ANALYSIS OF RELATIONSHIP BETWEEN ANEMIA KNOWLEDGE AND IRON TABLET CONSUMPTION ADHERENCE AMONG PREGNANT WOMEN

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ABSTRACT

Maternal anemia continues to be a major public health issue because it is associated with adverse maternal and neonatal outcomes during pregnancy and childbirth. Iron supplementation through Fe tablets is one of the recommended interventions to reduce the occurrence of anemia; however, adherence to tablet consumption among pregnant women remains unsatisfactory. Knowledge regarding anemia may play an important role in influencing adherence behavior. This study investigated the association between pregnant women's knowledge of anemia and their compliance with Fe tablet intake.A quantitative analytical study using a cross-sectional design was conducted. Knowledge of anemia served as the independent variable, while adherence to Fe tablet consumption was treated as the dependent variable. The study population comprised 681 pregnant women attending antenatal care services at Sindangkasih Public Health Center, Ciamis Regency. A total of 87 participants were selected through simple random sampling using the Slovin formula. Data were obtained using an anemia knowledge questionnaire and the Morisky Medication Adherence Scale (MMAS-8). Statistical analysis was performed using Spearman's rank correlation test.The findings revealed that nearly half of the respondents demonstrated a moderate level of anemia-related knowledge (49.4%). Furthermore, 42.6% of participants were categorized as having low adherence to Fe tablet consumption. Correlation analysis showed a significant positive association between knowledge and adherence ($\rho = 0.681$; $p < 0.001$).These findings indicate that better knowledge regarding anemia is associated with greater compliance in consuming Fe tablets during pregnancy. Strengthening educational interventions may therefore contribute to improving adherence and reducing the risk of anemia among pregnant women.

Keywords: Anemia, Pregnant Women, Knowledge, Iron Supplementation, Adherence.

INTRODUCTION

Maternal anemia remains a significant health concern that extends beyond nutritional deficiency. The condition can adversely affect both maternal and fetal health, leading to serious complications during pregnancy and delivery. Women with anemia may experience reduced physical endurance, weakened immunity, increased vulnerability to infection, postpartum bleeding, and other obstetric complications. For the fetus, anemia has been linked to premature birth, low birth weight, restricted growth, and higher perinatal mortality. Consequently, anemia continues to contribute substantially to maternal and neonatal morbidity and mortality worldwide (Salsabila et al., 2025).

Despite numerous prevention programs, anemia among pregnant women remains highly prevalent across many countries. According to the World Health Organization (WHO), the estimated prevalence of anemia among women aged 15–49 years who are pregnant reached 35.5% in 2025. Considerable regional differences were observed, with the highest prevalence reported in Africa (43.0%) and Southeast Asia (42.1%). Although lower rates were documented in Europe and the Western Pacific Region, anemia remains an important public health challenge globally (WHO, 2025).

At the local level, anemia among pregnant women continues to be a major concern in Ciamis Regency. Health records documented 1,852 cases during 2024. Among the 36 community health centers in the regency, Sindangkasih Public Health Center reported the

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largest number of cases, totaling 149, including 138 mild cases and 11 severe cases. The increase in severe anemia cases is particularly concerning because only one severe case had been reported in 2022.

To address this issue, the Indonesian government recommends that pregnant women receive and consume at least 90 iron tablets throughout pregnancy. Nevertheless, health service data from January to November 2025 indicated that 102 anemia cases were still identified, while only 292 pregnant women had completed the recommended intake of 90 Fe tablets. These findings suggest that adherence to iron supplementation remains a challenge.

Several factors may influence adherence behavior, including an individual's understanding of anemia and the benefits of iron supplementation. The Health Belief Model proposed by Rosenstock explains that health-related actions are affected by perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. Pregnant women who recognize the consequences of anemia are generally more motivated to follow preventive recommendations, whereas those who perceive themselves as healthy may underestimate the need for regular supplementation (Fitriyanti & Rahmalia, 2026).

Previous investigations have consistently reported a relationship between maternal knowledge and compliance with iron supplementation. Fajrin et al. (2021) reported that limited understanding of iron supplementation was common among pregnant women, particularly first-time mothers. Other studies have demonstrated that reproductive experience, educational attainment, age, employment status, environmental influences, and sociocultural factors contribute to differences in knowledge and health behavior (Munawaroh et al., 2019; Fajrin, 2018).

Although evidence regarding knowledge and adherence is available, studies integrating health behavior theory and focusing on areas with exceptionally high anemia prevalence remain limited. Therefore, this study examined the association between anemia knowledge and Fe tablet adherence among pregnant women attending Sindangkasih Public Health Center, the area with the highest recorded burden of anemia in Ciamis Regency, while incorporating the Health Belief Model as a conceptual perspective.

A preliminary assessment involving ten pregnant women revealed that gaps in both knowledge and adherence persisted. Six participants demonstrated insufficient understanding of anemia, while eight reported inconsistent consumption of Fe tablets. Common reasons included the perception that supplementation was unnecessary when no symptoms were present and concerns regarding side effects such as nausea. These observations provided the rationale for conducting the present study.

METHOD

This study employed a quantitative research design with a cross-sectional approach to determine the relationship between pregnant women's level of knowledge about anemia and adherence to Fe tablet consumption. The independent variable in this study was the level of pregnant women's knowledge regarding anemia, while the dependent variable was adherence to Fe tablet consumption.

The study population consisted of all pregnant women who attended Antenatal Care (ANC) examinations at Sindangkasih Public Health Center in 2025, totaling 681 individuals. The respondents included pregnant women in the second and third trimesters who were willing to participate and able to communicate effectively. The exclusion criteria included first-trimester pregnant women, pregnant women with severe illnesses, and pregnant women who had consumed Fe tablets for less than one month.

The sampling technique used was simple random sampling. The sample size was calculated using the Slovin formula with a margin of error of 10%, resulting in 87 respondents. Data collection was conducted at Sindangkasih Public Health Center after obtaining research

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permission from the relevant institutions and respondents' consent through informed consent procedures.

Data were collected using two research instruments. The first instrument was a questionnaire measuring pregnant women's knowledge about anemia, covering the definition, causes, signs and symptoms, impacts, and prevention of anemia during pregnancy. Correct answers were scored 1, while incorrect answers were scored 0. Knowledge levels were categorized as good (76–100%), moderate (56–75%), and poor (<56%).

The second instrument used was the Morisky Medication Adherence Scale (MMAS-8) to measure adherence to Fe tablet consumption. The questionnaire consisted of eight questions related to Fe tablet intake. Adherence levels were categorized into high adherence (score = 8), moderate adherence (score = 6–7), and low adherence (score <6).

Data analysis was performed using descriptive and inferential statistics. Descriptive analysis was used to describe respondents' characteristics, knowledge levels, and adherence levels in the form of frequency distributions and percentages. Inferential analysis was conducted to determine the relationship between pregnant women's knowledge about anemia and adherence to Fe tablet consumption, with the level of significance set at $p < 0.05$.

RESULTS AND DISCUSSION

Table 1
Respondents Characteristics

Characteristics	Category	Frequency (n)	Percentage (%)
Age	< 20 Years	6	6.9
	20–35 Years	66	75.9
	> 35 Years	15	17.2
Trimester	Second Trimester	42	48.3
	Third Trimester	45	51.7
Education	Elementary School	22	25.3
	Junior High School	23	26.4
	Senior High School	23	26.4
	Higher Education	19	21.9
Total		87	100.0

This study involved 87 pregnant women in the second and third trimesters who attended antenatal examinations at Sindangkasih Public Health Center. Based on the findings, the majority of respondents (75.9%) were within the healthy reproductive age range of 20–35 years, and most had a secondary education level (26.4%). These respondent characteristics indicate that pregnant women with higher educational backgrounds tend to receive and understand health information more easily, including information related to anemia prevention and the importance of regular Fe tablet consumption.

Table 2
Pregnant Women's Knowledge Level About Anemia

Knowledge Level	Frequency (n)	Percentage (%)
Good (17–22)	16	18.4
Moderate (12–16)	43	49.4
Poor (<12)	28	32.2
Total	**87**	**100.0**

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The results showed that the majority of respondents had a moderate level of knowledge, totaling 43 respondents (49.4%), while respondents with good and poor levels of knowledge had lower percentages. These findings indicate that most pregnant women already possessed a basic understanding of anemia; however, limitations still existed in understanding the impacts of anemia and the importance of regular Fe tablet consumption.

Knowledge is an important factor in shaping an individual's health behavior. According to the Health Belief Model theory, individuals who understand the risks and impacts of a disease are more likely to engage in preventive actions. In the context of this study, pregnant women who understood the risks of anemia tended to be more aware of the importance of adherence to Fe tablet consumption during pregnancy.

The findings of this study are consistent with the study conducted by Triana et al. (2021), in which the dominant category at the study location was a "moderate" level of knowledge rather than "poor." This condition is presumed to be closely related to the availability of routine Antenatal Care (ANC) programs at Sindangkasih Public Health Center, which may have exposed pregnant women to basic information regarding anemia prevention and the importance of continuous Fe tablet consumption.

Table 3
Adherence Level to Fe Tablet Consumption

Adherence Level	Frequency (n)	Percentage (%)
High	9	10.3%
Moderate	41	47.1%
Low	37	42.6%
Total	**87**	**100%**

The results showed that 37 respondents (46.2%) were categorized as non-adherent to Fe tablet consumption. Low adherence was mainly influenced by several factors, including forgetting to take Fe tablets and experiencing side effects such as nausea and constipation after consuming the tablets.

Adherence to Fe tablet consumption is one of the important efforts in preventing anemia among pregnant women. Fe tablets help fulfill the increased iron requirements during pregnancy due to the expansion of blood volume and fetal growth needs. Non-adherence to Fe tablet consumption may lead to decreased hemoglobin levels, thereby increasing the risk of anemia, premature delivery, hemorrhage, and low birth weight infants.

Compared to the study by Yulianah (2022), which found a very strong correlation between adherence and hemoglobin levels (r = 0.882), the low level of adherence found in this study may contribute to the high risk of anemia in the area. This indicates that without good adherence, the goal of improving hemoglobin levels will be difficult to achieve.

Table 4
Relationship Between Knowledge Level and Adherence to Fe Tablet Consumption

Knowledge Level	**Non-Adherent (Low)**	**Adherent (Moderate & High)**	**Total**
Poor (n=28)	25 (89.3%)	3 (10.7%)	28 (100%)
Moderate (n=43)	12 (27.9%)	31 (72.1%)	43 (100%)
Good (n=16)	0 (0.0%)	16 (100%)	16 (100%)
Total	**37 (42.5%)**	**50 (57.5%)**	**87 (100%)**

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Based on the results of the Spearman Rank correlation test, the correlation coefficient (ρ) was found to be 0.681 with a significance value (p-value) of less than 0.001. Since the p-value was less than 0.05, the null hypothesis (H_0) was rejected and the alternative hypothesis (H_a) was accepted. This indicates that there is a significant relationship between pregnant women's level of knowledge about anemia and adherence to Fe tablet consumption at Sindangkasih Public Health Center.

Good knowledge enables pregnant women to understand the benefits of consuming Fe tablets as well as the risks that may occur if anemia is not prevented. Pregnant women who have a good understanding of anemia tend to have higher perceived susceptibility and perceived benefits, which increases their motivation to comply with health workers' recommendations. In contrast, pregnant women with low levels of knowledge tend to perceive Fe tablet consumption as less important, especially when they do not experience symptoms of anemia.

The findings of this study support Lawrence Green's theory, which explains that health behavior is influenced by three main factors: predisposing factors, enabling factors, and reinforcing factors. In addition, the Health Belief Model (HBM) explains that an individual's health behavior is influenced by perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Pregnant women who possess good knowledge about anemia tend to have greater awareness regarding the risks and impacts of anemia during pregnancy. They understand that anemia may lead to various complications, such as fatigue, postpartum hemorrhage, premature birth, low birth weight, and impaired fetal growth.

Based on the findings of this study, the researchers assume that knowledge not only functions as a source of information but also as a factor that shapes pregnant women's internal motivation to maintain their own health and that of their fetus. Pregnant women who understand the risks of anemia and the benefits of Fe tablet consumption are more likely to develop greater awareness and compliance with healthcare recommendations. Conversely, women with limited knowledge may not fully understand the importance of Fe tablet consumption, resulting in lower adherence levels.

CONCLUSIONS AND SUGGESTIONS

Most pregnant women participating in this study demonstrated a moderate understanding of anemia, while a substantial proportion reported inadequate adherence to Fe tablet consumption. Statistical analysis confirmed a strong positive relationship between knowledge of anemia and compliance with iron supplementation. Pregnant women with greater knowledge tended to exhibit better adherence behavior.

These findings highlight the importance of strengthening educational strategies within antenatal care services. Healthcare providers should enhance counseling and health promotion activities to improve pregnant women's understanding of anemia and the benefits of regular Fe tablet consumption. Increased awareness may encourage consistent adherence to supplementation recommendations and contribute to reducing the burden of maternal anemia.

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ETHICAL CONSIDERATIONS

This study obtained research approval from the relevant educational institution and healthcare service authorities. All respondents were provided with an explanation regarding the purpose of the study and gave informed consent prior to data collection

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CONFLICT OF INTEREST STATEMENT

The researcher declares that there is no conflict of interest in this study.

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