meeting their nutritional needs during pregnancy, especially if they also have a lack of knowledge about anemia and non-compliance with the consumption of blood-booster tablets. They will tend to suffer from anemia. On the other hand, grand multiparous pregnant women have the risk of suffering from anemia due to frequent births, so they are more often at risk of losing blood. It may also be aggravated by the lack of knowledge about anemia and also non-compliance with consuming blood-booster tablets during pregnancy.

However, this study still had limitations. This was a retrospective study, using secondary data. These secondary data were those kept within the register books where there might be errors in writing the data.

CONCLUSION

This study had disclosed that socio-economic variables, culture of abstinence, and regular ANC visit did not significantly affect anemia in pregnancy, while maternal parity, knowledge, and regular consumption of blood-booster tablets did significantly affect anemia in pregnancy.

DISCLOSURES

Conflict of interest

All authors have no conflict of interest in funding

Author contribution

All authors have contributed to all processes in this research, including preparation, data gathering, analysis, drafting, and approval for publication of this manuscript.

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