



RESEARCH ARTICLE

Factors Affecting the Incidence of Anemia in Pregnant Women at the Sawah Lebar Community Health Center in Bengkulu City in 2025

Kintan Anissa ¹); Mepi Sulastri ²)

Abstract

Anemia in pregnant women remains a significant public health problem and contributes to an increased risk of pregnancy and childbirth complications. This study aims to determine the factors that influence the incidence of anemia in pregnant women at the Sawah Lebar Community Health Center in Bengkulu City. This study used a quantitative design with a cross-sectional approach. The sample consisted of 56 pregnant women selected using total sampling technique. Data were collected through hemoglobin level examination and questionnaires regarding nutritional status, parity, and compliance with iron tablet consumption. Data analysis was performed using univariate and bivariate analysis with chi-square test and odds ratio (OR) calculation. The results showed that some pregnant women had anemia. There was a significant relationship between nutritional status ($p < 0.05$), parity ($p < 0.05$), and compliance with iron tablet consumption ($p < 0.05$) and the incidence of anemia. Pregnant women with poor nutritional status, risky parity, and non-compliance with iron tablet consumption had a greater chance of developing anemia. It was concluded that nutritional status, parity, and compliance with iron tablet consumption are factors that influence the incidence of anemia in pregnant women. There is a need to improve nutrition education and monitor compliance with iron tablet consumption at community health centers to reduce the incidence of anemia in pregnant women.

Keyword: Anemia, Pregnant Women, Nutritional Status, Parity, Iron Tablets.

Introduction

According to the World Health Organization (WHO), anemia in pregnant women remains highly prevalent globally and is a leading cause of maternal morbidity and mortality. In Indonesia, according to a report from the Indonesian Ministry of Health, the incidence of anemia in pregnant women remains quite high despite the implementation of various national prevention programs, such as the provision of iron (Fe) tablets.

Anemia in pregnant women is influenced by various factors, both biological and socioeconomic. These factors include maternal age, parity, pregnancy spacing, education level, occupation, nutritional status, and adherence to Fe tablet consumption. Pregnant women who are too young (<20 years) or too old (>35 years) are at higher risk of developing anemia due to suboptimal physical condition and iron reserves. High parity and close pregnancy spacing can also result in insufficient iron reserves in the body. Furthermore, poor nutritional status, particularly as measured by Mid-Upper Arm Circumference (MUAC), is an important indicator in assessing the risk of anemia. Pregnant women with a mid-height circumference (MUAC) of <23.5 cm are at risk of developing Chronic Energy Deficiency (CED), which is closely linked to anemia.

A mother's education and knowledge also play a role in determining health behaviors, including adherence to iron tablet consumption and a balanced diet during pregnancy. Based on national data, the prevalence of anemia among pregnant women in Indonesia remains quite high.

National survey results indicate that the anemia rate among pregnant women reaches approximately 48.9%, making it a serious nutritional health problem in Indonesia. This figure is well above the WHO threshold for prevalence, which is considered a public health problem if it exceeds 40%. At the regional level, data also indicates that Bengkulu Province faces similar challenges in addressing anemia in

pregnant women. According to a study in the Bengkulu region, the prevalence of anemia among pregnant women was recorded at approximately 12.6%, indicating a persistent anemia problem, although lower than the national rate.

Furthermore, reports from the Bengkulu Provincial Health Office indicate an increasing trend in the incidence of anemia among pregnant women in several regions from year to year. For example, the prevalence of anemia in pregnant women increased from 2.31% in 2017 to 3.93% in 2018, and then drastically increased to 19.09% in 2019 in various regions of Bengkulu Province. These data indicate that anemia in pregnant women remains a health problem that requires more intensive intervention, both through maternal health programs and education and nutrition strategies. This situation illustrates the urgency of examining the factors influencing the incidence of anemia in pregnant women in primary health care facilities such as the Sawah Lebar Community Health Center in Bengkulu City so that interventions can be more targeted and effective.

Method

The type of research used is quantitative correlation with a cross-sectional approach. The population in this study were all 56 pregnant women at the Sawah Lebar Community Health Center. The sampling technique used a total population of 56 respondents. The variables consisted of the incidence of anemia in pregnant women, which was determined based on Hb levels <11 g/dl in the first and third trimesters or <10.5 g/dl in the second trimester. Independent variables included age, parity, pregnancy spacing, education level, nutritional status (MUAC), and compliance with Fe tablet consumption. The instrument used was a direct questionnaire.

Data analysis was performed univariately to see the frequency distribution of each variable. Bivariate analysis used the Chi-Square test with a significance level of $\alpha = 0.05$ to determine the relationship between the independent variables and the incidence of anemia. If eligible, multivariate analysis was performed using logistic regression to determine the dominant factors influencing the incidence of anemia.

^{1) 2)} Fakultas Ilmu Kesehatan, Universitas Dehasen Bengkulu

*) *corresponding author*

Kintan Anissa

Email: kintananissa.kb@gmail.com

Results and Discussion

Univariate Analysis

Table 1. Frequency distribution of respondent characteristics

Variables	Category		
Anemia Incident	Anemia	4	2.9
	No Anemia	2	7.1
Age	At risk (<20 years / >35 years)	0	5.7
	No Risk (20–35 years)	6	4.3
Parity	≥3 (At Risk)	8	2.1
	<3 (No Risk)	8	7.9
Pregnancy Spacing	<2 years (At risk)	6	8.6
	≥2 years (No Risk)	0	1.4
Nutritional Status (MUI)	<23.5 cm (KEK)	4	5.0
	≥23.5 cm (Normal)	2	5.0
Fe Consumption Compliance	Not obey	2	9.3
	Obedient	4	0.7

Based on the results of research conducted at the Sawah Lebar Community Health Center on 56 respondents, it was found that 24 pregnant women (42.9%) experienced anemia and 32 respondents (57.1%) did not experience anemia. The age distribution showed that the majority of respondents were in a healthy reproductive age (20–35 years) as many as 36 people (64.3%), while at-risk ages (<20 years or >35 years) were 20 people (35.7%).

Based on parity, the majority of respondents had parity <3 (38 people) (67.9%), while parity ≥3 (18 people) were 18 (32.1%). Most respondents had a pregnancy interval of ≥2 years (40 people) (71.4%), and 16 (28.6%) had a pregnancy interval of <2 years. Nutritional status based on LILA showed that 42 respondents (75.0%) had normal nutritional status (≥23.5 cm), while 14 respondents (25.0%) experienced Chronic Energy Deficiency (CED). Based on compliance with Fe tablet consumption, 34 respondents (60.7%) were compliant with consuming Fe tablets, while 22 respondents (39.3%) were non-compliant.

The prevalence of anemia in this study was 42.9%, indicating that anemia in pregnant women remains a public health problem. According to the World Health Organization (WHO, 2021), anemia in pregnant women remains a global problem with high prevalence, especially in developing countries. It is categorized as a serious public health problem if the prevalence is ≥40%.

Maternal age is one factor influencing the incidence of anemia. Pregnant women under 20 years of age are still growing, resulting in increased iron requirements. Meanwhile, those over 35 years of age experience a decline in physiological function, which can impact iron metabolism. This aligns with a report from the Indonesian Ministry of Health (Indonesian Health Profile, 2022), which states that suboptimal reproductive age contributes to an increased risk of pregnancy complications, including anemia.

Parity is also related to iron reserves in the body. Repeated pregnancies and deliveries can deplete iron reserves, increasing the risk of anemia. A study published in the Indonesian Maternal Health Journal (2019–2023) showed that mothers with high parity have a greater risk of anemia than those with low parity.

Too close a spacing between pregnancies (<2 years) can prevent the mother's body from fully recovering iron reserves from the previous pregnancy. This is in line with the WHO (2018)

recommendation of a minimum spacing of 24 months to reduce the risk of maternal and neonatal complications.

Nutritional status is a crucial factor in the occurrence of anemia. Pregnant women with a mid-body circumference (MUAC) of <23.5 cm are at risk of Chronic Energy Deficiency (CED), which is associated with nutrient deficiencies, including iron. Recent research in maternal nutrition (2020–2023) indicates that pregnant women with malnutrition have a 2–3 times higher risk of anemia than women with normal nutritional status.

Compliance with iron tablet consumption is a crucial factor in preventing anemia. The iron tablet supplementation program is a national strategy to reduce the prevalence of anemia in pregnant women. According to the Indonesian Ministry of Health (2022), pregnant women are recommended to consume at least 90 iron tablets during pregnancy. Non-compliance is often caused by side effects such as nausea and constipation, lack of knowledge, and low motivation.

Overall, the results of this study indicate that anemia in pregnant women remains a health problem that requires serious attention through increased nutritional education, monitoring of nutritional status, and strengthening iron supplementation programs in antenatal care services.

Bivariate Analysis

Table 2. Relationship between age, parity, pregnancy spacing, nutritional status, and Fe compliance with the incidence of anemia

Variables	Category	Anemia n (%)	No Anemia n (%)	p-value
Age	Risky	13 (65.0)	7 (35.0)	0.021
	No Risk	11 (30.6)	25 (69.4)	
Parity	≥3	10 (55.6)	8 (44.4)	0.087
	<3	14 (36.8)	24 (63.2)	
Pregnancy Spacing	<2 years	9 (56.3)	7 (43.7)	0.095
	≥2 years	15 (37.5)	25 (62.5)	
Nutritional Status (MUI)	<23.5 cm	11 (78.6)	3 (21.4)	0.003
	≥23.5 cm	13 (31.0)	29 (69.0)	
Fe Compliance	Not obey	16 (72.7)	6 (27.3)	0.001
	Obedient	8 (23.5)	26 (76.5)	

The results of the study showed that age was significantly associated with the incidence of anemia ($p=0.021$). Pregnant women at risk (<20 years or >35 years) were more likely to experience anemia than those aged 20–35 years. Physiologically, being too young requires higher iron intake due to growth, while being too old experiences a decline in the body's physiological functions. This is in line with a report from the Ministry of Health of the Republic of Indonesia (2022) which stated that non-ideal reproductive age increases the risk of pregnancy complications, including anemia. These results are in line with research published in *the Journal of Reproductive Health* (2020), which stated that non-ideal reproductive age increases the risk of anemia by 3–4 times compared to healthy reproductive age. Furthermore, the Ministry of Health of the Republic of Indonesia (Indonesian Health Profile, 2022) also states that extreme age is a risk factor for pregnancy complications, including anemia.

No significant association was found with the parity variable ($p=0.087$). Although mothers with parity levels ≥3 tended to experience anemia more frequently, the relationship was not statistically significant. This is likely because most respondents had low parity, which meant their iron reserves were still relatively good. Research published in *the Indonesian Journal of Clinical Nutrition* (2019) showed that mothers with high parity had a greater risk of anemia than those with low parity, but this factor is often influenced by nutritional status and pregnancy spacing. The insignificance of the parity variable in this study is likely due to the fact that most respondents had low parity, which meant their iron reserves were still relatively good.

The variable of pregnancy spacing ($p=0.095$) also showed no significant association. Although mothers with a pregnancy spacing of less than 2 years were more likely to experience anemia, a statistically significant association was not found. The World Health Organization (2018) recommends a minimum pregnancy spacing of 24 months to

reduce the risk of maternal complications. Research in *BMC Pregnancy and Childbirth* (2021) also states that short pregnancy spacing increases the risk of anemia, although this effect may be influenced by nutritional intake and iron supplementation.

The nutritional status variable ($p=0.003$) showed a significant association with anemia. Pregnant women with a MUAC <23.5 cm (CED) were more likely to experience anemia (78.6%). Chronic energy deficiency reflects low nutrient reserves, including iron, increasing the risk of anemia. This is consistent with the WHO (2021) report, which states that malnutrition is a major factor in anemia in pregnant women.

Compliance with iron tablet consumption ($p=0.001$) was the most significant factor in this study. 72.7% of mothers who did not comply with iron tablet consumption experienced anemia. Iron supplementation is a key intervention in preventing anemia during pregnancy. The Indonesian Ministry of Health recommends consuming at least 90 iron tablets during pregnancy to prevent anemia. Research in *the International Journal of Environmental Research and Public Health* (2020) states that low compliance with iron supplementation significantly increases the risk of anemia in pregnant women. Non-compliance is often caused by side effects such as nausea and constipation, as well as a lack of education and monitoring by healthcare professionals.

Overall, the factors significantly associated with the incidence of anemia in this study were age, nutritional status, and compliance with Fe tablet consumption, with Fe compliance as the most dominant factor based on the smallest p -value.

Table 3. Odds Ratio (OR) of factors associated with the incidence of anemia

Variables	OR	Interpretation
Age at Risk	4.22	Mothers aged <20 or >35 years have a 4.2 times greater risk of experiencing anemia than mothers aged 20–35 years.
Parity ≥ 3	2.14	Mothers with parity ≥ 3 have a 2.1 times greater risk of experiencing anemia than mothers with parity <3 .
Pregnancy interval <2 years	2.14	Mothers with a pregnancy interval of <2 years have a 2.1 times greater risk of experiencing anemia compared to those with ≥ 2 years.
Nutritional Status (LILA <23.5 cm)	8.18	Mothers with KEK have an 8.1 times greater risk of experiencing anemia compared to normal nutritional status.
Non-Compliance with Iron Consumption	8.67	Mothers who do not comply with Fe consumption have an 8.7 times greater risk of experiencing anemia than those who comply.

The odds ratio calculation results show that adherence to iron tablet consumption is the highest risk factor for anemia ($OR=8.67$). This means that pregnant women who are not compliant with iron tablet consumption are almost nine times more likely to develop anemia than those who are compliant. This reinforces the recommendation of the Indonesian Ministry of Health, requires the consumption of at least 90 Fe tablets during pregnancy as an effort to prevent anemia.

The second high-risk factor is nutritional status (CED), with an OR of 8.18. Pregnant women with a MUAC <23.5 cm have a more than eightfold increased risk of developing anemia compared to women with normal nutritional status. According to the World Health Organization (2021), nutritional deficiencies, especially iron deficiency, are the leading cause of anemia in pregnant women globally. The risk factor for age showed an OR of 4.22, meaning mothers aged <20 or >35 had a fourfold greater risk of anemia. This aligns with the theory that suboptimal reproductive age increases the risk of pregnancy complications. Parity and pregnancy spacing have an OR of approximately 2 times, but based on previous statistical tests it is not

significant ($p>0.05$), so even though there is a tendency for an increased risk, these factors have not been proven statistically significant in this study.

Limitation Of The Study

This study used a cross-sectional design, meaning it cannot directly explain cause-and-effect relationships. The limited sample size (56 respondents) and limited study at the Sawah Lebar Community Health Center limit the generalizability of the results. Furthermore, some data were obtained through questionnaires, potentially introducing information bias.

Conclusions and Recommendations

Based on the results of a study of 56 pregnant women at the Sawah Lebar Community Health Center, it can be concluded that there is a significant relationship between nutritional status, parity, and compliance with iron tablet consumption with the incidence of anemia in pregnant women. Pregnant women with poor nutritional status, at-risk parity, and non-compliance with iron tablet consumption have a greater chance of experiencing anemia. Recommendations are suggested for the Sawah Lebar Community Health Center to increase nutrition education and routine monitoring of compliance with iron tablet consumption for pregnant women. In addition, pregnant women are expected to pay more attention to balanced nutritional intake and be disciplined in taking iron tablets to prevent anemia.

References

- Gebremedhin, S., & Enquesselassie, F. (2021). *Prevalence and determinants of anemia among pregnant women in sub-Saharan Africa: A systematic review and meta-analysis*. Archives of Public Health, 79, Article 219. <https://doi.org/10.1186/s13690-021-00711-3>
- Girma, S., Teshome, T., Worku, M., Solomon, T., Kehulu, S., Aman, R., Bonsa, M., Assefa, T., & Gezahegn, H. (2020). *Anemia and associated factors among pregnant women attending antenatal care at Madda Walabu University Goba Referral Hospital, Bale Zone, Southeast Ethiopia*. Journal of Blood Medicine, 11, 479–485. <https://doi.org/10.2147/JBM.S285190>
- Kejela, G., Wakgari, A., Tesfaye, T., Turi, E., Adugna, M., Alemu, N., & Jebessa, L. (2020). *Prevalence of anemia and its associated factors among pregnant women attending antenatal care follow-up at Wollega University Referral Hospital, Western Ethiopia*. Contraception and Reproductive Medicine, 5, Article 26. <https://doi.org/10.1186/s40834-020-00130-9>
- World Health Organization. (2018). *WHO recommendations on antenatal care for a positive pregnancy experience*. Geneva: World Health Organization.
- World Health Organization. (2021). *Global anaemia estimates in women of reproductive age, by pregnancy status, 2000–2019*. Geneva: World Health Organization.
- Young, M. F., Oaks, B. M., Tandon, S., Martorell, R., Dewey, K. G., & Wendt, A. S. (2019). *Maternal hemoglobin concentrations across pregnancy and maternal and child health outcomes: A systematic review and meta-analysis*. Annals of the New York Academy of Sciences, 1450(1), 47–68. <https://doi.org/10.1111/nyas.14093>
- Kementerian Kesehatan Republik Indonesia. (2020). *Pedoman pencegahan dan penanggulangan anemia pada ibu hamil*. Jakarta: Kementerian Kesehatan RI.
- Kementerian Kesehatan Republik Indonesia. (2022). *Profil Kesehatan Indonesia Tahun 2022*. Jakarta: Kementerian Kesehatan RI.
- Rahmawati, W., & Wulandari, L. (2020). *Hubungan status gizi dan kepatuhan konsumsi tablet Fe dengan kejadian anemia pada ibu hamil*. Jurnal Gizi Klinik Indonesia, 16(3), 123–130.

- Sari, M., & Fitriani, D. (2019). Faktor risiko anemia pada ibu hamil di Indonesia: Analisis data survei kesehatan. *Jurnal Kesehatan Reproduksi*, 10(2), 89–97.
- Teshale, A. B., Tesema, G. A., & Worku, M. G. (2020). Anemia and associated factors among pregnant women in low-income countries: A multilevel analysis. *International Journal of Environmental Research and Public Health*, 17(19), 1–12. <https://doi.org/10.3390/ijerph1719XXXX>