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THE OVERVIEW OF FACTORS ASSOCIATED WITH THE INCIDENCE OF ANEMIA IN PREGNANT WOMEN AT LEMPAKE HEALTH CENTER IN SAMARINDA

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Abstrak

Anemia in pregnant women is a common health problem with a high prevalence in both Indonesia and worldwide. This condition has serious impacts on both the mother and fetus, ranging from the risk of preterm delivery, low birth weight, to an increased maternal and perinatal mortality rate. WHO data show that 35.5% of pregnant women globally experience anemia, while the prevalence in Indonesia reaches 48.9% and in East Kalimantan as high as 87%. In Samarinda City, Lempake Public Health Center ranks third among 26 health centers in terms of anemia cases in pregnant women. The factors associated with anemia during pregnancy remain inconsistent across studies, making this research important to conduct. To describe the factors associated with the incidence of anemia among pregnant women at Lempake Public Health Center, Samarinda City. This study employed a retrospective cohort design with a descriptive-analytic quantitative approach. The research was conducted from January to August 2025. The population consisted of 160 pregnant women registered at Lempake Public Health Center, from which 83 respondents with complete data were selected based on inclusion criteria. Data were collected from cohort records at the health center and analyzed using univariate methods to describe the frequency distribution of each variable. The findings showed that most respondents were in the high-risk pregnancy age group (84.3%), the majority had non-risk parity (90.4%), most had normal nutritional status (91.6%), and the majority had non-risk MUAC (77.1%). The incidence of anemia was found in 20.5% of pregnant women, while 79.5% did not experience anemia.

Keywords: Anemia, Gestational Age, Parity, Nutritional Status

Introduction

Pregnancy is a physiological process experienced by women for approximately 40 weeks, divided into trimesters with significant physical, psychological, and metabolic changes. During this period, the need for iron increases, making pregnant women a group vulnerable to various health problems. One common disorder experienced is anemia, a condition characterized by low hemoglobin levels in the blood that can endanger the mother's health and affect fetal growth and development if not properly managed. Therefore, special attention to the health condition of pregnant women is crucial, both in terms of medical monitoring and fulfilling nutritional needs as well as health education, to minimize risks and support a safe delivery process and healthy babies (Setiawan et al., 2024).

Anemia is one of the most common health problems in pregnant women and can have serious impacts on both mother and fetus (Devi et al., 2023). This condition is usually caused by increased

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iron requirements that are not matched by adequate nutritional intake, resulting in decreased hemoglobin levels in the blood. In the late trimester, the mother's blood volume increases significantly to support fetal growth, making iron deficiency more likely to occur. Anemia during pregnancy can increase the risk of complications such as preterm delivery, low birth weight, and bleeding during childbirth.

Anemia is a nutritional problem that requires attention and is one of the public health issues in Indonesia, affecting all age groups from toddlers, adolescents, pregnant women, to the elderly. Anemia can be caused by various factors including iron deficiency, vitamin B12 deficiency, folic acid deficiency, infectious diseases, hereditary factors, and bleeding (Ministry of Health, 2020). Anemia is one of the most common health problems during pregnancy. It occurs when the number of red blood cells is insufficient to meet the body's needs, which vary for each individual. Factors such as gender, place of residence, smoking habits, and stage of pregnancy can influence these physiological needs (Namangdjabar et al., 2022).

Pregnant women with anemia are considered to be in a condition of potential danger to mother and child, meaning a high risk that endangers the health of both mother and fetus (WHO, 2020). This condition requires careful and comprehensive management from various parties, ranging from family to government. Anemia during pregnancy has been reported to have negative impacts on maternal and child health, as well as increasing the risk of maternal and perinatal mortality. Adverse effects on the mother include fatigue, decreased work capacity, impaired immune function, increased risk of heart disease, and even death (Kasmiati K, 2023). Therefore, it is important to give serious attention and implement effective prevention measures against anemia during pregnancy to ensure the health and safety of both mother and child.

According to data from the World Health Organization (WHO), 35.5% of pregnant women worldwide suffer from anemia, with 4 out of 10 ASEAN countries classified as having severe prevalence (>40%) (WHO, 2023). These countries include Cambodia (51.5%), Laos (47%), Myanmar (47.8%), and Indonesia (44.2%) (Ammarta, 2023). The percentage of anemia cases among pregnant women in Indonesia has increased from 42.1% in 2015 to 44.2% in 2019. Globally, the prevalence of anemia in pregnant women is 41.8%. In Indonesia, the prevalence is 48.9%, while in East Kalimantan it reaches 87.0%. According to the 2019 Health Profile report of Samarinda City, 1,342 pregnant women were recorded with anemia, and in 2020 the number was 1,209 (Ministry of Health RI, 2021).

Based on data from the Samarinda City Health Office, Puskesmas Lempake ranks third highest among 26 community health centers in Samarinda in terms of anemia cases in pregnant women. This ranking indicates that anemia among pregnant women in the working area of Puskesmas Lempake is quite concerning, considering that anemia during pregnancy can have serious impacts on the health of both mother and fetus. This position also reflects significant risk factors in the local community related to maternal health conditions, nutritional intake patterns, and access to health services. The high anemia rate is an important indicator that more optimal efforts are needed in prevention and management to minimize anemia incidence in pregnant women.

Research by Vevi Gusnidarsih (2020) shows that risk factors related to anemia in pregnant women include the mother's age at pregnancy. Women aged 20 to 35 years are considered low risk because their reproductive organs function healthily and are safe for pregnancy. Pregnant women under 20 years old are vulnerable to anemia due to immature reproductive function, emotional and mental instability, which can lead to insufficient attention to fulfilling nutritional needs during pregnancy. Meanwhile, pregnant women over 35 years old are also at risk of anemia due to decreased immunity and body resistance, making them more susceptible to diseases and infections (Gusnidarsih, 2020).

Method

This study used a retrospective cohort design with a descriptive-analytic approach, which involved describing the characteristics of pregnant women based on medical record data and analyzing the relationship between factors such as gestational age, parity, nutritional status, and upper arm circumference (UAC) with the incidence of anemia in the third trimester using inferential statistical tests over the last three months. The population in this study consisted of pregnant women in the first, second, and third trimesters from January to July 2025 who were diagnosed with anemia and recorded at Puskesmas Lempake, Samarinda City, totaling 160 individuals. Based on inclusion and exclusion criteria, 83 individuals were selected. The sample in this study comprised pregnant women who met the criteria, with sample determination and sampling techniques applied. The sample was obtained using a total sampling technique from the cohort data of pregnant women at Puskesmas Lempake, totaling 160 records. Secondary data for this study were obtained from written documents related to patients who visited the ANC clinic at Puskesmas Lempake, Samarinda City. Primary data were collected directly through interviews. Anemia data in pregnant women were obtained by measuring hemoglobin (Hb) levels using a digital Hb measuring device with direct observation of the measurement. Meanwhile, data on gestational age, parity, nutritional status, and UAC were obtained from medical records. Secondary data were also collected from reports and register books at the Maternal and Child Health Clinic of Puskesmas Lempake, Samarinda City. Data analysis in this study was conducted univariately in the form of descriptive analytics to describe the frequency distribution and percentage of each research variable.

Result

1. Gestational Age

In this study, gestational age was divided into two categories: at-risk and not at-risk. The at-risk category included pregnant women with gestational ages of 0–13 weeks (first trimester) and 28–40 weeks (third trimester), while the not at-risk category included gestational ages of 14–27 weeks (second trimester). To facilitate the analysis process, the at-risk category was coded as 1, and the not at-risk category was coded as 2.

The frequency distribution of the gestational age variable is as follows:

Tabel 1 Frequency distribution of the gestational age

Category	Frequency (f)	Persentage (%)
At risk	70	84,3
Not at risk	13	15,7
Total	**83**	**100**

Source: Data Sekunder, 2025

The analysis results showed that the majority of respondents were in the at-risk gestational age category, totaling 70 respondents (84.3%). Meanwhile, only 13 respondents (15.7%) were in the not at-risk category. This indicates that most pregnant women in this study were within the gestational age ranges of 0–13 weeks and 28–40 weeks, while only a small portion were in the 14–27 weeks range.

2. Parity

The parity data, after being coded, were analyzed using SPSS to obtain frequency distributions and percentages for each category. The frequency distribution of the parity variable is as follows:

Tabel 1 Frequency Distribution of Parity Variable

Category	Frequency (f)	Persentage (%)
At risk	8	9,6
Not at risk	75	90,4
Total	**83**	**100**

Source: Data Sekunder, 2025

The analysis showed that most respondents were in the low-risk parity category, with 75 respondents (90.4%). Meanwhile, only 8 respondents (9.6%) were in the high-risk parity category. This indicates that the majority of pregnant women in this study had fewer than three deliveries, while only a small portion had three or more deliveries.

3. Nutritional Status

The nutritional status data, after coding, were analyzed using SPSS to obtain frequency distributions and percentages for each category. The frequency distribution of the nutritional status variable is as follows:

Table 3 Frequency Distribution of Nutritional Status Variable

Category	Frequency (f)	Persentage (%)
At risk	7	8,4
Not at risk	76	91,6
Total	**83**	**100**

Source: Data Sekunder, 2025

The analysis showed that most respondents were in the non-risk nutritional status category, with 76 respondents (91.6%). Meanwhile, only 7 respondents (8.4%) were in the at-risk nutritional status category. This finding indicates that the majority of pregnant women in this study had good nutritional status based on Body Mass Index (BMI) values, while only a small portion had poor nutritional status with BMI below 18.5.

4. Upper Arm Circumference (UAC)

The UAC data, after coding, were analyzed using SPSS to obtain frequency distributions and percentages for each category. The frequency distribution of the UAC variable is as follows:

Table 4 Frequency Distribution of UAC Variable

Category	Frequency (f)	Persentage (%)
At risk	19	22,9
Not at risk	64	77,1
Total	**83**	**100**

Source: Data Sekunder, 2025

The analysis showed that most respondents were in the non-risk UAC category, with 64 respondents (77.1%). Meanwhile, 19 respondents (22.9%) were in the at-risk UAC category. This indicates that the majority of pregnant women in this study had an upper arm circumference ≥ 23.5

cm, while about one-fifth of respondents had UAC < 23.5 cm, indicating a risk of malnutrition.

5. Incidence of Anemia

The frequency distribution of anemia incidence is as follows:

Table 5 Frequency Distribution of Anemia Incidence Variable

Category	Frequency (f)	Persentage (%)
At risk	19	22,9
Not at risk	64	77,1
Total	**83**	**100**

Source: Data Sekunder, 2025

The analysis showed that most respondents were in the non-anemic category, with 66 respondents (79.5%). Meanwhile, 17 respondents (20.5%) experienced anemia. This indicates that the majority of pregnant women in this study had hemoglobin levels ≥ 11 g/dl, while about one-fifth had hemoglobin levels < 11 g/dl, indicating anemia during pregnancy.

Discussion

This study describes the analysis results of factors related to the incidence of anemia in pregnant women at Puskesmas Lempake, Samarinda City. The results were then compared with theories and previous research findings to provide a comprehensive explanation.

1. Gestational Age

Univariate analysis showed that the majority of respondents (84.3%) were in the at-risk gestational age category, i.e., first trimester (0–13 weeks) and third trimester (28–40 weeks), while 15.7% were in the non-risk second trimester. This indicates that most pregnant women tend to have check-ups during gestational ages vulnerable to anemia. In the first trimester, the mother's body is still adapting to pregnancy and often experiences nausea and vomiting that disrupt iron intake. In the third trimester, iron needs increase sharply due to fetal growth and increased plasma volume, which can cause anemia due to physiological hemodilution (Manuaba in Atika, 2021; Cunningham in Rahma, 2021).

This finding aligns with Satriawati et al. (2021), who stated that pregnant women in the first and third trimesters have a 2,728 times higher chance of anemia compared to the second trimester. Other studies by Utari, Hidayat & Askuri (2023) and Widyaningsih, Irsam & Rohmani (2023) also showed a significant relationship between at-risk gestational age and anemia. However, some studies such as Fitri et al. (2023) and Purnamasari (2022) reported different results, highlighting the role of other factors like nutritional intake and compliance with iron tablet consumption.

Based on this, the high proportion of pregnant women with at-risk gestational age at Puskesmas Lempake is likely due to more frequent check-ups during the first and third trimesters, as well as community habits that pay less attention to nutritional intake and iron supplementation from early pregnancy.

2. Parity

Most respondents (90.4%) had low-risk parity (less than 3 deliveries), while 9.6% were high-risk. Women with high parity tend to experience decreased iron reserves due to repeated pregnancies and deliveries, making them more vulnerable to anemia (Manuaba in Atika, 2021; Saifuddin in Sukardi et al., 2024). Studies by Sari et al. (2022), Rohmawati (2021), and Utari, Hidayat & Askuri

(2023) support this finding.

However, Isnaini et al. (2021) and Utami (2020) reported that parity was not significantly related to anemia because nutritional factors and compliance with iron tablet consumption were more dominant. This shows that the relationship between parity and anemia is influenced by social, economic, and health behavior conditions.

The low proportion of high-risk parity at Puskesmas Lempake is likely related to family awareness in planning the number of children and the use of family planning programs, as well as nutritional education through antenatal care services.

3. Nutritional Status

Most respondents (91.6%) had non-risk nutritional status (BMI > 18.5), while 8.4% were at risk. Good nutritional status supports adequate iron reserves and essential nutrients during pregnancy, reducing the risk of anemia (Proverawati & Asfuah in Wildayani, 2021; Kusharisupeni in Rahayu, 2020).

Studies by Sari and Fitria et al. (2023), Putri (2020), and Trisia, Hamid & Handayani (2020) showed a significant relationship between nutritional status and anemia. However, Aryanti et al. (2023) and Arum (2021) found that other factors such as compliance with iron tablet consumption and dietary patterns also play important roles.

The low proportion of at-risk nutritional status at Puskesmas Lempake is suspected to be due to effective nutritional monitoring and education programs during antenatal visits, as well as family support in maintaining pregnant women's diet.

4. Upper Arm Circumference (UAC)

Most respondents (77.1%) had non-risk UAC (> 23.5 cm), while 22.9% were at risk. Low UAC indicates Chronic Energy Deficiency (CED), which increases the risk of anemia due to inadequate energy and iron reserves (Proverawati & Asfuah in Wildayani, 2021; Kusharisupeni in Rahayu, 2020).

Studies by Adriati & Chloranyta (2022), Suhartini (2020), and Surahmi et al. support the significant relationship between low UAC and anemia. However, Utama (2021) and Wahyuni (2021) reported that nutritional interventions and supplementation can reduce anemia risk even with low UAC.

Differences in dietary patterns, nutritional awareness, and socioeconomic conditions are suspected to cause variations in at-risk UAC at Puskesmas Lempake.

5. Incidence of Anemia

About 20.5% of pregnant women experienced anemia, while 79.5% did not. Anemia in pregnancy is defined as hemoglobin levels < 11 g/dl and can cause serious complications for mother and fetus (Manuaba in Atika, 2021; Proverawati in Wildayani, 2021).

This prevalence aligns with studies by Rahayu (2017), Indriyani (2020), and Rahadinda et al. (2022), which show anemia as a maternal health problem impacting low birth weight (Afifah Zahro & Widyastuti, 2020; Wulandari et al., 2022). However, some studies like Fauzia et al. (2024) and Wulandari (2021) report higher anemia prevalence, likely influenced by socioeconomic conditions and compliance with iron tablet consumption.

The researcher assumes that anemia incidence at Puskesmas Lempake is influenced by suboptimal iron tablet consumption behavior, less diverse diets, and low iron intake. Nevertheless, the relatively low anemia rate indicates successful maternal health programs in the area.

Conclusion

Gestational Age: Most pregnant women in the first and third trimesters were in the at-risk gestational age category, totaling 70 respondents (84.3%). This indicates that pregnancy check-ups are more frequent during early and late pregnancy phases, which are also vulnerable to anemia. Parity: The majority of respondents had low parity (1–2 deliveries), totaling 75 respondents (90.4%). This suggests that these women are relatively safe because their body's nutrient reserves have not been heavily depleted by repeated pregnancies. Nutritional Status: Most pregnant women had good nutritional status with BMI ≥ 18.5, totaling 76 respondents (91.6%). This finding shows that these women maintained good health during pregnancy, although a small portion remains at risk of anemia due to poor nutritional status. Upper Arm Circumference (UAC): Most respondents had non-risk UAC (≥ 23.5 cm), totaling 64 respondents (77.1%). This indicates that, generally, the energy and nutrient reserves of pregnant women are adequate, although some respondents require more attention due to higher anemia risk. Incidence of Anemia: Most pregnant women did not experience anemia, totaling 66 respondents (79.5%). This figure shows that although the general condition of pregnant women is good, anemia remains a health issue that requires serious attention in the working area of Puskesmas Lempake, Samarinda City.

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