Journal of Creativity Student
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The Influence of Main Reasons for Not Taking IFA Tablets on Adherence to ≥ 90 Tablet Consumption Among Pregnant Women

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Abstract
Anemia during pregnancy is still a public health problem in Indonesia that affects mothers and babies. The government has implemented a supplementation program for iron tablets (IBT) to prevent anemia, but the compliance of pregnant women with these tablets is still low. Various factors, such as lack of awareness, side effects, and mothers' perceptions of the importance of IBT, contribute to low compliance rates. This study analyzes the impact of the main reasons for not taking IBT on the number of tablets consumed during pregnancy based on data from the 2023 Indonesian Health Survey (SKI). This study used an analytical cross-sectional study design with secondary data from the 2023 Indonesian Health Survey. The independent variable was the main reason for not taking IBT, while the dependent variable was the number of tablets consumed during pregnancy (≥90). Data analysis was performed using correlation and regression. The results showed that the main reasons for not taking IBT were forgetting (30.39%), nausea/vomiting due to pregnancy (21.57%), bad taste and smell (12.60%), and side effects (12.57%). Most pregnant women did not reach the recommended consumption amount, with 60.37% consuming less than 90 tablets. The reason with the most significant influence on compliance was "not yet up to the end of time" ($R=0.344$, $R^2=0.117$, $p=0.030$). The main factors influencing compliance of pregnant women in consuming iron tablets were perception of the need for supplements, side effects, and lack of awareness. Increasing education, social support, monitoring strategies, and reminders for consumption are needed to improve pregnant women's compliance with iron tablets to reduce the incidence of anemia in Indonesia.

Keywords: pregnancy anemia, iron supplement tablets, compliance, Indonesian Health Survey

INTRODUCTION

Anemia during pregnancy remains a significant global public health problem, with varying prevalence rates across regions and countries. The World Health Organization (WHO) estimates that anemia affects around 40% of pregnant women worldwide. The leading cause of anemia during pregnancy is iron deficiency due to the body's increased need for iron to support fetal development and maintain maternal health. One of the global targets set by the Sustainable Development Goals (SDGs) is to significantly reduce maternal mortality by improving access to and quality of maternal health services, including anemia prevention. SDG 3 aims to improve health and well-being for all, with one of its primary targets being to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (1). Anemia is identified as a direct cause of maternal death in around 20% of cases and contributes indirectly to the remaining 50% of maternal deaths. This makes anemia the leading indirect cause of maternal death after hemorrhage and hypertensive disorders (2).

The global prevalence of anemia in pregnant women was reported to be around 36% in 2019. This figure shows a slight decrease from 41% in 2000 (3). Anemia in women of reproductive age, especially pregnant women, is a significant public health problem, especially in developing countries. WHO estimates that around 41.8% of pregnant women worldwide are anemic, with the highest prevalence in Sub-Saharan Africa (57.1%), followed by South Asia and West Africa. Anemia in pregnancy can cause various complications, including premature birth, low birth weight, and increased

risk of maternal and infant mortality. In Ghana, the prevalence of anemia in pregnant women ranges from 29% to 70%, with the highest rates found in rural areas (4,5).

Anemia in pregnant women is still a health problem in West Java, with the number of cases fluctuating. 2015, there were 53,432 cases, increasing to 85,826 cases in 2019 before decreasing to 63,246 cases in 2020. In Kuningan Regency, the highest cases of anemia occurred in 2016, namely 5,611 cases, then reduced to 2,871 cases in 2020. The decrease in the incidence of anemia was due to health interventions such as iron supplementation and nutritional education. Even so, anemia in pregnant women remains a concern because of its impact on the mother and baby, so prevention efforts must continue to be strengthened (6).

The Indonesian government has implemented a program to provide at least 90 iron tablets during pregnancy to prevent anemia. However, even though this program has been running, the level of compliance of pregnant women in consuming iron tablets is still relatively low. Based on data from the 2023 Indonesian Health Survey (SKI), pregnant women's compliance with consuming Iron Supplement Tablets (TTD) is still relatively low, both at the national level and in West Java Province. Nationally, only 44.0% of pregnant women received ≥90 tablets during pregnancy, and even lower, namely 36.8%, who consumed them according to recommendations. In West Java, the compliance rate is slightly higher than the national average, with 44.4% of pregnant women receiving ≥90 tablets but only 37.5% consuming them. Various pregnant women consuming TTD, among others, feel it is not necessary because they already feel healthy, forget to consume it regularly, do not like the taste and smell of the tablet, experience nausea or vomiting after consuming, and feel side effects such as dizziness and digestive disorders, pregnant women also consider this tablet as a medicine, so they hesitate to consume it regularly, have not had time to finish the stock given or feel bored. This low compliance shows that there are still challenges in implementing the iron supplementation program for pregnant women, both in terms of distribution and compliance with consumption, which need to get more attention to reduce the number of anemia in pregnant women in Indonesia (7).

Studies on maternal compliance with iron supplementation show variation by location and influencing factors. A study in South India found that compliance with iron and folic acid (IFA) tablets was 64.7%, with factors that increased compliance including older age, higher order of pregnancy, and single daily dosing. In contrast, the main reasons for non-compliance were forgetting to take tablets, side effects such as nausea and constipation, and lack of understanding of the importance of the supplement. In the Philippines, a study showed that although 85% of pregnant women reported taking iron supplements, checking the number of tablets remaining showed a lower compliance rate of approximately 70%. Factors contributing to higher compliance included earlier antenatal visits, understanding of the supplement's health benefits, and positive perceptions of the health program, while side effects and unpleasant taste of the supplement were barriers (8). A study in Ethiopia showed that only 38.3% of pregnant women adhered to supplementation, with the main factors influencing compliance being knowledge of the importance of supplementation and experience of side effects in previous pregnancies (9). A randomized trial in the UK by Stanworth et al. (2024) found that iron supplementation adherence in pregnant women without anemia tended to be higher in the alternate-day (62%) and thrice-weekly (61%) regimens compared to the daily dose (47%), mainly due to side effects and missed tablets. Side effects such as nausea, constipation, and black stools were more frequently reported in the daily group, although these symptoms are also common in pregnancy itself. Interestingly, despite lower adherence, the daily group experienced a minor decrease in hemoglobin levels compared to the other groups, suggesting potential clinical benefit if tolerance could be improved. This study emphasizes the importance of dose adjustment, understanding of risk-benefit, and educational and structural support from the health care system to improve adherence and effectiveness of iron supplementation in pregnant women (10). A Canadian study comparing low and high iron supplementation showed that lower iron doses were better tolerated with lower constipation rates but still had similar effectiveness in increasing hemoglobin levels (11). Overall, these studies emphasize the importance of better education, appropriate dose selection, and support from the health system to improve maternal adherence to iron supplementation to prevent anemia and pregnancy complications.

A study by Ambarsari et al. (2023) at Tanah Kalikedinding Health Center, Surabaya, found that only 20.4% of pregnant women were compliant in consuming Fe tablets, and 63.3% of them experienced an increase in hemoglobin levels. In contrast, 70.6% of pregnant women who were not compliant experienced decreased hemoglobin levels, indicating that compliance in consuming Fe tablets is essential in preventing anemia in pregnant women (12). To increase compliance, providing

Fe tablet consumption monitoring cards effectively increases compliance by up to 20.8% and positively impacts hemoglobin levels (13). In addition, counseling by pharmacists and health workers can improve compliance in consuming Fe tablets by up to 8.6 times higher than without counseling (14). Therefore, an educational and monitoring approach is essential in reducing anemia rates in pregnant women.

The background above shows that anemia in pregnant women remains a serious health problem in various countries, including Indonesia. Although the government has implemented a supplementation program for Iron Tablets (TTD), pregnant women's compliance level is still relatively low, which can impact the health of mothers and babies. Various factors, such as lack of knowledge, perceived side effects, and the perception that anemia is not dangerous, contribute to the low consumption of iron tablets. Therefore, an in-depth analysis is needed regarding pregnant women's compliance with consuming iron tablets and the factors that influence it so that a more effective intervention strategy can be designed.

Based on this background, this study aims to analyze pregnant women's compliance in consuming iron tablets (IBT) in Indonesia based on data from the 2023 Indonesian Health Survey (SKI) and identify the factors contributing to this compliance. The results of this study are expected to provide recommendations for the government and health workers in increasing compliance with iron tablet consumption and reducing the incidence of anemia in pregnant women in Indonesia. All data used in this study comes from the 2023 Indonesian Health Survey (SKI) and will be processed using statistical software such as SPSS so that the analysis can be carried out accurately and systematically.

METHOD

This study used an analytical cross-sectional study design to analyze the effect of the main reasons for not taking iron tablets on the number of tablets consumed during pregnancy. The data used in this study came from the 2023 Indonesian Health Survey, which is secondary data. The variables used in this study consisted of independent variables, namely the main reasons for not taking iron tablets (Feeling unnecessary/not useful, Forgetting, Bad taste and smell, Nausea/vomiting due to pregnancy, Side effects, Considering it as medicine, Not yet over, Bored and others), dependent variables in the form of the number of iron tablets consumed ≥ 90 tablets during pregnancy. This study used secondary data from the 2023 Indonesian Health Survey. A national survey institution collected data through structured interviews with respondents using standard questionnaires. Data analysis used correlation and regression with the aim of a more comprehensive interpretation to determine how much influence there is between the main reasons for not taking iron tablets and the incidence of the number of iron tablets consumed ≥ 90 tablets during pregnancy.

RESULT & DISCUSSION

The following table presents the analysis results of the main reasons influencing pregnant women's compliance with consuming Iron Supplement Tablets (TTD) during pregnancy in 38 Provinces, based on data from the 2023 Indonesian Health Survey (SKI).

Table 1. Distribution of Main Reasons for Not Consuming Iron Supplement Tablets (TTD) and Compliance with Consumption of ≥ 90 Tablets During Pregnancy Based on Data from the 2023 Indonesian Health Survey

Variable	Mean	Median	SD	Minimal	Maximal	95% CI
Feeling unnecessary/useless	5.32	5.45	2.4683	0	10.1	4.51-6.13
Forgetting	30.39	27.80	11.9254	13.8	72.5	26.48-34.31
Unpleasant taste and smell	12.60	11.75	5.62567	3	26.6	10.75-14.45
Nausea/vomiting due to pregnancy	21.57	21.55	7.10456	2.3	43.4	19.23-23.90
Side effects	12.57	11.65	6.01327	1.8	31.9	10.60-14.55
Considering medicine	2.22	1.95	1.46572	0	5.7	1.74-2.71
Not yet finished	1.67	1.40	1.56762	0	7.5	1.15-2.18
Bored	8.86	8.40	3.99415	0.9	22.2_	7.55-10.17
other	5.30	5.40	2.90498	0.6	13.3	4.35-6.25
Taken ≥ 90 tablets	39.48	41.85	13.127	14.4	74.4	35.17-43.80

Data source: 2023 Indonesian Health Survey

Table 1 shows that the most dominant reason for pregnant women not taking TTD was forgetting, with an average of 30.39 and a 95% confidence interval of 26.48–34.31. Other reasons that

were quite often reported were nausea/vomiting due to pregnancy (21.57), unpleasant taste and smell (12.60), and side effects (12.57). Meanwhile, reasons such as not having finished the time and considering it as medicine had a lower average value. Regarding tablet consumption, most pregnant women who were not compliant consumed less than 90 tablets (average 60.37), while the group that consumed ≥90 tablets had an average of 39.48. In addition to analyzing the main reasons for not taking Iron Supplement Tablets (TTD), this study also evaluated factors influencing pregnant women's compliance with TTD. This analysis was conducted by looking at the relationship between various reasons and the level of compliance with TTD consumption during pregnancy, which is shown in Table 2.

Table 2. Analysis of the Influence of the Main Reasons for Not Consuming Iron Supplement Tablets (TTD) on Compliance with Consumption of ≥ 90 Tablets During Pregnancy Based on Correlation and Regression

Variable	R	R2	p-value	Persamaan Garis
Feeling unnecessary/useless	0.288	0.083	0.08	Y=47.622−1.529X
Forgetting	0.131	0.017	0.432	Y=43.873−0.144X
Bad taste and smell	0.122	0.015	0.466	Y=35.904+0.284X
Nausea/vomiting due to pregnancy	0.342	0.117	0.036	Y=25.872+0.631X
Side effects	0.05	0.002	0.766	Y=38.114+0.109X
Considering medicine	0.114	0.013	0.495	Y=41.757-1.022X
Not the time is up	0.344	0.118	0.34	Y=34.686+2.880X
Bored	0.249	0.062	0.132	Y=46.724-0.817X
Other	0.093	0.009	0.578	Y=41.716-0.421X

Data source: 2023 Indonesian Health Survey

Based on Table 2, the most influential reason for pregnant women's compliance in consuming Iron Supplement Tablets (TTD) is "Not yet finished", with R = 0.344, R^2 = 0.118, and p-value = 0.027. This shows that pregnant women who feel that their TTD has not run out tend to be less compliant in consuming tablets as recommended. In addition, other reasons such as "Feeling unnecessary/not useful" and "Bored" also have a fairly high relationship to compliance, with R = 0.288 and R = 0.249, although the p-value shows that this relationship is not statistically significant.

Meanwhile, reasons such as "Side effects" (R = 0.050) and "Others" (R = 0.093) have a very weak correlation to compliance with TTD consumption, which means that these reasons do not greatly influence pregnant women's decisions to consume tablets. Overall, the results of the analysis showed that the main factors influencing pregnant women's compliance in consuming TTD were the perception that the tablets were still available or had not run out, as well as the lack of awareness of the benefits of TTD during pregnancy. Therefore, educational efforts and increasing awareness of the importance of consuming TTD regularly are needed to improve pregnant women's compliance.

Discussion

The results of this study indicate that the main factors that cause pregnant women not to consume Iron Supplement Tablets (TTD) are forgetting (30.39%, R=0.131, R^2=0.017, p=0.432), nausea/vomiting due to pregnancy (21.57%, R=0.312, R^2=0.097, p=0.046), unpleasant taste and smell (12.60%, R=0.122, R^2=0.015, p=0.466), and side effects felt (12.57%, R=0.050, R^2=0.002, p=0.766). In addition, other reasons such as feeling unnecessary (5.32%, R=0.288, R^2=0.083, p=0.080), considering TTD as a medicine (2.22%, R=0.131, R^2=0.013, p=0.495), not having finished the time (1.67%, R=0.344, R^2=0.117, p=0.030), and being bored (8.86%, R=0.249, R^2=0.062, p=0.132) also influenced the compliance of pregnant women in consuming TTD. Most pregnant women in this study did not reach the recommended amount of TTD consumption, which is a minimum of 90 tablets during pregnancy, with only 39.48% of pregnant women being compliant. In comparison, the other 60.37% consumed less than 90 tablets.

This finding is in line with research conducted by Kody et al. (2021) in Indonesia, which showed that the level of compliance of pregnant women with iron supplement consumption was still low, with only 2.9% of pregnant women having high compliance, while 69.6% showed low compliance. In this study, no significant relationship was found between maternal perception of anemia and the level of compliance with iron supplement consumption, indicating that even though mothers understand anemia, they are still non-compliant in consuming iron supplements (15). In addition, a study by Debbarma et al. (2022) in India found that 25% of pregnant women were non-compliant in consuming iron and folic acid supplements. The main factors causing non-compliance were unpleasant taste, side effects, and insufficient supply. This study also showed that pregnant women with a better

understanding of the benefits of supplements tended to be more compliant in consuming iron supplements (16).

Another study conducted in Senegal by Seck & Jackson (2007) also showed that 42% of pregnant women had low compliance with iron and folic acid supplementation. The main factors causing low compliance were forgetfulness, gastrointestinal side effects, and lack of education from health workers regarding the supplement's benefits (17). The results of this study indicate that the level of compliance of pregnant women with iron supplementation at the Gynecology-Obstetrics and Pediatric Hospital in Yaoundé is still relatively low, with more than half of the participants (56%) not complying with consumption recommendations. This high level of non-compliance is in line with other studies that identify significant factors, such as forgetting to take supplements, side effects, and limited access to supplements, as the main obstacles to pregnant women's compliance with iron supplementation. Forgetting to take tablets (70.1%) was the dominant factor, indicating the need for more effective reminder strategies, such as providing routine education and using assistive devices, such as technology-based reminders. In addition, side effects such as nausea and constipation (19.7%) also play a role in reducing compliance, which is similar to findings in various developing countries. Mothers who did not experience side effects were three times more likely to be adherent than those who did experience side effects, highlighting the need for more tolerable supplement formulations and education on managing potential side effects. Age was also a factor in adherence, with mothers aged 25 years and above more likely to be non-adherent than younger mothers (OR = 0.40; p = 0.02), which may be related to differences in priorities and health concerns during pregnancy. Therefore, more effective interventions, such as behavioral change communication, increased counseling during antenatal care, and greater availability of supplements, are needed to improve maternal adherence to iron supplementation to prevent anemia and pregnancy complications (18)

A study in India by Mithra et al. (2013) found that compliance with iron supplement consumption only reached 64.7%, with the main factors for non-compliance being forgetfulness and side effects. This study also highlighted that support from health workers and access to free supplements increased compliance with consumption (19); a study in Sri Lanka by Pathirathna et al. (2020) showed that although the level of compliance of pregnant women with iron and folic acid supplementation reached 80.1%, 66.9% of them still had difficulty in complying with consumption due to forgetfulness. Side effects such as nausea and digestive disorders were also major obstacles (20). Overall, the results of this study confirm that efforts to improve compliance with iron supplement consumption need to be carried out with a multidimensional approach, including increasing education for pregnant women, social support, and more effective strategies for dealing with side effects. Thus, the incidence of anemia in pregnant women can be minimized, which ultimately contributes to improving maternal and infant health.

CONCLUSION

The results of this study indicate that the compliance of pregnant women in consuming Iron Supplement Tablets (ITP) is still low, with the main factors of non-compliance being forgetfulness, nausea/vomiting due to pregnancy, unpleasant taste and smell, and side effects. Social factors, education, and perceptions of the benefits of supplements also significantly influence pregnant women's compliance. Therefore, a more effective approach is needed to increase the consumption of ITP to prevent anemia in pregnant women. To improve pregnant women's compliance with consuming Iron Supplement Tablets (ITP), a more effective approach is needed, such as increasing education, social support, reminder tools, and routine monitoring by health workers. These steps are expected to increase the awareness and compliance of pregnant women in consuming ITP so that it can reduce the incidence of anemia and improve the health of mothers and babies.

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