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The Relationship Between Maternal Nutritional Intake Patterns and the Incidence of Anemia Among Third-Trimester Pregnant Women at Majalaya Public Health Center Bandung Regency

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Abstract
Introduction: *The Indonesian Health Survey (SKI) 2023 reported a decrease in anemia prevalence among pregnant women from 48.9% to 27.7%. However, local data at Majalaya Public Health Center showed an increase from 15 cases (1.04%) in 2022 to 46 cases (3.35%) in 2023. A balanced nutritional intake plays a key role in preventing anemia during pregnancy.* ***Objective:*** *This study aimed to determine the relationship between nutritional intake patterns and the incidence of anemia among third-trimester pregnant women at Majalaya Public Health Center, Bandung Regency.* ***Method:*** *This was a correlational study using a cross-sectional design, conducted from January to July 2025. The population consisted of 98 third-trimester pregnant women, with data collected through primary sources. Data analysis was performed using the Chi-square test with a significance level of $p \leq 0.05$.* ***Result and Discussion:*** *Statistical analysis showed a significant relationship between nutritional intake patterns and anemia incidence, with a p-value of 0.002 ($< \alpha = 0.05$), indicating that inadequate nutrition is associated with a higher risk of anemia.* ***Conclusion:*** *Nutritional intake patterns have a significant association with the incidence of anemia in third-trimester pregnant women at Majalaya Public Health Center.*

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Introduction

Anemia is a condition in which the number of red blood cells, along with their capacity to transport oxygen, is insufficient to meet the body's physiological needs (Mahfudz, 2024); (Susanti, Kalsum, & Siregar, 2023). Data from the Indonesian Health Survey (SKI) 2023 indicate that the prevalence of anemia among pregnant women decreased from 48.9% to 27.7%. In 2023, a total of 1,517 pregnant women were recorded as having anemia, representing 3.20% of the total pregnant population (SKI, 2023); (Winengsih & Ariesta, 2025); (Sari, Anggeriani, Marlisa, & Ariyani, 2026).

Research findings from medical faculties across Indonesia show that the prevalence of anemia among pregnant women ranges from 50% to 63%. Meanwhile, studies by Pusponegoro and the Anemia World Map during the same period reported that 51% of pregnant women experienced anemia, contributing to up to 300 deaths per day (Shaikh, 2015). At Majalaya Public Health Center, the incidence of anemia among pregnant women increased from 15 cases (1.04%) in 2022 to 46 cases (3.35%) in 2023, reflecting an increase of 2.31%. A balanced diet is defined as the daily composition of foods that provide essential nutrients in types and amounts appropriate to the body's needs, while adhering to principles of dietary diversity or variety, physical activity, personal hygiene, and the maintenance of ideal body weight (Ministry of Health of the Republic of Indonesia, 2019).

A study conducted by Wigutomo (2018) at Buleleng III Public Health Center demonstrated a significant association between dietary patterns and the incidence of anemia among pregnant women ($p < 0.05$). The relationship between dietary patterns and anemia was found to be strong, indicating that poorer dietary patterns are associated with a higher incidence of anemia during pregnancy. Therefore, pregnant women are encouraged to adopt adequate dietary patterns that meet nutritional requirements throughout pregnancy (Sari et al., 2026); (Syaharani, Atmadja, & Listyawardhani, 2024);(Sembiring & Purba, 2024)

In the context of antenatal care (ANC), opportunities to reduce anemia are often integrated into scheduled health service contacts. According to national guidelines, Hb level monitoring is typically conducted during the first visit and repeated during the second or third trimester if risk factors are identified (Kemenkes RI, 2022). Nutrition counseling—ideally delivered during the second trimester and reinforced in the third trimester—is a critical point of intervention to improve dietary intake and iron supplementation adherence (NUR ARIFAH, 2025); (Yunika, 2021). Cadres and Posyandu (integrated health posts) play a frontline role in delivering health education, distributing iron and folic acid tablets, tracking Hb status, and ensuring follow-up care. These integrated ANC efforts are essential for the early detection and prevention of anemia in pregnant women (Yuliyana, Salmarini, Palimbo, & Gunawati, 2024)

This study aims to determine the relationship between nutritional intake patterns and the incidence of anemia among third-trimester pregnant women at Majalaya Public Health Center, Bandung Regency.

Method

The correlational analysis method used in this study aimed to determine the relationship between maternal nutritional patterns and the incidence of anemia at Majalaya Public Health Center, Bandung Regency. This study employed a cross-sectional design, in which data on the study variables were collected and analyzed at a

single point in time.

The study population consisted of all third-trimester pregnant women attending Majalaya Public Health Center, Bandung Regency, totaling 98 participants. This study utilized primary data, defined as data obtained and collected directly from third-trimester pregnant women. Data collection involved assessing dietary patterns using a standardized Food Frequency Questionnaire (FFQ) and laboratory examinations to measure hemoglobin (Hb) levels. Prior to data collection, the researchers approached prospective respondents and provided a detailed explanation of the study. Pregnant women who agreed to participate were asked to sign an informed consent form. Maternal dietary patterns were assessed using a validated Food Frequency Questionnaire, which is commonly used to evaluate nutritional intake patterns.

Result and Discussion

1. Result

Table 1
Maternal Nutritional Intake Patterns

Maternal Nutritional Intake Patterns	Frequency	Percentage
Poor	20	20.4
Good	78	79.6
Total	**98**	**100**

Based on the table above, the results indicate that the majority of pregnant women had good nutritional intake patterns, totaling 78 individuals (79.6%), while 20 individuals (20.4%) exhibited poor nutritional intake patterns.

Table 2
Incidence of Anemia Among Pregnant Women

Hemoglobin Status	Frequency	Percentage
Anemia	27	27.6
Non-Anemia	71	72.4
Total	**98**	**100**

Based on the table above, the results show that the majority of pregnant women were non-anemic, totaling 71 individuals (72.4%), while 27 individuals (27.6%) were anemic.

Table 3
Relationship Between Maternal Nutritional Intake Patterns and the Incidence of Anemia in Pregnant Women

Maternal Nutritional Intake Patterns	Hemoglobin Status		Total	P Value
	Anemia	Non-Anemia		
Poor	11	9	0.002	
Good	16	62	78	0.002
Total	**27**	**71**	**98**	

Based on Table 3, the results showed a p-value of 0.002 at a significance level of α = 5% (0.05). Since the p-value (0.002) was less than α (0.05), the result was statistically significant.

2. Discussion

An imbalanced diet can lead to an imbalance in nutrient intake, resulting in either nutrient deficiencies or, conversely, excessive intake of certain nutrients, which may cause overnutrition (Pratiwi, Pabidang, & Waryana, 2023). Factors influencing dietary patterns include knowledge, local cultural practices, socioeconomic status, and the social environment. Prevention and management of anemia in pregnant women can be achieved through improving dietary patterns and adopting healthy eating habits, as well as consuming foods rich in protein, iron, and folic acid during pregnancy. Although menstruation ceases during pregnancy, additional iron intake remains essential for fetal development, placental growth, and the expansion of maternal blood volume. The total iron requirement during pregnancy approaches 1,000 mg, increasing significantly as pregnancy progresses. Daily iron requirements rise from 0.8 mg/day in the first trimester to 6.3 mg/day in the third trimester. The most accessible and widely implemented interventions are delivered through community health services such as Posyandu and Public Health Centers (Puskesmas) (Prawirohardjo, 2021).

Pregnant women represent a population particularly vulnerable to nutritional deficiencies. Inadequate maternal nutrition during pregnancy has substantial consequences for fetal growth and development, as well as for maternal health. Poor nutritional status during pregnancy may result in complications affecting both the mother and the fetus, including anemia, hemorrhage, inadequate maternal weight gain, and increased susceptibility to infectious diseases.

These findings are consistent with a study by Sari and Djannah (2020) entitled *The Relationship Between Nutritional Status and the Incidence of Anemia Among Pregnant Women at Kotagede Public Health Center, Yogyakarta*. The study reported an anemia prevalence of 66.7% among pregnant women. Chi-square analysis yielded a p-value of 0.006, indicating a significant association between hemoglobin levels and nutritional status, iron tablet consumption, and dietary patterns.

An appropriate dietary pattern for pregnant women should include adequate sources of carbohydrates, proteins, fats, vitamins, and minerals. Iron plays a crucial role in the formation of red blood cells. Iron deficiency in pregnancy can disrupt energy metabolism, leading to reduced functional capacity of various organ systems.

A study by Pertiwi (2023), entitled *The Relationship Between Dietary Patterns and the Incidence of Anemia Among Pregnant Women in the Kerjo Public Health Center Area, Karanganyar Regency*, found that 49% of pregnant women consumed main meals fewer than three times per day, 16.3% consumed fewer than five types of foods per day, 36.7% were anemic, and 63.3% were non-anemic. The study demonstrated a significant association between meal frequency and anemia incidence ($p = 0.002$) and between food variety and anemia incidence ($p = 0.01$). The findings concluded that dietary patterns were significantly associated with anemia among pregnant women.

Similarly, a study by Sandrayayuk et al. (2023) entitled *The Relationship Between Dietary Patterns and the Incidence of Anemia Among Third-Trimester Pregnant Women at Pleret Public Health Center, Bantul*, reported a significant association between dietary patterns and anemia incidence. The study showed that 43.3% of pregnant women had good dietary patterns, 50% had moderate dietary patterns, and 6.7% had poor dietary patterns. Regarding anemia status, 43.3% were non-anemic, 53.3% had mild anemia, and 3.3% had moderate anemia.

Conclusion

The majority of pregnant women had good nutritional intake patterns, with 78 individuals (79.6%), while 20 individuals (20.4%) had poor nutritional intake patterns. Most pregnant women were non-anemic, totaling 71 individuals (72.4%), whereas 27 individuals (27.6%) were anemic. A significant relationship was found between maternal nutritional intake patterns and the incidence of anemia among pregnant women, with a p-value of 0.002 at a significance level of $\alpha = 5\%$ (0.05).

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