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# 1 The Correlation Between Pregnant Women Knowledge Level, Perception, and Compliance With Ferrous Fumarate Tablet Consumption in a Primary Health Care Institution

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## ABSTRACT

Anemia in pregnancy is one of the causes of death in pregnant women. Approximately, 41.8% of anemia cases occurred in pregnant women, with the highest prevalence rate of 61.3% in the African region and 52.5% in the Asian region. WHO states that 23% of anemia in pregnancy is caused by iron deficiency. The Public Health Office has promoted a program to treat anemia in pregnant women by providing iron supplements containing iron and folic acid. However, non-compliance in the consumption of these supplements is still a problem among pregnant women patients. This study aimed to determine the correlation between level of knowledge, perception, and compliance of pregnant women in consuming ferrous fumarate tablets in the Puskesmas Health Center (Puskesmas) Jetis 1, Bantul, Yogyakarta. This study used an analytic observational method with a cross sectional approach. The sample was selected using the consecutive sampling technique. Sixty respondents were recruited based on inclusion criteria. The inclusion criteria were pregnant women who had their pregnancy checked at Puskesmas Jetis 1 Bantul Yogyakarta, aged between 16-45 years, received ferrous fumarate supplements, were not deaf and not illiterate, and were cooperative. The data obtained from the questionnaire were analyzed univariately using the frequency distribution (proportion) test and bivariately using the Chi-Square test. The results of the analysis showed that 43 (71.7%) respondents had a good level of knowledge, 29 (48.3%) respondents had a positive perception, and 39 (65.0%) respondents complied with the ferrous fumarate consumption. The correlation between knowledge level and compliance with ferrous fumarate consumption showed  $p = 0.002$ ;  $OR = 6.05$ ;  $CI = 95\% (1.79-20.51)$ . The correlation between perception and compliance with ferrous fumarate consumption showed  $p = 0.935$ ;  $OR = 1.05$ ;  $CI = 95\% (0.36-3.02)$ . In conclusion, the results of this study indicated that there was a significant correlation between the respondents' level of knowledge and level of compliance with ferrous fumarate tablet consumption.

**Keywords:** anemia, pregnancy, compliance, knowledge, perception.

## 1. INTRODUCTION

Anemia in pregnancy is a hematocrit (Ht) level, Hb concentration or erythrocyte count which is below the "normal" limit,  $<11\text{g/dl}$  <sup>(1)</sup>. Based on WHO estimates, about 10% of live births experienced postpartum hemorrhage complications, and 52% of pregnant women in developing countries experience anemia <sup>(2)</sup>.

The Riskesdas (Health Research) data in 2018 revealed that 48.9% of pregnant women suffered from anemia. The anemia incidence in pregnant women is tremendously associated with iron intake during pregnancy <sup>(3)</sup>. Other causes of anemia in developing countries consist of inadequate iron, infectious disease factors such as malaria, worms, diarrhea, HIV/AIDS, and other infectious diseases, genetic diseases (sickle cell

anemia and thalassemia), hemorrhage during childbirth, blood loss, heavy menstruation, and the pregnancy proximity <sup>(4)</sup>.

In 2018, the number of pregnancies in Indonesia reached 5,291,143, in which 59,612 (1.13%) pregnant women were from Yogyakarta <sup>(5)(6)</sup>. Based on Riskesdas data in 2018, 48.9% of pregnant women in Indonesia suffered from anemia and 15.21% of the cases were discovered in Yogyakarta. Bantul Regency ranked third for pregnancy anemia, which was around 15.18% <sup>(7)</sup>.

The majority of anemia in pregnancy was because of iron deficiency (iron deficiency anemia) <sup>(8)</sup>. During pregnancy, there is a twofold increase in iron

requirements due to the increased blood volume to meet the mothers' needs (preventing blood loss during childbirth) and fetal growth<sup>(9)</sup>. Food intake is not always sufficient to meet iron requirements in pregnancy. Hence, the provision of iron supplements in tablet form can be an alternative to prevent anemia in pregnant women.

Based on Riskesdas data in 2018, it is presented that 73.2% of pregnant women in Indonesia were provided with iron tablets. The provision of iron supplements in Indonesia is a program of the government which objective is to reduce the prevalence of anemia among pregnant women. This supplement contains iron (Fe) and folic acid<sup>(9)</sup>.

However, the program effectiveness is still considered insignificant, which is indicated by the high rate of anemic risk among pregnant women in Indonesia. This condition led to increasing the perinatal mortality incidence, maternal mortality and morbidity, and hemorrhage during childbirth which is considered as the main cause (28%) of maternal mortality in Indonesia<sup>(9)</sup>.

Some previous studies explain that the failure of the government's iron supplementation program was influenced by several factors which consist of low compliance with the iron supplementation consumption, side effects of the tablets (e.g. gastro-intestinal disorders), the iron tablet dosage, and lack of communication and counseling with health workers<sup>(10)</sup>.

The main factor affecting the ineffectiveness of the iron tablet consumption program on pregnant women was due to the low level of adherence to these supplements consumption. The low compliance level was due to perceptions of pregnant women who are not well informed about the intended use of iron tablets or about the decreased quality of life because of the absence of the iron supplement consumption<sup>(11)</sup>. Ridwan in Indriyani (2013) asserted that the iron low intake in pregnant women is partly due to low knowledge which leads them to possess a negative perception of iron tablets. The knowledge level determines whether a person is easy to absorb and understand the provided information<sup>(12)</sup>.

Research conducted outside the city of Yogyakarta presents that there is a correlation between the knowledge of pregnant women and iron tablets consumption<sup>(13)</sup>. It is also reported that pregnant women's perceptions have a correlation with iron supplement consumption compliance<sup>(14)</sup>. However, research related to factors which influence compliance with iron tablet consumption still needs to be developed, especially in Yogyakarta.

Therefore, based on the explanations elaborated in the previous sections, this study was designed to investigate the correlation between pregnant women level of knowledge, perceptions and compliance with ferrous fumarate tablet consumption in the Primary Health Center (Puskesmas) Jetis 1, Bantul, Yogyakarta.

## 2. METHOD

This study employed an analytic observational method with a cross sectional approach. The protocols used in this study was approved by Ahmad Dahlan University Research Ethics Committee (KEP UAD) with ethical clearance No:011904024.

### 2.1. Subject

The data were collected from pregnant women undergoing outpatient care at the midwifery clinic of Puskesmas Jetis 1, Bantul Yogyakarta. A total of 98 respondents were selected in this study, and 38 respondents were excluded due to the gestational age which was approaching the estimated day of childbirth and the rejection from the patient. The sample was selected using consecutive sampling technique. From 98 respondents, 60 people had agreed to the informed consent based on the inclusion criteria. The pregnant women meeting the inclusion criteria requirements were had their pregnancy checked at Puskesmas Jetis 1 Bantul Yogyakarta, aged 16-45 years, and had been receiving ferrous fumarate supplements, were not deaf and not illiterate, and were cooperative. The data were collected by interviewing the respondents using a questionnaire which had been tested for validation and reliability in the previous studies<sup>(15)</sup>. The data collected were in the form of respondent demographics, level of knowledge, perceptions, and patients' compliance. The data obtained from the questionnaire were analyzed univariately using frequency distribution (proportion) test and using the Chi-Square test for the bivariate analysis.

### 2.1. Validation of Instruments

Each question item in the questionnaire obtained a validity value of  $r > 0.36$ <sup>(15)</sup>. The reliability scores for level of knowledge, perception and compliance were 0.816, 0.638, 0.782, respectively (Cronbach alpha  $> 0.6$ )<sup>(15)</sup>. Thus, it can be implied that the questionnaire used in this study was valid and reliable.

## 3. RESULT AND DISCUSSION

### 3.1 Respondents' Demographic Characteristics

The respondents' demographic characteristics in this study were recorded in Table 1. The majority of the respondents were not at risk of iron-deficiency anemia (20-35 years) (85%), middle school graduates (grade  $\leq 12$ , no degree) (66.7%), and working either in a private or governmental sector (58.3%). The respondents' clinical characteristics showed that 73.3% of pregnant women were in the first to second pregnancy, and the majority of them (53.3%) were in the third trimester pregnancy.

**Table 1.** The Demographic and Clinical Characteristics of the Respondents (n=60)

Characteristic of the Respondents	Number of Respondents (n)	Percentage (%)
<b>Age</b>		
Not at risk (20-35 years)	51	85.0
At risk (<20 or >35 years)	9	15.0
<b>Education Level</b>		
≤ 12 years	40	66.7
> 12 years	20	33.3
<b>Occupation</b>		
Not working (Housewives)	25	41.7
Working (private, government)	35	58.3
<b>Gravida</b>		
≤ 2	44	73.3
>2	16	26.7
<b>Pregnancy Age</b>		
Trimester 2	28	46.7
Trimester 3	32	53.3

**Table 2.** The Respondents' Level of Knowledge, Perception and Compliance with Iron Supplement Consumption (n=60)

Variable	Number of respondents (n) N=60	(%)
Level of Knowledge ( $\bar{x}$ = 79.83)		
Good	43	71.7
Poor	17	28.3
Perception ( $\bar{x}$ = 30.65)		
Positive	29	48.3
Negative	31	51.7
Level of Compliance ( $\bar{x}$ = 68.17)		
Compliant	39	65.0
Non compliant	21	35.0

**Table 3.** The Responses of the Pregnant Women to the Questionnaire's Items

Questionnaire Item	Correct answer	
	N	%
the definition of anemia	60	100.0
signs and symptoms of anemia	60	100.0
risk factors for pregnancy anemia	43	71.7
increased iron requirements during pregnancy	55	91.7
side effects of iron tablets	30	50.0
management of iron tablets' side effects	13	21.7
foods containing iron	59	98.3
how to consume iron tablets	57	95.0
bleeding during delivery due to anemia	54	90.0
monitoring or examination of hemoglobin/Hb levels in pregnant women	48	80.0

### 3.2. Level of Knowledge

The respondents' knowledge level, perception and compliance with iron supplement consumption was presented in Table 2. It is shown that the majority of the respondents had a good level of knowledge (71.7%), but had a negative perception (51.7%). However, 65% of the respondents showed compliance with iron tablet consumption.

The respondents' level of knowledge is shown in Table 3. The majority of the pregnant women had good knowledge about iron supplements. The majority of the pregnant women understood the definition of anemia and target Hb levels (100%), signs and symptoms of anemia (100%), risk factors for pregnancy anemia (100%), increased iron requirements during pregnancy (91%), risk of pregnancy anemia (90%), the importance of monitoring HB levels during pregnancy (80%), foods containing iron (98.3%), and the way to consume iron tablets (95%). Although the pregnant women were well-informed on the way to consume iron tablets (95%), half of them had no understanding on the side effects of iron tablets (50%), and the management of the side effects (21.7%). (95%). Although the pregnant women were well-informed about how to consume iron tablets (95%), half of them had no understanding of the side effects of iron tablets (50%), as well as the management of the side effects (21.7%).

### 3.3. Perception

Based on Table 2, the majority of the respondents (31 women) had a negative perception (51.7%) (<30.65), while the other 29 (48.3%) respondents had a positive perception (≥30.65) on the iron supplement consumption. The respondents' perceptions are presented in detail in Table 4.

Based on the responses of pregnant women presented in Table 4, it is clear that the majority of pregnant women were quite anxious about anemia in pregnancy (60%). They realized that pregnancy anemia harm both mother and fetus (61.7%). The majority of pregnant women strongly agreed with the iron supplements use to prevent anemia in pregnancy(50%). More than half (63.3%) of the pregnant women stated that regular consumption of iron supplements could reduce the anemia symptoms in pregnancy. However, the pregnant women were not aware of the iron supplement side effects (55%) or how to consume iron supplements, which should be once a day or consumed with tea. However, the pregnant women agreed that family support was important, especially in reminding and motivating them to consume iron supplements regularly. The pregnant women also asserted that it was important to increase their iron intake by consuming foods containing high iron (53.3%).

**Table 4. The Respondents' Perceptions of Iron Supplements**

No	Statement	Strongly agree	agree	disagree	Strongly disagree
		n (%)	n (%)	n (%)	n (%)
1	Having anemia during pregnancy is not a serious problem.	5 (8.3)	5 (8.3)	36 (60.0)	14 (23.3)
2	Anemia during pregnancy can harm both the mother and the fetus.	37 (61.7)	22 (36.7)	0 (0.0)	1 (1.7)
3	The consumption of iron supplements/tablets can prevent anemia in pregnancy.	30 (50.0)	30 (50.0)	0 (0.0)	0 (0.0)
4	The need for iron in pregnant women is less than in non-pregnant women.	0 (0.0)	8 (13.3)	40 (66.7)	12 (20.0)
5	The regular consumption of iron supplements/tablets can prevent weakness, fatigue, and headaches during pregnancy.	19 (31.7)	38 (63.3)	2 (3.3)	1 (1.7)
6	The consumption of iron supplements/tablets can cause side effects such as nausea and vomiting.	4 (6.7)	22 (36.7)	33 (55.0)	1 (1.7)
7	The consumption of tea can reduce discomfort (nausea and vomiting) when taking iron supplements/tablets.	4 (6.7)	19 (31.7)	37 (61.7)	0 (0.0)
8	Taking one iron tablet per day at night or day results in the same effect.	2 (3.3)	33 (55.0)	23 (38.3)	2 (3.3)
9	Family can play an important role in reminding the importance of taking iron supplements/tablets during pregnancy.	25 (41.7)	33 (55.0)	2 (3.3)	0 (0.0)
10	Anemia (iron deficiency) can be overcome by eating foods that contain iron (spinach, beans, and beef).	27 (45.0)	32 (53.3)	1 (1.7)	0 (0.0)

**3.4. The Correlation between Level of Knowledge, Perception and Compliance with Iron Supplement Consumption**

The correlation between the respondents' level of knowledge, perception and compliance with iron supplement consumption was presented in table 5. The statistical test result presents a significant correlation between the knowledge level and the compliance level with ferrous fumarate tablet consumption (p-value=0.002 <0.050; OR=6.05; CI=95% (1.79-20.51). The p value <0.050 indicates that there was a significant correlation between the level of knowledge and compliance with ferrous fumarate tablet consumption. OR 6.05 shows that the level of knowledge had a 6.05x chance of influencing patient adherence to consume ferrous fumarate tablets.

The result of Chi-Square bivariate statistical test shows p=0.935 > 0.050; OR=1.05; and CI=95% (0.36-3.02). It is implied that there was no significant correlation between the level of perception and adherence to compliance with ferrous fumarate tablet consumption (p> 0.050). The Odds Ratio (OR) value is not significant because there was no correlation between the two variables.

Furthermore, the correlation between knowledge and perception shows p value greater than 0.05 p=0.774; OR=0.775; CI=95% (0.276-2.612). This result also indicates that there was no significant correlation between the level of knowledge and perception.

**4. DISCUSSION**

Previous studies have shown that the ineffectiveness of the iron tablet supply program on pregnant women is influenced by the low level of patient compliance with iron supplement consumption. Low level of compliance may result from the negative perception of pregnant women who are not well informed about the purpose of using these tablets or about a decrease in quality of life due to the absence of the iron supplement consumption (11). Besides level of compliance, level of knowledge can also affect the success of the therapy. Level of knowledge determines whether a person is able to absorb and understand the information provided easily. The results of the questionnaire survey in this study indicated that the majority of pregnant women (71.7%) had good knowledge about anemia in pregnancy and iron supplementation during pregnancy (11).

Level of knowledge referred to in this study was the respondents' understanding of the nutrition obtained during pregnancy. Level of knowledge affects the ability of a pregnant woman to receive information about iron intake. Low level of knowledge will have a negative impact on iron deficiency cases among pregnant women. The better the knowledge, the more information that can be absorbed by pregnant women regarding the benefits of Fe tablets during pregnancy. Level of knowledge can also affect the compliance of pregnant women in taking Fe tablets, in which pregnant women understand well the benefits of consuming Fe tablets during pregnancy (16).

This finding is in line with Wanjira Kamau et al, 2019 who found that 40.9% pregnant women had a high level

of understanding of iron and folic acid supplementation. It was further mentioned in the study that the majority of the respondents obtained information on iron supplementation from health services (63%), brochures (91%), or health workers in the community (87%). This suggests that pharmacists need to provide education and counseling to pregnant women regarding iron and folic acid supplementation<sup>(17)</sup>.

The description of the respondents' level of knowledge presented in Table 4 suggests that the majority of pregnant women are not well informed about the side effects of iron tablets. In similar fashion, previous research shows that pregnant women have low awareness of the side effects of ferrous tablets, and of how to control and prevent them. It was also stated that the majority of pregnant women stopped taking Ferro supplements due to side effects such as nausea, vomiting or gastro-intestinal disorders<sup>(17)</sup>. Workers regarding the use of Ferro tablets can increase the level of knowledge of pregnant women which in turn can increase their compliance with the consumption of iron supplements<sup>(10)</sup>.

One of the factors that can affect the knowledge of pregnant women regarding iron supplementation is visit to the Antenatal Care (ANC) unit in a primary health service institution. Gebremedhin, et al, 2014 mentioned in his research that 74.9% of pregnant women who regularly visited ANC (4 times) or often received education related to iron supplementation had a high level of compliance<sup>(10)</sup>.

The level of knowledge of iron supplementation affects the duration of iron consumption among pregnant women<sup>(10)</sup>. Gebremedhin, et al, 2014 found that consumption of iron tablets for 90 days can increase hemoglobin (Hb) levels in pregnant women by 0.23g/dl.

More than twenty five percent (8.3%) of pregnant women in this study had a low level of knowledge. However, half of these pregnant women (50%) were aware of the side effects of iron tablets. It can be concluded that, pregnant women need to be educated about the use of iron tablets. Previous research has suggested that the presence of iron supplement side effects can be a barrier to the pregnant woman's compliance with iron supplement consumption<sup>(10)</sup>. The side effects of iron tablets are the main reason of why many pregnant women stop taking iron tablets during pregnancy. Therefore, pharmacy education and counseling regarding the use of iron tablets to prevent anemia in pregnant women need to be done.

Compliance with the consumption of iron tablets is also influenced by the level of perception of pregnant women<sup>(18)</sup>. Many pregnant women believe that taking iron tablets can reduce the risk of anemia during pregnancy<sup>(19)</sup>. Table 2 showed that 51.7% of pregnant women had a negative perception related to anemia and

iron supplementation during pregnancy. Furthermore, it was found that the majority of the pregnant women were worried about anemia in pregnancy (60%). They realized that anemia during pregnancy could harm both the mother and the fetus (61.7%). This is in line with the research conducted (Nivedita and Fatima (2016), stating that pregnant women are at risk of anemia that can affect the baby. It was further mentioned that besides consuming iron tablets, pregnant women should also need to get more nutrition from iron-rich foods.<sup>(18)</sup>

Pregnant women's various perceptions of iron tablet consumption are influenced by various kinds of driving factors, including maternal knowledge about Fe tablets, the benefits felt by the pregnant women after taking Fe tablets, recommendations from health workers, and encouragement from the family members<sup>(19)</sup>. This study also revealed that pregnant women felt it was important to get support from their families, especially to remind and motivate them to consume iron tablets. The pregnant women also felt that it was important to get iron intake from food to meet their iron needs during pregnancy (53.3%).

Compliance with iron tablet consumption among pregnant women is shown through regular consumption of iron tablets for at least 90 days (Anonymous, 2013). Table 2 showed that the majority of the respondents of this study (65%) had a high level of compliance with the consumption of iron tablets. The results of the statistical test showed that level of knowledge of pregnant women had a 6.05x chance of influencing their adherence to consuming ferrous fumarate tablets ( $p$ -value =  $0.002 < 0.050$ ; OR=6.05; CI=95% (1.79-20.51)). This is consistent with the results of the studies conducted by<sup>(10)</sup> Gebremedhin, et al, 2014,<sup>(17)</sup> Wanjira Kamau et al, 2019. Pregnant women with higher levels of knowledge are more compliant with iron tablet consumption than pregnant women with lower levels of knowledge<sup>(21)</sup>.

Unlike the results of the previous studies, the majority of respondents in this study had negative perceptions regarding anemia and consumption of iron tablets (51.7%). The results of the statistical tests further confirmed that there was no correlation between the level of perception and adherence to consuming ferrous fumarate tablets ( $p > 0.050$ ). The OR value was not significant because there was no correlation between the two variables ( $p = 0.935 > 0.05$ ); OR = 1.05; and CI = 95% (0.36-3.02)). This is not in line with the results of research by Wulandari and Indriyani (2013) which state that there is a correlation between the perception of pregnant women about the incidence of anemia and compliance with taking iron tablets. It was stated that the perceptions of pregnant women regarding iron deficiency anemia and iron and folic acid supplementation are the only significant predictors of their compliance with iron and folic acid supplementation. However, according to the health belief model theory, someone who has the

belief that he or she is likely to get sick will be more interested in taking precautions<sup>(22)</sup>. Likewise, research by Gowri, Sakthi, and Palanivel (2017) showed that 62% of 599 pregnant women experienced anemia and pregnant women who had no concern about hemoglobin levels were at a higher risk of becoming anemic<sup>(23)</sup>. Negative perceptions about iron supplements and the absence of counseling from health workers are predicted to be the factors that influence the pregnant women non-adherence to iron supplementation.

## 5. CONCLUSION

The results of this study indicated that level of knowledge determined the level of compliance of pregnant women with iron tablet consumption. Therefore, pharmacists should provide education and counseling for pregnant women regarding the side effects of iron tablets and how to deal with them. In conclusion, knowledge of iron supplementation affects pregnant women compliance with iron tablet consumption.

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