

## ARTICLE INFORMATION

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## The relationship between maternal age and the incidence of anemia in pregnancy

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## Abstract

**Background:** Anemia in pregnancy remains an important maternal health problem and may contribute to maternal and fetal morbidity. Maternal age is one of the characteristics that may be associated with anemia, particularly when pregnancy occurs before 20 years or after 35 years of age.

**Purpose:** To analyze the relationship between maternal age and the incidence of anemia during pregnancy.

**Method:** This quantitative study used an observational analytical design with a cross-sectional approach. The study population comprised 137 pregnant women who underwent antenatal check-ups at Sungai Durian Community Health Center from October to December 2025. A total of 133 respondents met the study criteria and were selected using total sampling. Secondary data were obtained from medical records and included maternal age and hemoglobin status. Data were analyzed using the Pearson Chi-Square test at  $\alpha = 0.05$ , and the odds ratio (OR) with a 95% confidence interval (CI) was reported.

**Results:** Most respondents were in the non-risk maternal age group of 20–35 years (65.4%), while 34.6% were in the risk age group (<20 or >35 years). Anemia was identified in 49 respondents (36.8%). The Pearson Chi-Square test showed a significant association between maternal age and anemia in pregnancy ( $p = 0.008$ ). Pregnant women in the risk age group had 2.705 times higher odds of anemia than those aged 20–35 years (OR = 2.705; 95% CI = 1.288–5.681).

**Conclusion:** Maternal age was significantly associated with anemia in pregnancy. Pregnant women aged <20 or >35 years require closer screening and monitoring for anemia during antenatal care.

**Suggestion:** Health workers should strengthen early anemia screening among pregnant women in the risk age groups and provide appropriate nutrition education and counseling on adherence to iron supplementation.

**Keywords:** Anemia; Maternal Age; Pregnancy; Risk Factors.

## INTRODUCTION

Pregnancy is a physiological condition that women can experience. It is a state in which the fetus grows and develops in the uterus for approximately 40 weeks. Under normal circumstances, pregnancy occurs. will ongoing for 37 weeks until with 40 weeks. Every Woman will own experience different pregnancies. The gestation period is also not always running normally, sometimes the pregnancy process will experience complications Good in the form of emergency and pathological. Complications that

occur Can own the impact that causes failure growth and development fetus. Impact bad from complications pregnancy is death Mother or death baby (Hasnita et al., 2025)

Maternal mortality rate or (AKI) which is one of the rejects measuring for see welfare builder health mention that in 2019 as many as 295,000 mothers pregnant, mother childbirth and motherhood postpartum deaths (World Health Organization, 2020). Based on the data obtained from WHO (World

Health Organization) states that the Maternal Mortality Rate in Indonesia is at a low level highest if compared to with other ASEAN countries namely 305 per 100,000 births live. While the target that has been as stated by the SDGs (Sustainable Development Goals), the target is for the number of maternal deaths to decrease by 2030. up to 70 per 100,000 births life (World Health Organization, 2022).

West Kalimantan, one of the provinces in Indonesia, reported 135 maternal deaths in 2023, a rate of 165 per 100,000 live births. The trend in maternal mortality rates has increased from 2022 to 2023, with 142 per 100,000 live births in West Kalimantan. Meanwhile, Sintang Regency ranks fifth with a maternal mortality rate of 14 cases, or 201 per 100,000 live births. The leading causes of maternal mortality are hemorrhage (35%), hypertension (21%), and other causes (West Kalimantan Health Office, 2023).

The leading causes of maternal death in Indonesia are hemorrhage, hypertension during pregnancy, and emergency anemia and chronic energy deficiency. Bleeding is the leading cause of maternal death (28%). In West Kalimantan, the number of maternal deaths decreased from 2022 to 2023 (West Kalimantan Health Office, 2023).

The high maternal mortality rate (MMR) provides an indication of the success of existing health efforts. The MMR provides guidance on which programs can be implemented or replaced to improve reproductive health, particularly in pregnancy, childbirth, and postpartum care (Jayanti, 2023). A higher maternal mortality rate indicates the low quality of health services provided to mothers, potentially leading to economic and social decline (Susanti et al., 2025)

One of the causes of bleeding is anemia, a condition in which the body experiences a deficiency of iron and folic acid, leading to acute bleeding. Pregnant women with anemia will have a negative impact on themselves and their unborn fetuses. The incidence of maternal deaths due to anemia ranges from 115,000 per year globally. WHO data shows that nearly 40% of pregnant women worldwide suffer from anemia. Several ASEAN countries have an average anemia incidence of 40% to 51%. Cambodia 51.5%,

Laos 47%, Myanmar 47.8%, and Indonesia 44.2% (Wijaya et al., 2025)

Anemia is predicted to contribute 10% to 12% of maternal deaths, which shows that if early prevention occurs, the incidence of maternal deaths caused by anemia can be reduced better (Mutoharoh & Indarjo, 2024) . Based on data obtained from Health Data Research in 2020, pregnant women who suffer from anemia are aged 14 to 24 years as much as 84.6%, pregnant women aged 25-34 years as much as 33.7%, aged 35 years to 44 as much as 33.6%, and aged 45 to 54 years as much as 24% (Central Statistics Agency, 2021).

Data obtained from the 2023 West Kalimantan Health Profile shows that the coverage of iron tablet provision for pregnant women was 68.5%, a decrease compared to 85.3% in 2022. Sintang Regency had the lowest iron tablet consumption coverage, at 11.7%.

Anemia in pregnancy is a condition where the hemoglobin level is below 11g/dl. Anemia is the most common disease experienced by pregnant women caused by increased nutritional needs and physiological changes in the circulatory system and spinal cord (Nasution et al., 2024) . Several factors contribute to anemia, which can worsen the condition of pregnant women. One cause is the mother's age being too young or too old. Pregnant women who are too young are not ready in terms of reproductive organ function and psychology to accept pregnancy, while in women who are too old, the function of reproductive organs and vital systems in the body decreases, resulting in hormonal imbalances that can cause disorders in the circulatory system, digestion, and others (Bria & Rohmah, 2023).

Research indicates a significant association between maternal age ( $p=0.013$ ) and the incidence of anemia. Other studies show a significant association between maternal age ( $p=0.026$ ) and parity ( $p=0.085$ ) with the incidence of anemia (Wakman et al., 2023; Puspitasari, 2024).

## RESEARCH METHOD

This study used a quantitative observational analytical design with a cross-sectional approach. The study population comprised all pregnant women

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who underwent antenatal check-ups at Sungai Durian Community Health Center from October to December 2025, totaling 137 visits. The final sample consisted of 133 respondents who met the inclusion criteria and were selected using total sampling.

The inclusion criteria were pregnant women with complete maternal age and hemoglobin data who underwent hemoglobin testing at Sungai Durian Community Health Center. Records with incomplete data were excluded. Pregnant women with anemia accompanied by conditions such as thalassemia were also excluded according to the study protocol.

Data were secondary data obtained from medical records. Maternal age was categorized as risk age (<20 years or >35 years) and non-risk age (20–35 years). Anemia status was classified according to the hemoglobin information recorded in the medical record. Descriptive analysis was used to summarize respondent characteristics, while the Pearson Chi-Square test was used to examine the association between maternal age and anemia. Statistical significance was set at  $\alpha = 0.05$ . The odds ratio (OR) and 95% confidence interval (CI) were used to estimate the strength of association.

## RESEARCH RESULT

**Table Characteristics of Respondents (N=133)**

| Variable                           | Results               | OR                      | p-value |
|------------------------------------|-----------------------|-------------------------|---------|
| <b>Age (Mean±SD) (Range) Years</b> | (29.4 ± 6.2 (18 - 48) | 2.705 (CI= 1.288-5.681) | 0.008   |
| Risk (20-35)                       | 46/34.6               |                         |         |
| No Risk (<20 or >35)               | 87/65.4               |                         |         |
| <b>Anemia (n/%)</b>                |                       |                         |         |
| Yes                                | 49/36.8               |                         |         |
| No                                 | 84/63.2               |                         |         |

The table shows that respondents who are age at risk (< 20 years > 35 years) as many as 133 respondents or as many as 34.6 % and 49 respondents experienced anemia or as much as 36.8%. Based on the results of the Pearson Chi-Square test,  $p = 0.008$  was obtained. Since the  $p$  value < 0.05, it can be concluded that there is a significant relationship between maternal age and the incidence of anemia in pregnancy. The analysis results also show that pregnant women with an age at risk (<20 years or >35 years) have a 2.705 times greater chance of experiencing anemia compared to pregnant women with an age not at risk (20–35 years) (OR = 2.705; 95% CI = 1.288–5.681).

## DISCUSSION

Pregnancy can lead to increased iron requirements in the blood, due to increased red blood cell mass, placental development and growth, and fetal growth. During pregnancy, the body's iron requirement reaches 1,000 mg. If the mother's iron

reserves are not met through supplements and diet, pregnant women are highly susceptible to anemia. Anemia is particularly prevalent in women at risk, namely those aged <20 or >35 (Yuvita et al., 2024).

Pregnant women under 20 years of age are still experiencing physical growth, so the iron needs of both mother and fetus are divided. This situation requires more iron reserves, resulting in suboptimal hemoglobin synthesis. Pregnancy occurring at a young age or in adolescence is also associated with psychological readiness, thus affecting the mother's knowledge of nutritional needs during pregnancy and adherence to iron supplementation (Ariendha et al., 2022).

In pregnant women over 35 years of age, organ function begins to decline, resulting in inefficient iron absorption, which impairs the hematologic system's ability to adapt due to the increased iron requirements during pregnancy. At this age, many pregnant women experience repeated pregnancies and chronic illnesses, leading to decreased iron stores. These

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conditions can lead to a decreased ability of the mother's body to maintain hemoglobin levels (Ismiati, 2024).

The results of this study are in line with another research conducted which states that pregnant women of high-risk age are more susceptible to anemia during pregnancy. This study also confirms that age is a maternal characteristic closely related to the incidence of anemia during pregnancy. This is related to biological readiness and the health status of the reproductive organs (Tendean et al., 2025).

Other research was conducted by (Budiana et al., 2022) stated that anemia in pregnancy is a problem for many pregnant women, therefore it is important to carry out early screening for early detection of pregnancy risks so that nutritional interventions and iron supplementation can be given at the right time.

Untreated anemia increases the risk of premature delivery, low birth weight, postpartum hemorrhage, puerperal infection, and increased maternal morbidity and mortality. Therefore, it is important for pregnant women to understand how to prevent and treat anemia during pregnancy (Yuvita et al., 2024).

Pregnant women in the reproductive age range (20-35 years) have a lower risk of anemia. This is because reproductive organ function has fully developed and the body's nutrient reserves are adequate. At this age, hematopoietic function can also function efficiently, allowing the body to adapt to pregnancy more optimally (Yani et al., 2023).

During pregnancy, there is an increase in blood plasma volume and red blood cell count, a physiological change that helps meet the oxygen needs of the mother and fetus. During pregnancy, iron absorption, nutrient absorption, and food reserves, as well as changes in the hormone erythropoietin, continue to function normally, maintaining hemoglobin levels in the body (Tendean et al., 2025).

Researchers believe that anemia at high-risk ages is caused by multiple factors. Physical readiness before pregnancy, psychological factors, and nutritional status are all important indicators. At a young age, mothers are not physically ready because they are still growing. Therefore, they are unable to adapt to the physiological changes of pregnancy. Furthermore, psychological factors contribute to

young mothers' lack of knowledge about nutritional needs and adherence to iron supplementation, leading to inadequacy in anemia prevention and treatment. In older mothers, physical factors significantly influence pregnancy. The mother's body is no longer able to adapt due to declining organ function, especially the reproductive organs. Furthermore, in older age, pregnant women often experience degenerative diseases such as hypertension and diabetes, which can worsen the pregnancy.

## CONCLUSION

Maternal age is significantly associated with anemia. High-risk mothers are those aged <20 or >35, so pregnancy at this age requires special attention. Screening and early detection are essential for anemia prevention and treatment. This study also demonstrates that maternal age during pregnancy influences adaptation to changes in the hematological system. This study also suggests that the optimal gestational age is during the productive age range, 20–35.

## SUGGESTION

It is recommended that health facilities and community health workers educate the public about the optimal age for pregnancy. Increasing public knowledge in this area will contribute to reducing maternal morbidity and mortality.

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The Relationship Between Maternal Age and the Incidence of Anemia in Pregnancy

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