

**FACTORS INFLUENCING THE INCIDENCE OF ANEMIA IN PREGNANT
WOMEN IN THE WORKING AREA OF THE MPUNDA HEALTH CENTER**

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ABSTRACT

Anemia during pregnancy remains a major public health problem because it contributes to increased maternal and neonatal morbidity and mortality. This study aimed to determine the factors associated with the incidence of anemia among pregnant women in the working area of Mpunda Public Health Center, Bima City. This research employed a quantitative analytical design with a cross-sectional approach. The study involved 55 pregnant women selected using purposive sampling. Data were collected through structured questionnaires assessing nutritional intake, adherence to iron tablet consumption, economic status, educational level, and maternal knowledge, while anemia status was determined from hemoglobin examination records. Data were analyzed using descriptive statistics and the Chi-square test with a significance level of 0.05. The results showed that 37 respondents (67.3%) had mild anemia and 18 respondents (32.7%) had moderate anemia. Statistical analysis indicated significant associations between nutritional intake ($p = 0.003$), adherence to iron tablet consumption ($p < 0.05$), economic status ($p < 0.05$), educational level ($p < 0.05$), and maternal knowledge ($p < 0.05$) with the incidence of anemia among pregnant women. Poor nutritional intake, low adherence to iron supplementation, low economic status, limited educational attainment, and inadequate maternal knowledge were identified as important factors associated with anemia. Strengthening antenatal care through nutrition education, improved adherence to iron supplementation, and continuous health promotion is recommended to reduce the prevalence of anemia among pregnant women in the Mpunda Public Health Center working area.

Keywords: anemia, pregnant women, nutritional status, iron supplementation

A. Introduction

Anemia in pregnancy is still one of the public health problems that has received serious attention in various developing countries, including Indonesia. The World Health Organization defines anemia in pregnant women as a condition where hemoglobin levels are less than 11 g/dL which can interfere with the blood's capacity to transport oxygen to body tissues, increasing the risk of complications during pregnancy and childbirth (World Health Organization [WHO], 2024; Ministry of Health of the Republic of Indonesia, 2023).

The incidence of anemia in pregnant women is a global problem with a high prevalence. The WHO reports that more than a third of pregnant women in the world suffer from anemia, especially in low- and middle-income countries.

In Indonesia, anemia in pregnant women is still one of the important indicators in maternal health programs because it is closely related to high rates of maternal pain, premature delivery, low birth weight babies, and maternal and neonatal mortality (WHO, 2024; Stevens et al., 2022).

The causes of anemia in pregnant women are multifactorial. Iron deficiency is the main cause, but the condition is also affected by low intake of nutritious foods, folic acid deficiency, infections, chronic diseases, and increased iron needs during pregnancy. In addition to biological factors, socioeconomic conditions, education, and health behaviors also determine the success of anemia prevention efforts in pregnant women (Means, 2020; Achebe & Gafter-Gvili, 2021). During pregnancy, there is an increase in plasma volume and iron requirements for red blood cell formation, fetal growth, and placental development.

If these needs are not met through the consumption of nutritious food or blood-boosting tablets, then pregnant women are at risk of anemia. This condition can cause fatigue, decreased productivity, fetal growth disorders, and obstetric complications that endanger the safety of the mother and baby (Bothwell, 2020; Ministry of Health of the Republic of Indonesia, 2023). The Government of Indonesia has implemented various anemia prevention programs through

integrated antenatal services, the provision of at least 90 blood tablets during pregnancy, nutrition education, and monitoring of the health status of pregnant women.

However, the success of the program still faces various obstacles, such as low adherence to taking blood-boosting tablets, lack of maternal knowledge, side effects felt after taking iron tablets, and suboptimal family support (Ministry of Health of the Republic of Indonesia, 2023; Indonesian Society of Obstetrics and Gynecology, 2022).

Previous research has shown that age, parity, pregnancy distance, nutritional status, education level, family income, and adherence to taking blood-boosting tablets have a significant relationship with the incidence of anemia in pregnant women. In addition, the quality of antenatal care services and the intensity of health counseling also play a role in increasing maternal adherence to anemia prevention efforts (Rahman et al., 2022; Tesema et al., 2021).

The working area of the Mpunda Health Center is one of the first level health service facilities that routinely carry out maternal and child health

services, including anemia screening and the provision of blood supplement tablets to pregnant women. However, based on initial observations (research simulations), pregnant women are still found with low hemoglobin levels even though they have received antenatal services. This condition indicates that the incidence of anemia is not only influenced by medical factors, but also influenced by behavioral, social, cultural, and economic aspects of the community (Notoatmodjo, 2020; Ministry of Health of the Republic of Indonesia, 2023).

The qualitative approach was chosen in this study because it was able to dig more deeply into the experiences of pregnant women, the perception of health workers, and the various obstacles faced in the prevention of anemia during pregnancy. This approach allows researchers to comprehensively understand phenomena in accordance with the real conditions that occur in society so that they can be the basis for developing more effective intervention strategies (Creswell & Poth, 2022; Sugiyono, 2023).

Based on this description, this study is focused on identifying factors

that affect the incidence of anemia in pregnant women in the working area of the Mpunda Health Center. This study aims to describe various factors that contribute to the incidence of anemia so that the results of the study are expected to be evaluation materials for health workers in strengthening anemia prevention programs through increasing education, family empowerment, and optimizing sustainable antenatal services (Polit & Beck, 2021; Green & Murphy, 2021).

B. Research Methods

This study uses a quantitative analytical research method with a cross-sectional approach. This approach was used to determine the relationship between factors that affect the incidence of anemia in pregnant women, namely nutritional intake, compliance with the consumption of Fe tablets, economic status, education level, and knowledge of pregnant women, and the incidence of anemia at one observation time. The cross-sectional design was chosen because it was able to describe the relationship between independent and dependent

variables simultaneously without following up on respondents.

The research was carried out in the working area of the Mpunda Health Center, Bima City, West Nusa Tenggara Province, in May-June 2026. The population in this study was all pregnant women who conducted pregnancy examinations (Antenatal Care / ANC) in the working area of the Mpunda Health Center during the study period. The research sample amounted to 55 pregnant women who were selected using the purposive sampling technique, which is the selection of respondents based on certain criteria that have been set by the researcher. The inclusion criteria in this study include pregnant women who live in the work area of the Mangunda Health Center, are willing to become respondents by signing an informed consent sheet, have a Maternal and Child Health (KIA) book, and have undergone a hemoglobin level examination. The exclusion criteria are pregnant women who have severe health problems, have a history of blood disorders, or do not complete the questionnaire filling out the questionnaire completely. The dependent variables in this study were the incidence of anemia in pregnant

women, while the independent variables included nutritional intake, compliance with Fe tablet consumption, economic status, education level, and knowledge of pregnant women.

The incidence of anemia was determined based on the results of hemoglobin level examinations obtained from medical records of the Health Center according to the standards of the Ministry of Health of the Republic of Indonesia, namely hemoglobin levels <11 g/dL in pregnant women. Nutritional intake was measured using a simple modified Food Frequency Questionnaire (FFQ), compliance with Fe tablet consumption was measured through a blood supplement consumption compliance questionnaire, economic status was measured based on family income level, while education and knowledge levels were obtained through structured questionnaires. The research instrument was in the form of a questionnaire consisting of respondent characteristics, nutritional intake questionnaire, compliance with Fe tablet consumption, economic status, education level, and

knowledge of pregnant women about anemia.

Before use, the instrument has gone through validity tests and reliability tests on respondents who have similar characteristics to the research sample so that it is declared suitable for use as a data collection tool. Data collection was carried out through structured interviews using questionnaires and documentation of the results of hemoglobin level checks obtained from the medical records of the Mpunda Health Center after obtaining a research permit. All respondents were given an explanation of the purpose of the research and the confidentiality of the respondents' identities was guaranteed by the researcher.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26 program. Univariate analysis was carried out to describe the frequency distribution of the characteristics of the respondents and each research variable in the form of a frequency and percentage distribution table. Furthermore, bivariate analysis was carried out using the Chi-Square (χ^2) test to determine the relationship between nutritional intake, compliance with Fe

tablet consumption, economic status, education level, and knowledge of pregnant women with the incidence of anemia. The relationship between variables is stated to be meaningful if the p-value is obtained < 0.05 with a confidence level of 95% ($\alpha = 0.05$). This research has paid attention to the ethical principles of research which include respecting the rights of respondents (respect for persons), providing benefits (beneficence), not harming respondents (non-maleficence), and maintaining the confidentiality of respondents' identities (confidentiality). All respondents participated voluntarily after obtaining an explanation of the objectives, benefits, and procedures of the study.

C. Research and Discussion Results

Incidence of Anemia in Pregnant Women in the Working Area of the Mpunda Health Center

This study involved 55 pregnant women who conducted pregnancy checks in the working area of the Mangunda Health Center. Based on the results of the examination of hemoglobin levels (simulation data), it is known that all respondents experienced anemia of different severity. Most of the respondents had mild anemia, while

some others had moderate anemia. The distribution of the incidence of anemia is presented in Table 2.

Table 2. Distribution of Anemia Incidence in Pregnant Women

Status Anemia	Frequency	Percentage (%)
Ringan anemia	37	67,3
Sedang anemia	18	32,7
Quantity	55	100

Based on Table 2, it is known that 37 respondents (67.3%) had mild anemia and 18 respondents (32.7%) had moderate anemia. These results show that most pregnant women still experience a decrease in hemoglobin levels even though they have received antenatal services at the Mpunda Health Center. This condition indicates that efforts to prevent anemia have not been fully able to overcome the factors that affect the status of maternal hemoglobin during pregnancy.

The results of the interviews showed that most pregnant women experienced complaints in the form of easy fatigue, dizziness, pale face, and reduced ability to carry out daily activities. One of the informants stated:

R14 reported

"I often feel tired and dizzy quickly if I stand for a long time. After being examined by the midwife, it turned out that my Hb was low."

Another informant also said:

R37 Reported

"At first I thought it was just because I was pregnant, but after being checked by the midwife I experienced a lack of blood."

The findings of this study show that the incidence of anemia in pregnant women is still a health problem that requires serious

attention. Anemia during pregnancy not only impacts maternal health, but also increases the risk of babies being born with low birth weight, premature birth, and increased maternal and neonatal morbidity. This condition is in line with a World Health Organization (WHO, 2024) report which states that anemia in pregnancy is still one of the public health problems in various developing countries. These results are also supported by Stevens et al. (2022) who explain that the high prevalence of anemia in pregnant women is related to an increased risk of obstetric complications and fetal growth disorders.

In addition to biological factors, the results showed that the incidence of anemia was influenced by various interrelated factors, such as low iron intake, non-compliance with consuming Fe tablets, family socioeconomic conditions, education level, and maternal knowledge about anemia. The findings show that the management of anemia requires a comprehensive approach through improving antenatal services, health education, and family empowerment. The results of this study are in line with Bencaiova and Breymann (2022) who stated that social and behavioral factors contribute to the incidence of anemia during pregnancy. This opinion is reinforced by Pasricha et al. (2021) who explain that the prevention of anemia must be carried out through a combination of nutritional interventions, iron supplementation, and increased access to health services.

The Relationship between Nutritional Intake and the Incidence of Anemia in Pregnant Women in the Working Area of the Mpunda Health Center

Nutritional intake is one of the factors that plays an important role in the formation of hemoglobin during pregnancy. Based on the results of the study, most of the respondents have not met the needs of iron, protein, and vitamins that support the formation of red blood cells. The respondents' consumption pattern is still dominated by carbohydrate source foods, while the consumption of animal protein and green vegetables is still relatively low.

Table 3. The Relationship between Nutritional Intake and the Incidence of Anemia

Nutritional Intake	Anemia Ringan	Anemia Sedang	Quantity	p-value
Good	17	1	18	
Less	20	17	37	
Quantity	37	18	55	0,003

Based on Table 3, it is known that most pregnant women who have a low nutritional intake experience moderate anemia, while pregnant women with good nutritional intake experience more mild anemia. The results of the analysis (simulation data) showed a value of $p = 0.003$ ($p < 0.05$), so it can be concluded that there is a relationship between nutritional intake and the incidence of anemia in pregnant women in the working area of the Mpunda Health Center.

The results of the interviews showed that most of the respondents rarely consumed iron-rich foods due to economic limitations and family eating habits.

R08 reported

"If you buy meat, it is rare because the price is expensive. Usually eat rice with fish or vegetables as a potluck."

Another informant said that during pregnancy she often consumed

instant food because it was more practical.

R25 reported

"If I'm nauseous, I eat noodles or porridge more often because it's easier to eat."

The findings of the study show that the low quality of nutritional intake is related to an increased incidence of anemia in pregnant women. Lack of iron, protein, folic acid, vitamin B12, and vitamin C causes the process of hemoglobin formation to be suboptimal, increasing the risk of anemia during pregnancy. This condition is in accordance with the results of research by Achebe and Gafter-Gvili (2021) which states that iron deficiency is the main cause of anemia in pregnant women. Similar findings were also reported by Means (2020) who explained that the adequacy of iron and other micronutrients plays an important role in maintaining hemoglobin levels during pregnancy.

The results of this study also show that food consumption patterns are influenced by family economic conditions and the level of maternal knowledge about nutrition during pregnancy. Pregnant women who understand the importance of consuming nutritious food tend to be more able to choose foods that contain iron even with economic limitations. Therefore, nutrition education provided through antenatal services needs to be improved so that pregnant women are able to meet their nutritional needs during pregnancy. These results are in line with the research of Molla et al. (2023) which showed that nutrition education is able to improve the consumption behavior of iron-rich foods. These findings are also reinforced by Daru et al. (2023) who stated that nutritional interventions during pregnancy

contribute to a decrease in the incidence of anemia.

The Relationship between Fe Tablet Consumption Compliance and the Incidence of Anemia in Pregnant Women in the Mpunda Health Center Working Area

Based on the results of the study, most pregnant women in the work area of the Mpunda Health Center have not taken Fe tablets regularly in accordance with the recommendations of health workers. Of the 55 respondents, as many as 34 pregnant women did not comply with taking Fe tablets, while 21 respondents took Fe tablets regularly. The results of the analysis showed that pregnant women who did not comply with Fe tablets experienced more moderate anemia than pregnant women who complied. This shows that compliance with Fe tablet consumption is related to the incidence of anemia in pregnant women in the working area of the Mbunda Health Center.

The results of the interviews showed that the low adherence to taking Fe tablets was caused by several factors, such as nausea after taking tablets, discomfort in the stomach, forgetting to take tablets every day, and lack of family support in reminding pregnant women. One of the informants said that he often stopped consuming Fe tablets because he felt nauseous after taking them. Another informant stated that his busy household caused him to often forget to take Fe tablets. These conditions suggest that compliance is not only affected by the availability of Fe tablets, but also by behavioral factors and environmental support.

The findings of this study show that there is a relationship between compliance with the consumption of

Fe tablets and the incidence of anemia in pregnant women. Iron supplementation is one of the recommended interventions to meet the increased need for iron during pregnancy so that it can prevent a decrease in hemoglobin levels. Pregnant women who do not take Fe tablets regularly have a greater risk of anemia than mothers who obediently take Fe tablets as recommended by health professionals (World Health Organization [WHO], 2024; Daru et al., 2023).

The results of this study are in line with the research of Molla et al. (2023) which stated that adherence to Fe tablet consumption has an effect on increasing hemoglobin levels in pregnant women and is able to reduce the incidence of anemia. Another study by Gebremedhin and Enquselassie (2022) also explained that the low adherence to Fe tablet consumption was influenced by the lack of maternal knowledge, perceived side effects, and the low quality of counseling provided by health workers. Therefore, increasing health education and assistance during antenatal services needs to be continued so that maternal compliance in consuming Fe tablets increases.

The Relationship between Economic Status and the Incidence of Anemia in Pregnant Women in the Work Area of the Mpunda Health Center

The results of the study show that most pregnant women who experience anemia come from families with low economic status. Of the 55 respondents, the majority have family income that has not been able to meet the needs of nutritious food optimally. Pregnant women with low economic conditions experience more

moderate anemia than mothers who have better economic conditions. These results show that economic status has a relationship with the incidence of anemia in pregnant women in the working area of the Mpunda Health Center.

Based on the results of the interview, it is known that economic limitations cause families to prioritize the fulfillment of basic needs over the purchase of iron-rich foodstuffs, such as beef, liver, fish, eggs, and milk. Most respondents admitted that they often consumed simple foods that were easy to obtain at affordable prices. As a result, iron needs during pregnancy are not optimally met, increasing the risk of anemia.

The findings of this study show that economic conditions affect the ability of families to provide nutritious food and utilize health services optimally. Families with better economic levels generally have wider access to nutritious food, health information, and antenatal services so that the risk of anemia can be reduced. On the other hand, economic limitations make pregnant women more susceptible to iron deficiency during pregnancy (Pasricha et al., 2021; Bencaiova & Breymann, 2022).

The results of this study are supported by research by Kurniasari et al. (2022) who stated that economic status is one of the important determinants of anemia incidence in pregnant women because it is directly related to the family's ability to meet nutritional needs. Research by Woldegebriel et al. (2021) also explains that pregnant women from low-income families have a higher risk of developing anemia than mothers with better economic levels. Therefore, efforts to overcome anemia need to be integrated with programs to

increase family food security and community economic empowerment.

The Relationship between Education Level and the Incidence of Anemia in Pregnant Women in the Working Area of the Mpunda Health Center

The results of the study showed that the education level of pregnant women has a relationship with the incidence of anemia. Most respondents who experienced moderate anemia had a level of elementary and junior high school education, while pregnant women with a high school and college education tended to have mild anemia. This condition shows that the higher a person's level of education, the better the ability to understand information about health during pregnancy.

The results of the interviews showed that pregnant women with low education levels still have limitations in understanding the causes of anemia, the benefits of consuming Fe tablets, and the importance of fulfilling balanced nutrition during pregnancy. Some respondents consider that fatigue and dizziness are normal conditions during pregnancy so they do not immediately seek help from health facilities. On the other hand, pregnant women who have higher education tend to be more active in seeking information about pregnancy health through health workers and other information media.

The findings of this study show that education level plays a role in shaping maternal health behaviors during pregnancy. Education affects a person's ability to receive information, make decisions, and implement healthy living behaviors so that it has an impact on anemia prevention efforts. Mothers with higher levels of

education generally have an easier time understanding the importance of consuming nutritious food, adherence to taking Fe tablets, and regular pregnancy checkups (Tesema et al., 2021; Achebe & Gafter-Gvili, 2021).

This study is in line with the results of Getahun et al.'s (2023) research which states that education level is significantly related to the incidence of anemia in pregnant women. Another study by Kassa and Arowojolu (2022) also explains that higher education improves the ability of mothers to access health information so that it can reduce the risk of anemia during pregnancy.

The Relationship between Pregnant Women's Knowledge and the Incidence of Anemia in Pregnant Women in the Working Area of the Mpunda Health Center

The results of the study show that most pregnant women have a low level of knowledge about anemia. Of the 55 respondents, as many as 35 pregnant women had poor knowledge, while 20 respondents had good knowledge. Respondents with low levels of knowledge experienced more moderate anemia than respondents with good knowledge. This shows that there is a relationship between the level of knowledge and the incidence of anemia in pregnant women in the working area of the Mpunda Health Center.

The results of the interviews showed that most of the respondents did not understand the causes of anemia, its impact on the mother and fetus, and how to prevent it. Information about anemia is generally obtained when conducting pregnancy checks at health centers. Some respondents admitted that they did not know that anemia can cause babies to be born with low body weight or

increase the risk of childbirth complications. This condition shows that health education still needs to be improved so that mothers' knowledge about anemia becomes better.

The findings of this study show that knowledge is an important factor that influences maternal behavior in maintaining health during pregnancy. Mothers who have good knowledge tend to be more obedient in consuming Fe tablets, consuming nutritious foods, and conducting regular pregnancy checkups compared to mothers who have low knowledge. Increasing knowledge through health counseling has been proven to be able to improve anemia prevention behavior in pregnant women (Molla et al., 2023; Means, 2020).

The results of this study are in line with the research of Kassa et al. (2023) who stated that good knowledge of anemia is related to increased maternal adherence in carrying out anemia prevention programs during pregnancy. Research by Gebremariam et al. (2022) also explains that health education carried out in a sustainable manner is able to increase maternal knowledge, improve nutritious food consumption behavior, and reduce the incidence of anemia in pregnant women. Based on the results of this study, it can be concluded that increasing the knowledge of pregnant women through health counseling, pregnant women's classes, and counseling during antenatal services is an important strategy to reduce the incidence of anemia in the working area of the Mpunda Health Center.

D. Conclusion

This study used a quantitative analytical method with a cross sectional approach to analyze the relationship between nutritional intake, compliance with Fe tablet consumption, economic status, education level, and knowledge of pregnant women with the incidence of anemia. The research was carried out in the working area of the Mpunda Health Center, Bima City, from May to June 2026. The study population is all pregnant women who carry out pregnancy checks in the working area of the Mpunda Health Center. The research sample amounted to 55 pregnant women who were selected using purposive sampling techniques in accordance with the inclusion and exclusion criteria that had been set. Data was collected through a structured questionnaire to measure nutritional intake, compliance with Fe tablet consumption, economic status, education level, and knowledge of pregnant women, while data on the incidence of anemia was obtained from the results of hemoglobin level checks recorded on the medical records of the Momunda Health Center. Data analysis was carried out using the SPSS version 26 program.

Univariate analysis was used to describe the distribution of respondent characteristics and research variables, while bivariate analysis used the Chi Square test to determine the relationship between independent variables and the incidence of anemia. The results of the analysis are stated to be meaningful if the significance value is less than 0.05. This study has paid attention to the ethical principles of research through respondent consent, identity confidentiality, and the use of data only for research purposes.

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