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THE IMPACT OF NUTRITIONAL STATUS ON THE RISK OF ANEMIA IN PREGNANT WOMEN: *A CROSS-SECTIONAL STUDY*

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Original Research

ABSTRACT

Introduction: *Pregnancy anemia is the cause of the high maternal mortality rate (AKI) in Indonesia. Nutritional status is one of the factors that affect pregnancy anemia. Poor nutritional status in pregnant women increases the risk of developing anemia, which is 6,500 times greater than in mothers with good nutritional status. This study aims to determine the relationship between nutritional status and the incidence of anemia in pregnant women.* ***Methods:*** *The research method used in this study is a quantitative study with a correlational design with a cross-sectional approach. The population in this study is all pregnant women who have their pregnancy checked at the Balerejo Health Center, a many as 50 people. Purposive sampling technique: a sample of 44 people. The independent variable is nutritional status, and the dependent variable is the incidence of anemia. The data was collected using a questionnaire and a LILA ribbon and analyzed using chi-square.* ***Results:*** *The results of the analysis of the chi-square statistical test showed that there was a relationship between nutritional status and the incidence of anemia, with the result of sig-p = 0.000, p< 0.05.* ***Conclusions:*** *It is recommended that pregnant women maintain their body condition by consuming nutritious food to meet the body's needs and avoid a lack of nutritional status and the occurrence of anemia, which can be fatal to death.*

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INTRODUCTION

Anemia in pregnancy is a condition of hemoglobin in the mother's blood less than 11 g/dl, which is one of the health problems related to maternal and child health that reflects the welfare, social, and economic development of the community and has an impact on the quality of human resources. Anemia in pregnant women is a major problem in the world, but it is generally experienced by developing countries rather than developed countries (Hidayati & Andyarini, 2018). Nutritional status is one of the factors that affect the occurrence of pregnancy anemia. Indonesia has continued to experience significant malnutrition for many years, despite the current economic growth (Laturake et al., 2022).

The main nutritional problems of pregnant women in Indonesia are a lack of nutritional intake in the long term, which results in the mother experiencing Chronic Energy Deficiency (SEZ) (Ministry of Health, 2019). The nutritional status of pregnant women in Indonesia is still considered poor, as shown by the high number of pregnant women who experience SEZs, who are at risk of various diseases, one of which is anemia. According to the research conducted, the risk of anemia in pregnant women is 6,500 times greater than in mothers with good nutritional status (Mutiarasari, 2019). Therefore, until now, the improvement of all forms of malnutrition for pregnant women is still the focus and target of the government until 2025 (Bappenas, 2021).

Based on the results of Basic Health Research (Riskesdas) in 2018, the prevalence of anemia in pregnant women increased by 11.8% from 2013 (37.1%) to 48.9%. This condition says that anemia is quite high in Indonesia and shows that the number exceeds severe public health problems, with a 40% anemia prevalence limit (Ministry of Health, 2018). The prevalence of anemia in pregnant women in East Java reaches 10.8% (East Java Health Office, 2022). The prevalence of anemia in pregnant women in Madiun Regency is 7.8%, amounting to 710 incidents. Balerejo District is the area with the

highest rate of anemia, which is 87 incidents or 12.3% in Madiun Regency (DINKES, Madiun 2022). Based on an initial survey at the Balerejo Health Center, 23 out of 50 pregnant women experienced anemia.

One of the causes of anemia experienced by pregnant women is nutritional status (Wahyudi & Prakoso, 2023). Pregnancy requires mothers to always maintain a nutritious intake to support fetal growth. Increasing the nutritional intake of pregnant women plays a role in increasing the blood supply needed by the fetus through physiological processes, namely blood dilution (Feleke & Feleke, 2020). The increasing need for blood, if not supported by adequate and balanced nutrition, will lead to pregnancy anemia. Negative impacts for mothers who experience anemia are bleeding during childbirth, vulnerability to infection, and a risk of miscarriage. The impact that can occur on fetuses with maternal anemia is Low Birth Weight (BBLR), babies are susceptible to infection, and babies are born prematurely (Sukmawati et al., 2021).

Efforts to increase knowledge and change people's habits about food intake in pregnant women can be done with KIE. Strengthening Communication, Information, Education (KIE) aimed at pregnant women and their families regarding proper eating habits is needed to be able to improve nutritional status and avoid disorders in fetal development and growth (Kasmara et al., 2023). Providing education and health advice that focuses on eating with balanced nutrition during pregnancy is considered to be able to change people's perception of a good diet (Beressa et al., 2024). The purpose of this study is to analyze the relationship between nutritional status and the incidence of anemia in pregnant women at the Balerejo Health Center, Madiun Regency.

MATERIALS AND METHODS

This study uses observational quantitative research methods with a correlational design and cross-sectional data collection methods. The research was conducted in March-April 2024. The population used was all pregnant women who carried out pregnancy checks at the Balerejo Health Center, Madiun Regency, as many as 50 pregnant women. The sample used in this study using purposive sampling was obtained as many as 44 respondents, with inclusion criteria: Tr II & III pregnant women, pregnant women who are willing to be respondents. The exclusion criteria are mothers with twin pregnancies, and mothers with pregnancy disorders such as: preeclampsia, hypertension, gestational diabetes. Ethical considerations in this study about ethical principles include: voluntary participation, informed consent, anonymity, confidentiality, potential harm, and communication of results.

The instrument to describe nutritional status is to observe LILA measurements. LILA measurement uses a 33 cm long LILA tape. According to the Ministry of Health, Republic of Indonesia (2015), the standard size of LILA in pregnant women with good nutritional status is LILA ≥ 23.5 cm and mothers with poor nutritional status is LILA < 23.5 cm.

The assessment of anemia status is carried out by looking at medical records and using a hemoglobin level checker in the form of a digital hemoglobinometer. Maternal anemia during pregnancy occurs when the mother's hemoglobin (Hb) is <11 g/L in the 1st and 3rd trimesters, while <10.5 g/L in the 2nd trimester (WHO, 2012). This research has received ethical approval from the KEPK of the University of Muhammadiyah Gresik with No. 026/KET/II.3.UMG/KEP/A/2024.

Data will be processed through the stages of editing, coding, scoring, entry, and data analysis. Furthermore, univariate data analysis was carried out on each variable of the research results. Then, bivariate analysis was carried out to determine the relationship between the independent variables and the dependent variables. The analysis technique used is the Chi Square test with a significance level of α=0.05.

RESULTS

Table 1. Characteristics of Respondents based on Age, Education, Pregnancy Distance, and Income at Balerejo Health Center, Madiun Regency, March – April 2024.

Age	Frequency (F)	Percentage (%)
<20 Years	0	0
20-35 Years	40	90.9
> 35 Years Old	4	9.1
Education	**Frequency (F)**	**Percentage (%)**
SD	1	2.3
Junior high school	6	13.6
Senior high school	25	56.8
Diploma / PT	12	27.3

Pregnancy distance	Frequency (F)	Percentage (%)
First child	17	38.6
<2 years	4	9.1
>2 years	23	52.3
Income	**Frequency (F)**	**Percentage (%)**
<2,243,000	18	40.9
≥2,243,000	26	59.1
Total	**44**	**100**

Based on Table 1, it is known that almost all respondents, namely 40 people (90.9%) are aged 20-35 years, most of them, namely 25 people (56.8%) respondents have high school education, most of the pregnancy intervals are more than two years, namely 23 people (52.3%), most of the family income, namely 26 (59.1%) respondents, is more than Rp. 2,243,000,000/month.

Table 2. Characteristics of Respondents based on Nutritional Status, and Incidence of Anemia at Balerejo Health Center, Madiun Regency, March – April 2024.

Nutritional Status	Frequency (F)	Percentage (%)
Good (Length ≥23.5 cm)	31	70.5
Less (Length <23.5 cm)	13	29.5
Incidence of Anemia	**Frequency (F)**	**Percentage (%)**
Anemia	18	40.9
No anemia	26	59.1
Total	**44**	**100.0**

Based on Table 2, it was identified that most pregnant women had good nutritional status (70.5%) and most of the respondents did not have anemia (59.1%).

Table 3. Characteristics of respondents based on the relationship between nutritional status and the incidence of anemia in pregnant women at Balerejo Health Center, Madiun Regency, March – April 2024.

Nutritional Status	Incidence of Anemia					
	Anemia		No Anemia		Total	
	F	%	F	%	F	%
Less	11	84.6	2	15.4	13	100
Good	7	22.6	24	77.4	31	100
Total	18	40.9	26	59.1	44	100
P-Value	0.000					

Based on Table 3, out of 44 respondents, 11 respondents (84.6%) had less nutritional status, and 24 respondents (77.4%) had no anemia. After conducting a statistical test with the chi-square test, it was obtained that sig-p = 0.000 < 0.05, which means that there is a relationship between nutritional status and the incidence of anemia in pregnant women at the Balerejo Health Center, Madiun Regency.

DISCUSSION

Nutritional Status of Pregnant Women

Based on the results of the study, it is known that most pregnant women have a good nutritional status, with 31 people (70.5%). The nutritional status of the mother affects the growth of the fetus that is being conceived. According to Proverawati (2013), nutritional status has a significant influence on the health of pregnant women. Pregnant women who do not have a SEZ can avoid risks and complications, including; anemia, bleeding, the mother's weight does not increase normally, is affected by infectious diseases, in the delivery process can result in difficult and long labor, premature delivery, stunted fetal growth and development, BBLR and bleeding after childbirth.

One of the factors that affects the nutritional status of pregnant women is age. Based on the results of the study, data on the age of pregnant women were obtained, mostly aged 20-35 years (90.9%). A woman's age can affect her nutritional status during pregnancy. A pregnant woman at a young age will need more energy and nutrition because, in addition to meeting the growth and development of the mother, the fetus she is carrying must also get enough nutrition. Therefore, the younger and older the age of pregnant women, it will affect the nutritional status of pregnant women.

Based on the results of the study, it was shown that the level of education of pregnant women is mostly high school. Through research (Andriani, 2015), it is argued that pregnant women with good nutritional status are accomplishing higher education as many as 57%. It is because mothers can receive information and knowledge about good nutrition, accompanied by sorting nutritious and non nutritious foods. Adequate

education will make it easier for mothers to receive information so that they are able to meet nutritional intake during pregnancy.

Based on the results of the study, most of the family's income is sufficient, which is more than 2,243,000/month. This is proven in a study (Metasari & Kasmiati, 2020). The results obtained show that 95.3% of mothers who have a good nutritional status tend to have sufficient economic resources. This sufficient income plays a role in a person's nutritional status. Families with sufficient income will be able to meet their food needs and can choose the type of food they want to buy, regardless of the price. With enough family income, pregnant women can meet their nutritional needs during pregnancy so that the growth and development of the fetus can develop optimally.

Incidence of Anemia in Pregnant Women

Based on the results of the study, most of the pregnant women, as many as 26 people (59.1%), did not experience anemia. Anemia in pregnancy due to increased blood volume is commonly called *Hydremia* or *Hypervolemia.* This is due to the decrease in blood cells compared to plasma, so that there is blood dilution. The ratio includes 30% plasma, 18% blood cells, and 19% hemoglobin. Blood thinning is a physiological factor during pregnancy, so that it can ease the work of the heart during pregnancy. The increase in blood in pregnancy begins at 10 weeks of pregnancy and peaks in pregnancy between 32-35 weeks.

Internationally, anemia in pregnant women is defined by the World Health Organization (WHO) as a condition when the level of hemoglobin (Hb) is less than 11 g/dL. The WHO reports that about 36.5% of pregnant women in the world suffer from anemia, with most cases caused by iron-deficiency anemia (Shi et al., 2022). Anemia in pregnancy is classified based on Hb levels: mild (10–10.9 g/dL), moderate (7–9.9 g/dL), and severe (<7 g/dL). The main theory states that iron needs increase significantly during pregnancy, reaching about 1000 mg of additional iron during a full pregnancy to support increased red blood cell mass, fetal growth, and placenta (Davidson et al., 2022).

In Indonesia, according to the 2018 Basic Health Research (Riskesdas), 48.9% of pregnant women experience anemia, which is mostly also caused by iron deficiency. A study by Wibowo et al. (2020) explains that low intake of nutritious foods, lack of iron supplements, and the incidence of infections (such as malaria and worms) are the main factors causing anemia among Indonesian pregnant women. The underlying theory also includes socio-economic factors, access to health services, and maternal education that affect the overall nutritional status of pregnant women (Asmin et al., 2021).

Based on the results of the study, it is known that almost all of the 40 respondents (90.9%) are in the age group of 25-35 years, which is the ideal age to get pregnant. Based on the theory from Manuaba 2011 in (Isnaini et al., 2021), the age group of 20 to 35 years is when the mother's reproductive period is healthy and the risk of pregnancy complications is low. The age group under 20 years still needs reproductive development for the mother, and in the age group over 35 years, the body begins to experience a decrease in immunity and is at high risk of various diseases, one of which is anemia.

In this study, most of the pregnancy intervals were more than two years, which was 23 (52.3%). The pregnancy gap of close to or less than 2 years causes the iron reserves that have been used in previous pregnancies not to fully recover due to the lack of a maternal period to return the uterus and reproductive system to their previous state (Heriansyah et al., 2019). The condition of pregnant women with a gap of more than 2 years, organ function has fully recovered, and they are ready to receive the fetus without having to deplete iron reserves, thus reducing the risk of anemia.

The Relationship between Nutritional Status and the Incidence of Anemia in Pregnant Women

Based on the results of the study, a small number of pregnant women with poor nutritional status experience anemia, while most pregnant women with good nutritional status do not experience anemia. The results of statistical analysis using the Chi Square test showed that there was a relationship between nutritional status and the incidence of anemia in pregnant women at the Balerejo health center, with a value of $p = 0.000 < 0.05$.

This study is in line with the research (Susanti, 2022) entitled The Relationship between Nutritional Status and Incidence of Anemia in Pregnant Women at the Tampa Padang Health Center in 2021 obtained a value of $p = 0.002 < 0.05$. This research is also strengthened by another study by Floridha et al., 2023), which revealed that there is a strong and significant relationship between the nutritional status of pregnant women and the incidence of anemia, with a value of 0.638 with a significance of $0.00 < 0.05$.

Anemia is caused by a person's nutritional status. The research is evidenced by previous

research conducted by Wahyudi & Prakoso (2023), stating that nutritional status is one of the risk factors, where good nutritional status is at risk of not experiencing anemia as much as 6,500 times when compared to mothers who have poor nutritional status.

Another study stated that the risk of anemia experienced by pregnant women is 2.9 times greater in mothers with poor nutritional status than in mothers with good nutritional status (Mutiarasari, 2019). Nutritional status in pregnant women has a risk of anemia because the absorbed nutrients in the form of food in the body experience an imbalance so that it has an impact on the insufficiency of absorbent substances in the body which will have an impact on poor nutritional status and will interfere with health which can affect the health of the mother and fetus. If pregnant women do not consume balanced nutrition, including both macronutrients and micronutrients, then pregnant women are at risk of malnutrition or chronic energy deficiency, which can lead to anemia.

CONCLUSIONS

Most of the pregnant women at the Balerejo Health Center have good nutritional status and do not experience anemia. There is a relationship between nutritional status and the incidence of anemia in pregnant women at the Balerejo Health Center, Madiun Regency. It is hoped that the results of this study can be used as a reference and information to complement library materials and reading materials regarding nutritional status and the incidence of anemia in pregnant women.

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AUTHORS' CONTRIBUTIONS

All authors critically revise the article, give final approval for the submission of the article, and agree to be responsible for all aspects of the work in ensuring that questions related to the accuracy or integrity of each part of the work are properly researched and resolved, and there is no conflict of interest.

CONFLICT OF INTEREST

There is no conflicts of interest in this research.

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REFERENCES

Asmin, E., Salulinggi, A., Titaley, C. R., & Bension, J. (2021). The relationship between knowledge and compliance of pregnant women consuming blood-boosting tablets with the incidence of anemia in South Leitimur and Ambon Bay Districts. *Journal of Community Health Epidemiology*, *6*(1), 229–236. https://doi.org/10.14710/jekk.v6i1.10180

Beressa, G., Whiting, S. J., & Belachew, T. (2024). Effect of nutrition education integrating the health belief model and theory of planned behavior on dietary diversity of pregnant women in Southeast Ethiopia: a cluster randomized controlled trial. *Nutrition Journal*, *23*(1), 1–13. https://doi.org/10.1186/s12937-023-00907-z

Davidson, S. M., Tampubolon, R., & Bornensiska, C. B. (2022). Nutritional Adequacy and Incidence of Anemia of Pregnant Women in the Working Area of the Sidorejo Lor Health Center, Salatiga City. *Journal of Nutrition*, *11*(2), 85. https://doi.org/10.26714/jg.11.2.2022.85-95

Feleke, B. E., & Feleke, T. E. (2020). The Effect of Pregnancy on the Hemoglobin Concentration of Pregnant Women: A Longitudinal Study. *Journal of Pregnancy*, *2020(1)*. https://doi.org/10.1155/2020/2789536

Hidayati, I., & Andyarini, E. N. (2018). Hubungan Jumlah Paritas dan Umur Kehamilan dengan Kejadian Anemia Ibu Hamil The Relationship Between The Number of Parities and Pregnancy Age with Maternal Anemia. *Journal of Health Science and Prevention*, *2*(1), 42–47.

Kasmara, D. P., Yusman, R., & Kecana, T. (2023). Kie (Communication, Information and Education) about the nutrition of pregnant women. *EBIMA: Journal of Midwife Education in the Community*, *4*(1), 5–9.

Ministry of Health. (2018). Riskesdas Report 2018 Nasional.pdf. In *IAARD Publishing Institute* (p. 156).

Ministry of Health. (2019). Performance Accountability Report 2018. *Journal of Community Nutrition*, *1–52*(9), 1689–1699.

Laturake, R., Nurbaya, S., & Hasnita. (2022). Factors Affecting Anemia in Pregnant Women in the Working Area of the Tamalanrea Jaya Makassar Health Center. *JIMPK: Student Scientific Journal & Nursing Research*, *3*(4), 51–61.

Mutiarasari, D. (2019). Hubungan Status Gizi dengan Kejadian Anemia pada Ibu Hamil di

Puskesmas Tinggede. *Healthy Tadulako Journal (Jurnal Kesehatan Tadulako), 5(2),* 42–48. https://doi.org/10.22487/htj.v5i2.119

Shi, H., Chen, L., Wang, Y., Sun, M., Guo, Y., Ma, S., Wang, X., Jiang, H., Wang, X., Lu, J., Ge, L., Dong, S., Zhuang, Y., Zhao, Y., Wei, Y., Ma, X., & Qiao, J. (2022). Severity of Anemia during Pregnancy and Adverse Maternal and Fetal Outcomes. *JAMA Network Open*, *5*(2), 1–13. https://doi.org/10.1001/jamanetworkopen.2021.47046

Sukmawati, S., Widiasih, R., & Mamuroh, L. (2021). Pregnancy Anemia and Influencing Factors: A Correlation Study. *Journal of Health Bakti Tunas Husada: Journal of Nursing Sciences, Health and Pharmacy Analysts*, *21*(1), 43. https://doi.org/10.36465/jkbth.v21i1.679

WHO. (2012). The Clinical Use of Blood in Medicine, Obstetrics, Paediatrics, Surgery & Anaesthesia, Trauma & Burns. *Transfusion*, *43*(12), 1769–1770. https://doi.org/10.1046/j.0041-1132.2003.00605.x