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Anemia in Pregnant Women Correlated with The Estimated Fetal Weight

Ratna Puspita Sari[1], Susanti Pratamaningtyas[2], Dwi Estuning Rahayu[3]
[1,2,3]Midwifery Department, Health Polytechnic Ministry of Malang, Indonesia

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Abstract

During pregnancy, the body's need for oxygen increases, causing an increase in erythropoietin production. An increase in plasma volume has an effect on fluid retention and blood dilution in pregnancy, causing a decrease in hematocrit, causing a decrease in Hb concentration and causing anemia. One possible impact is hampering fetal growth and development. The development of the fetus in the womb can be monitored by estimating the fetus's weight to detect fetal growth abnormalities early. This study aimed to understand the correlation between anemia in pregnant women and estimated fetal weight in the working area of the Sambi Health Center, Kediri Regency. The design of the study was cross-sectional, with a sample of 34 pregnant women with anemia. The sampling technique applied consecutive sampling. The instruments of the study were met line, Sysmex hematology analyzer and observation sheet. The results of this study were analyzed using the Kendall Tau test, and obtained a ρ value of 0.03<α 0.05, namely H0 was rejected so that there was a correlation between anemia in pregnant women and the estimated weight of the fetus in the working area of the Sambi Community Health Center, Kediri Regency. When a pregnant woman experiences anemia, it results in disturbances in metabolism and exchange of substances in the tissues, then the placenta shrinks, resulting in a decrease in the transfer of important nutrients for the growth and development of the fetus. The impact of this situation is a slowdown in fetal growth which results in a low estimated fetal weight.

✉Correspondence Address:
Health Polytechnic Ministry of Malang – East Java, Indonesia
Email : ratnapuspitas564@gmail.com
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INTRODUCTION

Pregnancy is a process that begins with fertilization, namely when the sperm and egg unite, and is then followed by the implantation process. This pregnancy period starts from fertilization until the birth of the fetus. The normal course of pregnancy lasts 40 weeks, which is equivalent to 10 months or 9 months according to the international calendar (Prawirihardjo, 2016). When pregnant, the body needs more oxygen, thereby increasing erythropoietin production (Sikoway et al., 2020). Changes in the hematological system during pregnancy occur due to increased blood flow to the placenta, resulting in an increase in plasma capacity of approximately 45-65%. Increasing plasma capacity affects fluid retention and blood thinning in pregnancy, causing a decrease in hematocrit of up to (20-30%), as well as causing a decrease in Hb concentration (Kusumawati & Hariyani, 2017). Hemoglobin in the blood (Hb) This is a parameter used to measure the incidence of anemia. 2 According to the World Health Organization (WHO), maternal anemia is a condition where hemoglobin is less than 11 g/dL (Jung et al., 2019).

Iron deficiency anemia occurs more frequently in developing countries, this is a comparison with more developed countries, to be precise, around 1,400 million individuals, or around 36% of the estimated total population of 3,800 million, experience anemia. Meanwhile, in Indonesia, the pregnancy rate in 2019 was still high, namely around 44% (WHO, 2019). In pregnant women, around 84.6% of cases of anemia usually occur among pregnant women aged 15 to 24 years (Indonesia, 2021). In Kediri Regency, the percentage of pregnant women with K4 anemia is 10.7%. Sambi Health Center is number one in 2022, namely 47.2% of K4 pregnant women experience anemia.

Pathologically, the most common cause of anemia is nutritional deficiency. Anemia in pregnancy is also influenced by maternal age, birth rate, birth spacing, maternal nutritional status, frequency of pregnancy checks, compliance with taking iron medication, maternal education, parasitic infections and chronic diseases are factors that contribute to the occurrence of anemia in pregnancy (Khairunnisa Latifa., Wiyati Putri Sekar., 2019). Possible impacts of anemia on the fetus include premature birth, babies with low birth weight, perinatal death, and stunted fetal growth and development (Saputro & Lestari, 2022). The term Low Birth Weight Baby or LBW relates to babies born with a weight below the average of 2,500 grams, no matter how long the gestational age is, whether it is a baby born on time or earlier than the expected birth date (Mulianisaa et al., 2021). In both developing and developed countries, babies born with a low birth weight, approximately 2,500g, is one of the elements that plays a major role in influencing the rate of newborn and postnatal mortality and the incidence of neonatal disease. In 2021, in Indonesia, neonatal deaths will be significantly caused by low birth weight (LBW) babies, around 34.5% (Indonesia, 2021). Likewise, in 2020, the LBW rate in Kediri Regency reached 42% (Kediri, 2020). At the Sambi Community Health Center, of the 660 live babies, 36 of them had a birth weight of around 2,500 grams. It is hoped that fetal development during pregnancy will increase to prevent disturbances in fetal growth and development (Metasari Andi Ria., Kasmiati., 2022). Fetal development in the womb can be monitored by estimating fetal weight to detect fetal growth abnormalities early (Hermawati et al., 2018).

Estimating fetal weight is one method for describing fetal weight during pregnancy (Hermawati et al., 2018). Estimation of fetal weight is considered important during pregnancy because fetal growth in the womb is intermittent, in the early stages the growth is rapid, but slows down as gestational age increases, which can increase the risk of complications during delivery for mother and baby (Saputro & Lestari, 2022). Before birth, the fetus' weight can be measured, and the height of the uterine fundus of the pregnant woman can be used as an estimate of gestational age and fetal weight (Kurdanti et al., 2020). Various factors, including internal and external factors, influence a baby's weight. Internal factors include the age of the pregnant woman, length of pregnancy, number of previous births, nutritional status during pregnancy, health conditions during pregnancy (including hemoglobin levels which indicate anemia), frequency of pregnancy checks. Meanwhile, external factors include the mother's education and employment (Utami et al., 2021).

Based on the background previously explained, researchers consider that anemia during pregnancy is one of the elements that contributes to the influence of estimated fetal weight. Therefore, the researchers felt interested in carrying out a study entitled "The CORRELATION between Anemia in Pregnant Women and Estimated Fetal Weight in the Working Area of the Sambi Community Health Center, Kediri Regency". This research aims to identify anemia in

pregnant women, identify estimated fetal weight in pregnant women, and analyze the CORRELATION between anemia in pregnant women and estimated fetal weight.

METHODS

The study design applied was cross-sectional. The variables in the study include the independent variable, namely anemia in pregnant women, as well as the dependent variable, namely the estimated fetal weight. The inclusion criteria in this study were pregnant women in the second and third trimesters UK 22-40 weeks who experienced anemia, had a pregnancy check-up at the Sambi Community Health Center, Kediri Regency, pregnancy with a single fetus, head presentation and longitudinal position, while the exclusion criteria in this study were pregnancies with complications of polyhydramnios or oligohydramnios, pregnancies with irregularities, pregnancies with malpresentation, pregnancies with macrocephaly, pregnancies with placenta previa. This research was carried out from 9 to 20 June 2023 involving a population of all pregnant women who experienced anemia in TM II and TM III so that the height of the uterine fundus could be measured using the metline in TM II, namely at a gestational age of over 20 weeks, in the working area of the Sambi Community Health Center. Kediri Regency, with a total of 52 pregnant women. In the study, 34 anemic pregnant women were taken as samples, using consecutive sampling techniques. The research instruments were Metline, Hematology analyzer with the Sysmex brand and observation sheets. Data were analyzed using the Kendall Tau test. In this study, data collection techniques using primary sources were used, namely measuring the hemoglobin of pregnant women in the second and third trimesters which was carried out by laboratory staff using a hematology analyzer with the Sysmex brand at the Sambi Community Health Center to determine anemia in pregnant women in the second and third trimesters and measuring TFU to determine the estimate. fetal weight by observation, namely a method of collecting data by directly observing research respondents to look for changes or things to be researched.

RESULTS

1. General data

Data regarding the frequency of characteristics of respondents can be found below:

Table 1 General data

Characteristics	f	%
Maternal age		
1. Age <25	9	26
2. Age 25-35	21	62
3. Age >35	4	12
Total	34	100
Last education		
1. Elementary School	6	18
2. Junior High School	12	35
3. Senior High School	11	32
4. College	5	15
Total	34	100
Work		
1. Private/Entrepreneur	6	18
2. Civil servants	3	9
3. IRT	25	74
Total	34	100
Gestational Age		
1. 20-24 weeks	2	6
2. 24-28 weeks	6	18
3. 28-32 weeks	4	12
4. 32-36 weeks	17	50
5. 36-40 weeks	5	15
Total	34	100

It can be seen from table 1 that, of the total 34 respondents, 21 respondents (62%) were aged between 25-35 years, 12 respondents (35%) had junior high school education, 25 respondents (74%) were housewives and 17 respondents (50%) gestational age 32-36 weeks.

2. Custom Data

a) Anemia in Pregnant Women

Data regarding the frequency of anemia in pregnant women can be found below:

Table 2 Special Data for Respondents Based on Anemia in Pregnant Women.

Characteristics	f	%
Anemia in Pregnant Women		
1. Mild Anemia	13	38
2. Moderate Anemia	21	62
3. Severe Anemia	0	0
Total	34	100

It can be seen from table 2 that, of the total 34 respondents, more than 21 respondents (62%) had moderate anemia, less than 13 respondents (38%) had mild anemia and none of the respondents (0%) had anemia. heavy.

b) Estimated Fetal Weight

Data regarding the frequency of estimated fetal weight can be found below:

Table 3 Special Data for Respondents Based on Estimated Fetal Weight

Characteristics	F	%
Estimated Fetal Weight		
1. Not enough	25	74
2. Normal	4	12
3. More	5	25
Total	34	100

It can be seen from table 3 that, of the total 34 respondents, more than 25 respondents (74%) estimated the fetal weight to be low, a small portion of 4 respondents (12%) estimated the fetal weight to be normal, and a small portion of 5 respondents (25%) estimated fetal weight is more.

c) Correlation between Anemia in Pregnant Women and Estimated Fetal Weight

The results of data analysis using Kendall Tau Anemia of pregnant women and the estimated fetal weight can be found below:

Table 4 Correlation Analysis of Anemia in Pregnant Women and Estimated Fetal Weight.

Anemia	Estimated Fetal Weight			Amount	P-Value
	Not enough	Normal	More		
	f	f	f		
Light	7	2	4	13	0.03
(%)	21	6	12	38	
Currently	18	2	1	21	
(%)	53	6	3	62	
Heavy	0	0	0	0	
(%)	0	0	0	0	
Amount	25	4	5	34	
(%)	74	12	15	100	

It can be seen from table 4 that, of the total 34 respondents, more than 18 respondents (53%) of pregnant women experienced moderate anemia and the estimated fetal weight was less. Based on the results of statistical tests using Kendall Tau, the results obtained a significant value of $0.03 < \alpha\ 0.05$, namely H0 was rejected, meaning there is a significant CORRELATION, so it can be concluded that there is a correlation between anemia in pregnant women and the estimated weight of the fetus.

DISCUSSION

Anemia in pregnancy can be interpreted as a pregnant woman experiencing iron deficiency in the blood. Apart from that, it can also be said to be a condition of the mother with a hemoglobin level of <11 gr% in the first and third trimesters, while in the second trimester the hemoglobin level is <10.5 gr%. Pregnancy anemia is called "potential danger to mother and child", which is why anemia requires serious attention from all parties involved in health services (Astutik, R, Y., Ertiana, 2018). Hemoglobin concentration in pregnant women can be influenced

by nutritional consumption, especially iron. In order to increase hemoglobin levels effectively, pregnant women need to obtain adequate amounts of iron, which can often be obtained through regular consumption of iron (Fe) tablets.

Education also has the potential to influence hemoglobin concentration during pregnancy, where in this study less than half of the respondents had a junior high school education of 12 respondents (35%), and more than half of respondents aged 25-25 years were 21 respondents (62%). Education plays a role in increasing a person's capacity to understand knowledge about nutrition. The higher the education they have, the more likely they are to be able to independently, creatively and sustainably implement healthy lifestyle patterns. Higher education increases maternal awareness of the importance of good nutritional intake to prevent anemia during pregnancy. Education has a strong CORRELATION with the capacity to receive health information, especially for anemic pregnant women, such as understanding anemia, selecting foods rich in iron, and the amount of iron consumed (Wasono et al., 2021).

The results of this study are in accordance with the research results of Tri Wahani, et al (2017) entitled "The CORRELATION Between Hemoglobin Levels of Pregnant Women in the Third Trimester and Fetal Weight at the Samarinda Trauma Center Health Center" which states that pregnant women whose Hb levels are abnormal can be caused by a deficiency. foods that contain iron, folic acid and vitamin B12 such as liver, anchovies, red meat, nuts, green vegetables, egg yolks and fruit. The amount of blood available is used for the needs of the mother and fetus, blood volume decreases at the beginning of pregnancy until the third trimester, low blood pressure occurs which is caused by an increase in blood plasma, there is an increase in body fluid (plasma volume) which is not proportional to the increase in blood cell mass red, as a result hemoglobin levels decrease.

During pregnancy the body will produce more blood to support the baby's growth. However, if the body does not get enough iron or other nutrients, the number of blood cells decreases and anemia occurs. Estimated fetal weight is an estimate of the weight of the baby in the mother's womb. Knowing the estimated fetal weight can help prevent the birth of low birth weight (LBW) babies.(Metasari Andi ria., kasmiati., 2022). When pregnant, a woman experiences an increased need for nutritional intake to meet the needs of the mother and fetus, including energy, protein, minerals, calcium, water, omega 3, vitamins, folic acid, iron and so on (Astuti, H, 2012).

The results of this research are in accordance with the results of research from Sayekti (2023) entitled "The CORRELATION between Hemoglobin Levels and Estimated Fetal Weight in Pregnant Women in the Third Trimester at the Kedungadem Bojonegoro Community Health Center" stating that in cases of severe anemia, low hemoglobin levels can endanger fetal development. Iron deficiency during pregnancy can have an impact on the growth and development of the fetus, both during pregnancy and afterward. Anemia is one of the factors that can cause problems in development in the womb and can cause fetal death (Sayekti & Sari, 2023). The nutritional intake of pregnant women is an important factor for the growth and development of the fetus. With adequate nutritional intake for the needs of the mother and fetus, the growth and development of the fetus will be in accordance with the gestational age.

When a pregnant woman experiences anemia, this results in a decrease in the blood's ability to send adequate oxygen to all tissues. As a result, disturbances occur in metabolism and exchange of substances in tissues. This disorder results in a reduction in the supply of nutrients needed by the fetus through the placental organ. Then, the placenta shrinks, resulting in a decrease in the transfer of nutrients important for fetal growth and development. The impact of this situation is a slowdown in fetal growth which results in a low estimated fetal weight.

The results of this research are in line with the results of this research, namely research conducted by Wahyuni (2017) entitled "The CORRELATION Between Hemoglobin Levels of Pregnant Women in the Third Trimester and Fetal Weight at the Samarinda Trauma Center Health Center" where the results of statistical tests obtained a P value of 0.000 $< \alpha$ (0.05) so that it can be stated that the null hypothesis is rejected and the alternative hypothesis is accepted which states that there is a significant CORRELATION between the Hb levels of pregnant women in the third trimester and fetal body weight. During pregnancy, iron deficiency results in anemia, increases the chance of death, and has negative impacts on the mother and fetus. Pregnant women can carry out hemoglobin checks and regular pregnancy checks so that they can determine the health condition of the mother and fetus and prevent anemia in pregnant women. It is hoped that the growth and development of the fetus during pregnancy can increase thereby preventing disruption of fetal growth and development during pregnancy (Metasari Andi

ria., kasmiati., 2022).

Estimation of fetal weight is very important, babies born with low birth weight or very large birth weight are associated with increased complications during labor and the postpartum period. Interpretation of fetal weight is an important factor in labor management. An accurate method of interpreting fetal weight can determine whether the baby's birth weight is large or small so that preventive measures can be taken to overcome various complications that may occur. Using an accurate method of interpreting fetal weight, the above problems can be minimized (Herawati et al., 2022). Anemia is one of the factors that often occurs in pregnant women. Pregnant women who suffer from anemia have a tendency to give birth to babies with low birth weight (LBW) (Mulianisaa et al., 2021).

CONCLUSION

By considering the review and discussion regarding the findings of the study that was carried out in the Sambi Community Health Center Working Area, Kediri Regency in June 2023, the researchers can conclude: Anemia in pregnant women was found to be more than partly moderate anemia, the estimated weight of the fetus in pregnant women was found to be more than half of the estimated weight. the fetus is lacking, and there is a correlation between anemia in pregnant women and the estimated weight of the fetus.

SUGGESTION

The hope is that health workers, especially midwives, can provide education to all pregnant women and pay special attention during pregnancy checks to pregnant women with anemia, and can explain to pregnant women the results of hemoglobin level checks and TFU measurements which are used as a sign of increasing estimated fetal weight during pregnancy.

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CONFLICTS OF INTEREST

In this research there is no conflict of interest in publishing the article.

AUTHOR CONTRIBUTIONS

All authors contributed fully to research activities starting from preparation, literature search, data processing tabulation, analysis. Each author makes a positive contribution to activities from start to finish, including in terms of publication.

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