Original Article

THE RELATIONSHIP BETWEEN PREGNANT WOMEN'S KNOWLEDGE AND ATTITUDES TOWARDS COMPLIANCE IN CONSUMING FERROUS SULFATE (FE) TABLETS IN THE WORKING AREA OF PUSKESMAS SAMUDERA, THE REGENCY OF NORTH ACEH IN 2025

Helmiana[1], Hafsah Us[2], Anita Anita[3]
[1] Puskesmas Samudra, The Regency of North Aceh
[2] Prodi DIII Kebidanan Aceh Utara, Poltekkes Kemenkes Aceh
Prodi DIII Kebidanan Banda Aceh, Poltekkes Kemenkes Aceh
*Corresponding author: helmianapkm86@gmail.com
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ABSTRACT

Background: Anaemia during pregnancy, especially iron deficiency anemia, remains a serious public health problem in Indonesia. According to the 2021 Indonesian Basic Health Research (Riskesdas), the prevalence of anemia among pregnant women reached 48.9%. In Aceh Utara District, local health reports show that 42% of pregnant women were diagnosed with anemia in 2023. Although iron tablets (Fe) are routinely distributed by health centres, only around 65% of pregnant women adhere to the recommended regimen. Limited knowledge, negative attitudes, and concerns about side effects often drive this low compliance. This study aims to examine the relationship between pregnant women's knowledge and attitudes and their compliance with iron tablet use.
Subjects and Method: This study employed a quantitative cross-sectional design. A total of 85 pregnant women who visit Puskesmas Samudera, The Regency, North Aceh, were selected using proportional random sampling. Data were collected using questionnaires and analyzed using the Chi-Square test to assess associations between variables.
Results: Knowledge is related to the compliance of pregnant women in consuming Fe tablets with a p-value = 0.002 ($p < 0.05$), and the attitude of pregnant women is related to compliance in consuming Fe tablets, with a p-value of 0.012 ($p < 0.05$).
Conclusion: Pregnant women's knowledge and attitudes towards iron tablets influence their compliance in consuming these tablets.

Keywords: Knowledge, Attitude, FE tablet, Puskesmas Samudera

INTRODUCTION

Based on World Health Organization (WHO) data and a global study over the past three years (2022–2024), compliance among pregnant women in taking iron (Fe) tablets to prevent anemia and preeclampsia remains relatively low globally. The WHO recommends a daily intake of 30–60 mg of iron and 400 µg of folic acid from early pregnancy until delivery, with an ideal total of ≥180 tablets during pregnancy. However, data show that only 8% of pregnant women meet this recommendation.

In Asia, compliance rates vary widely, ranging from 6.8% in Afghanistan to 75.9% in Cambodia. Meanwhile, in Sub-Saharan Africa, the average compliance rate is 39.2%, ranging from 3% in Burundi to 82% in Zambia [1]

Key determinants influencing adherence include maternal education level, gestational age at first ANC visit, number of ANC visits, access to information through mass media, and education and support from health workers. Low adherence significantly

impacts the increasing prevalence of anemia in pregnant women, which contributes to the risk of preeclampsia, preterm birth, and maternal and infant mortality.[2]

Therefore, increasing education about the importance of iron tablets, improving supplement distribution systems, and community-based interventions are crucial to improving adherence and the quality of maternal health in both developing and rapidly developing countries [3]. Meeting pregnant women's iron needs by consuming iron tablets is crucial for preventing anemia and improving maternal and fetal health [4].

Anemia, particularly that caused by iron deficiency, remains a significant challenge for maternal health in Indonesia. According to the 2021 Basic Health Research (Riskesdas), 48.9% of pregnant women in Indonesia suffer from anemia. This figure reflects that nearly half of pregnant women are at risk of anemia, which can negatively impact maternal health and fetal development.[5]

According to WHO data from 2024, approximately 36.8% of pregnant women worldwide suffer from anemia, caused primarily by iron deficiency. This condition not only increases the risk of premature delivery, low birth weight, and postpartum hemorrhage, but is also significantly correlated with an increased incidence of preeclampsia, which globally affects 2–8% of pregnancies [1]

In Indonesia, the situation is even more alarming, with the prevalence of anemia in pregnant women reaching 48.9%, making Indonesia one of the countries with the highest anemia rates in Southeast Asia. Data from the Indonesian Ministry of Health notes that 27.1% of total maternal deaths in Indonesia are caused by preeclampsia and eclampsia, demonstrating a strong link between iron deficiency and this fatal pregnancy complication [6].

In Aceh, the anemia rate among pregnant women is 12.84%, lower than the national average, but still contributes to a high risk of preeclampsia and impaired fetal development. Factors such as maternal education, regular antenatal care (ANC) visits, access to iron tablets, and support from health workers significantly influence adherence to iron supplement consumption during pregnancy [7]

Therefore, community-based interventions and policies that strengthen the distribution and education regarding iron tablet consumption are urgently needed to reduce anemia rates and their impacts, particularly preeclampsia, to reduce maternal and infant mortality. Anemia prevention is not only a nutritional issue, but also an effort to save the next generation through healthy, medically monitored pregnancies [1].

The high rate of anemia among pregnant women, which increases the risk of preeclampsia, indicates that adherence to iron tablet consumption remains a serious issue. One of the main factors influencing adherence is pregnant women's knowledge and attitudes regarding the importance of iron supplementation during pregnancy [8]

Pregnant women who have good knowledge about the benefits of iron tablets, the risks of anemia, and their impact on pregnancy tend to have a more positive attitude toward following medical recommendations, including adherence to regular iron tablet consumption. Conversely, low knowledge can lead to neglect or underestimation, thus decreasing compliance. Previous studies have shown a significant relationship between knowledge levels and attitudes toward health behaviors, including during pregnancy [9]

Therefore, in the context of efforts to reduce the prevalence of anemia and preeclampsia, it is essential to determine the extent to which pregnant women's knowledge and attitudes influence adherence to iron tablet consumption. This study aims to examine the relationship between pregnant women's knowledge and attitudes and their compliance with iron tablet use.

SUBJECT AND METHOD

1. Study Design

This study used a cross-sectional design to determine the relationship between pregnant women's knowledge and attitudes and adherence to iron (Fe) tablet consumption.

2. Population and Sample

The population consisted of all pregnant women in their first, second, and third trimesters registered at the Puskesms Samudera in 2025, totaling 582 pregnant women. The sample size was calculated using the Slovin formula, resulting in 85 pregnant women.

3. Study Variables

There are two independent variables in this study: pregnant women's knowledge and attitudes toward FE tablets. Meanwhile, the dependent variable is compliance with FE tablet consumption.

4. Operational Definition of Variables

The operational definitions of the variables in this study are:

-Knowledge: pregnant women's knowledge about FE tablets

- Attitude: pregnant women's reactions, feelings, beliefs, and persistent behavioral tendencies toward FE tablets

-Compliance with FE tablet consumption: how pregnant women adhere to the FE tablet consumption schedule at the dosage recommended by health professionals

5. Study Instruments

This study used a questionnaire as the research instrument. The pregnant women in the sample had to answer 35 questions.

6. Data analysis

a. Univariate Analysis: to assess sample characteristics

b. Bivariate Analysis: Assessing the relationship between knowledge and attitudes of pregnant women to compliance with FE Tablet Consumption. The data obtained were analyzed using the Statistical Package for the Social Sciences (SPSS) software.

7. Research Ethics

This research was conducted with due regard for research ethics, including informed consent. Informants who agreed to participate as respondents were required to sign a consent form after understanding the purpose and objectives of the research. Ethical clearance for this research was issued by the Health Research Ethics

Commission (KEPK) of Poltekkes Aceh in February 2025.

RESULT

1. Univariate Analysis

Based on the data in Table 1, most mothers in the Puskesmas Samudera work area are in the≥31 years age group (35.3%). In terms of education level, most mothers, namely 57 people (67.1%), had a high school education. Most mothers in this study sample were unemployed, namely 55 people (64.7%). The level of compliance with FE consumption was 72.9%, with 62 people (62.9%) non-compliant. In the attitude variable, most respondents had a negative attitude, namely 62 respondents (72.9%).

Table 1: Characteristics of the sample

Characteristic	Frequency	Percentage
Age of mother		
20 – 25 Years old	22	25.9%
26 – 30 Years old	33	38.8%
≥ 31 Years old	30	35.3%
Total	85	100%
Level of education		
University	8	9.4%
High School	57	67.1%
Junior high school	20	23.5%
Total	85	100%
Occupation		
Working	30	35.3%
Housewife	55	64.7%
Total	85	100%
FE consumption compliance level		
Compliant	23	27.1%
Non-Compliant	62	72.9%
Total	85	100%

Based on the data in Table 2, respondents' knowledge of FE consumption was low, with 57 respondents (67.1%). Meanwhile, 19 respondents (22.4%) had moderate knowledge, and only nine respondents (10.6%) had good knowledge of FE consumption.

Table 2. Frequency Distribution Based on Mother's Knowledge About FE Tablet

Knowledge	Frequency	Percentage
Good	9	10.6%
Moderate	19	22.4%
Low	57	67.1%
Total	**85**	**100%**

The sample's attitude toward FE tablets is shown in Table 3; the majority of respondents, namely 62 (72.9%), had a negative attitude toward consuming FE tablets. Meanwhile, only 23 respondents (27.1%) had a positive attitude.

Table 3: Frequency Distribution of Respondents; Mothers' Attitudes Towards Consuming FE Tablets

Attitude	Frequency	Percentage
Positive	23	27.1%
Negative	62	72.9%
Total	**85**	**100%**

2. Bivariate analysis

a. Relationship between pregnant women's knowledge and adherence to iron tablet consumption

Based on the results of the bivariate analysis, there was a significant relationship between maternal knowledge and adherence to iron tablet consumption, with a p-value of 0.002 ($p < 0.05$). Mothers with good knowledge of FE tablets were more compliant with taking them than mothers with less or sufficient knowledge. The results of the analysis are shown in Table 4 below.

Table 4: Analysis of the relationship between knowledge and Compliance With FE Tablet Consumption

Knowledge	Compliance				Total		P-value
	Obey		Disobey				
	F	%	F	%	F	%	
Good	9	39,1%	0	0%	9	10,6%	0,002
Moderate	13	56,5%	6	9,7%	19	22,4%	
Poor	1	4,3%	56	90,3%	57	67,1%	
Total	**23**	**100%**	**62**	**100%**	**85**	**100%**	

b. The relationship between maternal attitudes and compliance with FE tablet consumption

The analysis of the relationship between maternal attitudes and compliance with iron tablet consumption showed a significant relationship between maternal attitudes and compliance with iron tablet consumption (p-value: 0.012) ($p < 0.05$). All pregnant women with a positive attitude toward FE tablets were compliant with FE tablet use. Meanwhile, none of the pregnant women with negative attitudes were compliant with iron tablet consumption. The results of the analysis are shown in Table 5.

Table 5: Analysis of the Relationship between Attitudes and Compliance With FE Tablet Consumption

Attitude	Compliance				Total		P-value
	Obey		Disobey				
	F	%	F	%	F	%	
Positive	23	100%	0	0%	23	27,1%	0,012
Negative	0	0%	62	100%	62	72,9%	
Total	**23**	100%	**62**	**100%**	**85**	**100%**	

DISCUSSION

a. Relationship of Knowledge to Iron Tablet Compliance in Pregnant Women

The results of this study indicate a significant relationship between the level of knowledge of pregnant women and their compliance with iron (Fe) tablet consumption in the work area of the Samudera Community Health Center (UPTD), North Aceh. Statistical analysis using the Chi-Square test showed a p-value of 0.002 ($p < 0.05$), indicating a statistically significant correlation between pregnant women's knowledge and their compliance with iron tablet use.

Of the 85 respondents, nine pregnant women (39.1%) had good knowledge and were compliant with iron tablet use; none in this group were non-compliant. In the sufficient knowledge group, 13 women (56.5%) were compliant, and six women (9.7%) were non-compliant. Meanwhile, in the group with insufficient knowledge, only one woman (4.3%) was compliant with iron tablet use, while 56 women (90.3%) were non-compliant. These data indicate that pregnant women with good knowledge tend to be more compliant with iron tablet consumption than those with less knowledge.

The research team assumed that a good level of knowledge among pregnant women about the benefits, how to consume them, and the impact of iron deficiency would be directly proportional to their level of compliance in taking iron tablets. In other words, the higher the

pregnant women's knowledge, the more likely they are to take iron tablets as recommended by healthcare professionals.

This assumption is based on health behavior theory, which posits that knowledge is a key determinant of healthy behaviors, including adherence to medication or supplement use.

This finding is consistent with results from another study, which found that pregnant women with a good level of knowledge about anemia and iron tablets were 2.5 times more likely to adhere to iron tablet use than those with poor knowledge.[10]

Similar results were also found in a study at the Kalasan Community Health Center in Yogyakarta, which showed a significant relationship between pregnant women's knowledge level and adherence to iron tablet use, as indicated by a p-value <0.05.[11]

Based on data collected from 85 pregnant women, the majority were aged 26–30 (38.8%), followed by those aged 31 years and above (35.3%), and those aged 20–25 (25.9%). This indicates that most respondents were of reproductive age, who should have a good understanding of health during pregnancy. By education, the majority of pregnant women had secondary education, namely high school graduates (67.1%), with the remainder having college degrees (9.4%) or junior high school equivalent (23.5%). This level of education is quite important because a person's knowledge tends to increase with higher levels of education. However, the high proportion of respondents with secondary or lower education may contribute to a lack of understanding regarding the importance of taking iron tablets during pregnancy.

Employment status indicates that the majority of pregnant women were unemployed (64.7%), while 35.3% were employed. While unemployed mothers may devote more time to their health, this does not necessarily guarantee adequate access to information about the benefits of taking iron tablets. This may be due to limited exposure to information media or to effective counseling from health workers.

Furthermore, according to another study, adherence to iron tablet consumption is closely related to pregnant women's level of knowledge, perceptions of benefits and side effects, and effective communication from health workers. In this case, if a positive attitude and good understanding do not accompany knowledge, pregnant women will tend to refuse or stop taking iron tablets, especially when experiencing side effects such as nausea or constipation.[12]

Although some mothers have a high school education and are unemployed, this does not necessarily hinder them from obtaining health information. Mothers still have access to information through various sources, such as counseling by health workers, activities

at integrated health posts (Posyandu), and prenatal checkups at health care facilities. Therefore, effective dissemination of information and education remains crucial to improving pregnant women's knowledge and compliance, regardless of their educational background or employment status.

The World Health Organization (2021) emphasizes that educational interventions for pregnant women are crucial in increasing awareness and adherence to iron supplementation during pregnancy, as part of efforts to reduce the risk of anemia and pregnancy complications [1].

Theoretically, knowledge is a crucial factor in shaping behavior. Good knowledge of the benefits of iron tablets, the risks of anemia during pregnancy, and their impact on maternal and fetal health will encourage mothers to be more disciplined in taking them as recommended. Mothers who understand that anemia can lead to premature birth, low birth weight, or complications during delivery will be more motivated to prevent these conditions by regularly taking iron tablets.

The results of this study align with research conducted in Gowa Regency, which showed that pregnant women with good knowledge were 3.2 times more likely to be compliant with iron tablet consumption than those with poor knowledge. A similar study by Suryani, T. (2019) in Palembang City found that adequate understanding of anemia and iron tablets significantly influenced pregnant women's compliance.[13]

However, a study conducted in East Lombok Regency also showed no significant relationship between knowledge and adherence to iron tablet use. The researchers assumed that even if mothers had good knowledge, adherence was still influenced by other factors such as nausea, side effects of iron tablets, tablet availability at health facilities, and family and environmental influences.[14]

These differences in results indicate that knowledge alone is not always sufficient to foster adherence; it remains a key foundation that needs to be supported by other internal and external factors, such as attitudes, family support, and accessibility to health services.

According to Lawrence Green (in his Precede-Proceed theory), knowledge is a predisposing factor that plays a crucial role in shaping a person's behavior. Knowledge influences how a person perceives the benefits of an action and the risks of not performing it. In this context, pregnant women who have good knowledge about the benefits of iron tablets and the dangers of anemia during pregnancy tend to be more motivated and aware of the recommended iron tablet consumption.

Based on the results of this study, it can be concluded that pregnant women's knowledge level is significantly related to their compliance with iron tablet use.

Therefore, improving pregnant women's knowledge through nutrition education, structured counseling, and mentoring by Health workers and cadres are crucial for preventing anemia during pregnancy.

b. The Relationship Between Attitudes and Iron Tablet Compliance in Pregnant Women

The results of a study of 85 pregnant women in the Puskesmas Samudera showed a significant relationship between maternal attitudes and compliance with iron tablet consumption, with a p-value of 0.012 ($p < 0.05$). This indicates that pregnant women's attitudes statistically influence compliance with iron tablet consumption.

All respondents with positive attitudes (23 respondents, or 27.1%) were compliant. Conversely, 62 respondents (72.9%) with negative attitudes were non-compliant with iron tablet use. These findings indicate that pregnant women with a positive attitude toward the benefits of iron tablets tend to comply with recommendations to take them regularly. This suggests that attitude is a robust direct determinant of adherence to iron tablet consumption.

These results emphasize that efforts to increase knowledge alone are insufficient without changing pregnant women's attitudes toward iron tablet consumption. Health education delivered by healthcare professionals must address both the cognitive and affective aspects of the mother, not only providing information but also building confidence and commitment to maintaining her health and that of her fetus.

According to Green and Kreuter's theory in the Precede-Proceed model, attitudes are among the predisposing factors that can influence health behavior. Attitude is a readiness or tendency to act, shaped by a person's knowledge, experience, and beliefs about something. In this context, pregnant women who believe that iron tablets are essential for their health and that of their fetus and that they are safe to consume will be more motivated to comply with the recommended intake.[15]

The research team assumed that a pregnant woman's positive attitude towards the importance of taking iron tablets would increase her compliance with taking the supplements regularly and as recommended. This attitude encompasses the mother's belief in the benefits of iron tablets, trust in health professionals' recommendations, and willingness to cope with minor side effects such as nausea or constipation.

Attitude is a crucial component in shaping behavior. According to the Health Belief Model (HBM), a person will engage in a health behavior if they perceive its benefits and believe that the

action will lead to positive health outcomes.

This assumption is supported by Utami's research in Wonogiri (2019), who found that pregnant women with positive attitudes toward iron tablet consumption were more likely to be compliant, with a p-value <0.05. [16]

The results of this study align with findings from Wonosobo Regency, which showed a significant relationship between attitude and adherence to iron tablet use. The study stated that mothers with positive attitudes were twice as likely to adhere to the regimen as those with negative attitudes. [11]

However, some studies do not show a significant relationship between attitude and adherence. One example is a study at the Ngadiluwih Community Health Center in Kediri. The study found that although most mothers had positive attitudes, adherence remained low. This is suspected to be due to other barriers, such as nausea, side effects of iron tablets, or forgetfulness, which can cause mothers to be non-compliant despite positive attitudes.

These differences in results indicate that attitude does play a significant role. Still, it must be accompanied bystrengthening external factors, such as ongoing education, health worker mentoring, and the elimination of physical and psychological barriers to the use of FE tablets. Pregnant women's attitudes significantly influence adherence to iron tablet use in the Samudera Aceh Utara Community Health Center (UPTD) work area. Therefore, efforts to improve adherence need to be directed not only at increasing knowledge but also at developing and strengthening positive attitudes through educational, motivational, and supportive approaches from healthcare workers and the surrounding community.

CONCLUSION

Based on the results of the discussion above, the researcher can conclude that: 1) Knowledge is related to the compliance of pregnant women in consuming Fe tablets in the work area of Samudera Health Center in 2025, with a p-value = 0.002 ($p < 0.05$). 2) The attitude of pregnant women is related to compliance in consuming Fe tablets, and the p-value is 0.012 ($p < 0.05$).

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CONFLICT OF INTEREST

There is no conflict of interest in this research.

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