

Iron And Folic Acid Utilization Among Pregnant Women at Selected Jigjiga City Health Facilities, Jigjiga City Administration, Fafan Zone, Somali Regional State, Eastern Ethiopia

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Research Article

Keywords: Iron, Folic Acid Pregnant Women, Jigjiga, Fafan Zone, Somali Region, Ethiopia

Posted Date: May 21st, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-9428118/v1>

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Additional Declarations: No competing interests reported.

Abstract

Background

Iron and folic acid are essential nutrients that play crucial roles in maintaining health, especially for pregnant women, and their deficiencies during pregnancy place women at risk for poor pregnancy outcomes. Anemia caused by iron and folic acid is a public health concern, particularly in sub-Saharan Africa, including Ethiopia. However, limited information is known about iron-folic acid utilization among pregnant women in our setup.

Objective

This study aimed to assess iron and folic acid utilization among pregnant women attending at Jigjiga University, Sheikh Hassen Yabere Comprehensive Specialized Hospital, Jigjiga primary hospital, and Karamara General Hospital, Jijiga. Ethiopia, 2026.

Methods

A hospital-based cross-sectional study was conducted at Jigjiga University, Sheikh Hassen Yabere Comprehensive Specialized Hospital, Jigjiga primary hospital, and Karamara General Hospital from February 1 to March 30, 2026. A total of 408 pregnant women were interviewed. A pre-tested structured questionnaire was used to collect the data of this study by a simple random sampling method. The data completeness was checked out on a daily basis. Microsoft Excel was used for the data entry and analysis. Descriptive statistics were computed. Tables, graphs and charts, as well as concise written explanations to highlight key patterns were presented the findings of the study.

Results

In this study, 408 pregnant women were participated, with 97.6% response rate. The magnitude of utilization iron-folic acid among pregnant women was 57.4%, with 95% CI of 52.0–62.5. The age of majority of participants 154 (37.7%) in this study were between 22–26 years of age with a mean and standard deviations of 28.75 (± 7.04 SD). Regarding the educational status, only 21.1% of the respondents were diploma or higher, while around one-third 128 (31.4%) and one-fourth 106 (21.1%) of the participants were primary and secondary levels respectively.

Conclusion

The utilization rate of iron-folic acid supplementation during pregnancy in the study area was relatively low. Early antenatal care follow-up increases pregnant woman's inclination to use iron-folic acid. The

absence of adverse reactions can play a crucial role in promoting adherence to iron-folic acid. Healthcare providers and policymakers should focus on targeted interventions to raise awareness about the benefits of timely antenatal care and iron-folic acid utilizations. Additionally, they should prioritize educating pregnant women on the potential side effects of iron-folic acid utilizations and provide guidance on managing these adverse reactions. Furthermore, invest in research to explore additional factors influencing iron-folic acid utilization among pregnant women.

INTRODUCTION

Iron and folic acid are two essential nutrients that play a critical role in the health of pregnant women and the development of their fetuses (1). The utilization of these nutrients is particularly important during pregnancy due to the increased physiological demands placed on a woman's body as it supports fetal growth and development (2).

Iron is crucial for the synthesis of hemoglobin, the protein in red blood cells that carries oxygen throughout the body. During pregnancy, a woman's blood volume increases significantly by approximately 30% to 50% to accommodate the growing fetus. This increase necessitates higher iron intake to prevent iron deficiency anemia (3). Folic acid, also known as vitamin B9, is vital for DNA synthesis and cell division. It plays an especially important role in early fetal development (4). Adequate folic acid intake before conception and during early pregnancy has been showed to reduce the risk of neural tube defects (NTDs) such as spina bifida and anencephaly (5).

The World Health Organization (WHO) and The American Congress of Obstetricians and Gynecologists (ACOG) recommend that pregnant women receive supplementation with both iron and folic acid as part of routine prenatal care. The typical recommendation includes daily supplementation with 30–60 mg of elemental iron and 400 µg (0.4 mg) of folic acid starting from early pregnancy through at least the first trimester to prevent maternal Anemia, puerperal sepsis, low birthweight, and preterm birth (7, 8).

Iron and folic acid deficiency is a worldwide public health concern, particularly in low- and middle-income countries (2). According to the 2019 Lancet of Global Health Metrics report, anemia is estimated to affect 37% of pregnant women aged 15–49 years were anemics because of Iron and folic acid deficiency, and the vast majority of anemic pregnant women are in Africa (17). Iron deficiency, primarily due to inadequate dietary iron intake, is considered the most common nutritional deficiency leading to anemia. Deficiencies in other micronutrients including Folate Acid, can also result in anemia due to their specific roles in the synthesis of hemoglobin and/or erythrocyte production (18).

According to a 2015 WHO report, around 830 women die every day from preventable causes related to pregnancy (approximately 40% due iron IDA) and delivery around the world with poor and lower middle income countries accounting for 95% of all maternal deaths.(20).According to the latest World Health Statistics report, maternal death rates in low-income nations are 29 times greater than in high-income countries, with one woman dying from maternal causes for every 41 women (21).

In 142 countries around the world, anemia caused moderate to severe public health consequence (3). Anemia is prevalent in around 41.8 percent of pregnant women worldwide, including 24.1 percent in America, 48.2 percent in Southeast Asia, 25.1 percent in Europe, 44.2 percent in East Mediterranean, 30.7 percent in West Pacific, and 57.1 percent in Africa (22). In Ethiopia, 29% of pregnant women suffer from anemia (23).

Iron-deficiency anemia (IDA) is one of the most common nutritional deficiencies during pregnancy (24). Pregnant women with IDA are at a higher risk of severe fatigue and life-threatening complications during labor. It can also result in low birth weight, preterm delivery, and developmental delays (20). In severe cases, iron deficiency can contribute to maternal mortality rates due to complications such as hemorrhage or infection during childbirth (25, 26).

METHODS

Study design, area and period

A hospital-based cross-sectional study was conducted at Jigjiga city selected Hospitals. Jigjiga is the capital city of the Somali regional state located in Fafan zone, and 626 kilometers away from Addis Ababa, the capital city of Ethiopia. Jigjiga has an elevation of 1,609 meters above sea level. Jigjiga is the most populated and largest settlement in the Somali regional state. Jigjiga is the most populous and largest settlement in the Somali region. According to the headcount that was implemented from 29 August to September 5, 2024, Jigjiga City's population is estimated to be 618,359.

The overall health-care system was three hospitals (one Specialized comprehensive Referral Hospital, one general and primary), four health centers, five Health posts, and around 18 medium and higher private clinics. This study was conducted at three main hospitals (Jigjiga University Specialized Comprehensive Referral Hospital, Karamara General Hospital, and Jigjiga Primary Hospital) located in Jigjiga city from February 1 to March 30, 2026.

Population

All pregnant women who use the health care services at Jigjiga University Specialized Comprehensive Referral Hospital, Karamara General Hospital, and Jigjiga Primary Hospital and have ANC follow-up in Jigjiga city were source population of the study. The Study population consisted of pregnant women having a pregnancy ≥ 3 months who were found at Jigjiga University Specialized Comprehensive Referral Hospital, Karamara General Hospital, and Jigjiga Primary Hospital during the study period

Eligibility criteria

All women having a pregnancy ≥ 3 months, who are available at the Hospitals and have ANC follow-up during the study period were included in our study but Those pregnant women having GA less than 3

months, those who were mentally ill or sick and/or unable to respond at the time of data collection, and those who are not willing to participate or refused to give consent were excluded from this study.

Study variables

The Iron and Folic Acid utilization was the dependent variables of the study, while Socio-demographic related variables Sex, Age, Occupation, Marital status, educational status, Occupation, ANC follow up, TD vaccination were the predictor variables.

Sample size determination and sampling technique

Sample size was calculated by using single proportion formula by taking a finding of a study that reported a 54.9% prevalence of IFA tablets utilizations among pregnant women attending antenatal care in public hospitals in Jigjiga Town, Somali Region, Eastern Ethiopia (43), and adding 5% non-respondent rate, by using 95% confidence interval (CI) and 10% margin of error (D).

Where Z = 95% confidence interval (1.96) of who used IFA tablets of a study

P= estimated prevalence rate of iron-folic acid utilization (54.9%)

D=margin of sampling error (0.05), and N=sample size.

$$N = \frac{(Z\alpha)^2 P(1-P)}{d^2} = N = \frac{(1.96)^2 * 0.549 (1 - 0.549)}{0.05^2} = 380 + 38 \text{ non-respondent rate}$$

The final sample size was 418

The calculated sample size was allocated proportionally to each selected hospital based on their estimated number of three-month visits by pregnant women: 850 in Jigjiga University Specialized Comprehensive Referral Hospital, 570 in Karamara General Hospital, and 205 in Jigjiga Primary Hospital. The number of samples in each selected hospital was determined by the proportional allocation method using the following formula: $n = \left(\frac{N1}{Nt} \right) \times nt$

where n is the sample size, N1 is the average number of pregnant women attending each hospital, Nt is the total number of pregnant women in all Hospitals, and nt is the determined sample size.

Therefore, 418 pregnant women (218 from the specialized Hospital, 147 from General Hospital and 53 from the primary Hospital) following ANC were included in the study.

Sampling Technique

To get the required 418 pregnant women who meet the inclusion criteria, a simple random sampling technique was used by selecting from the appointment list of family planning and EPI registration books. In case, a woman misses during the appointment, then the next women were selected from the appointment list

Sampling Procedure

Jigjiga city administration has three hospitals (one referral, one general and primary), four health-centers, five Health posts, and around 18 medium and higher private clinics. The three hospitals were selected for this study since they have high client load in the city.

Data Collection Techniques and Tools

Data was collected by using a structured and pre-tested questionnaire. The questionnaire contained information on demographic data, pregnant women-related questionnaire, and hospital related questionnaire. Interviewer interviewer-administered technique was used to collect data by four experienced health extension workers, trained by the investigator. The training includes techniques of interviewing and terminology. Data was collected from the hospital every day until the allocated number was attained.

Data collection procedure

Four BSc midwives, three data collectors, and one supervisor were recruited, and two days of training were given. The supervisor used to give supportive supervision to check data completeness. The data collection method was a face-to-face interview.

Data analysis

The completeness of the data was checked, cleaned entered to MS Excel and analyzed. Descriptive statistics were completed. Results were presented in text, tables, Chris and graphs.

Data quality control

A structured and pre-tested questionnaire was used to collect the data. The questionnaires were originally prepared in English, translated to Somali, and back to English to maintain consistency of the questionnaire and increase understanding with the respondents. Pretest was done on 5% of the sample in a similar setting other than the actual site. One day, training was given for data collectors by the investigator. Collected data was checked manually for completeness accordingly and reviewed and checked by the investigator and supervisor on the day of data collection and before data entry.

Operational definitions

Recommended IFA Utilization

this study refers to 30 mg to 60 mg of elemental iron and 400 mcg (0.4 mg) of folic acid taken one tablet daily for 90 days and above (7).

Below-recommended utilization

refers to taking IFA supplement less than 90 days during pregnancy time (7).

IFA receipt

Pregnant women received 30 mg to 60 mg of elemental iron and 400 mcg (0.4 mg) of folic acid during their antenatal care visit (7).

Adherence to 180 days of supplementation: refers to taking proper dosage of 180 tablets (29).

Ferrous Sulfate

30 mg elemental iron equal to 150 mg of ferrous sulfate.

RESULTS

Socio-demographic characteristics of Study Participants

This study, 408 pregnant women were participated, with a response rate of 97.6%. The age of majority of participants 154 (37.7%) in this study were between 22–26 years of age with a mean and standard deviations of 28.75 (± 7.04 SD). Regarding the educational status, only 21.1% of the respondents were diploma or higher, while around one-third 128 (31.4%) and one-fourth 106 (21.1%) of the participants were primary and secondary levels respectively.

The occupational status of the respondents' husbands, most of them 162 (39.7%) were governmental employees, followed by daily labor 112 (27.5%) and private employees 86 (21.1%). On the other hand, majority 170 (41.7%) of the house-holds' average monthly income was birr > 7000, while 95 (23.3%) of the house-holds' income was birr < 5000 (Table 1).

Table 1
Socio-demographic characteristics of pregnant women attending Jigjiga City
Health facilities, Fafan Zone, Somali Regional State, Eastern Ethiopia, 2025

Variable	Category	Frequency	%
Mother age in years	=<21	62	15.2
	22–26	154	37.7
	27–31	108	26.5
	>=32	84	20.6
Mothers' Educational status	No formal educ	88	21.6
	Primary level	128	31.4
	Secondary level	106	26.0
	Diploma/higher	86	21.1
Mothers' Occupation	House wife	69	16.9
	Government employee	110	27.0
	Merchant	175	42.9
	Daily Labor	54	13.2
Marital status	Married	343	84.1
	Single Mother	65	15.9
Husband Educational status	No formal education	68	16.7
	Primary level	96	23.5
	Secondary level	109	26.7
	Diploma/higher	135	33.1
	Government	162	39.7
	Daily labor	112	27.5
	Private work	86	21.1
	Pastoralist	48	11.8
Family size	<= 4 members	79	19.4
	5–6 members	230	56.4
	>= 7 members	99	24.3
	< 5000	95	23.3

Variable	Category	Frequency	%
The HH monthly income	5000–7000	143	35.0
	> 7000	170	41.7

Maternal and Health Service Utilizations

The maternal health service utilization of the current study, 304 (74.5%) of the pregnant women who participated in this study had at least one or more ANC visit(s). Of these, only 44.4% of them had 3 or more ANC visits and majority of them 189 (62.2%) started their antenatal care follow-up before sixteenth week. However, more than three quarters (79.2%) of the respondents to this study had been counseled for Iron-folic acid utilization. One-fifth 67 (20.7%) of them had been advised by non-health professionals. On the other hand, around one-third 128 (37.3%) of the participants revealed that they did not experience IFA side effect, while majority 135 (39.4%) and one-fourth 80 (23.3%) of them experienced always and sometimes respectively (Table 2)

Table 2 Maternal health service utilization of pregnant women pregnant women attending Jigjiga City Health facilities, Fafan Zone, Somali Regional State, Eastern Ethiopia, 2025

Variable	Category	Frequency	%
ANC follow up	Yes	304	74.5
	No	104	25.5
Number of ANC Visits (304)	1-2 ANC visit	169	55.6
	3 or more ANC visits	135	44.4
Gravidity	Primigravida	46	11.3
	Multigravida	362	88.7
Parity	Nullipara	79	19.4
	Primipara	149	36.5
	Multipara	180	44.1
History of still birth	Yes	47	11.5
	No	361	88.5
Side Effect of IFA experienced	Always experienced	135	39.4
	Sometimes experienced	80	23.3
	Never experienced	128	37.3
Birth order	First birth	52	12.7
	Second or more	356	87.3
ANC visit started time (304)	< 16 week	189	62.2
	>= 16 week	115	37.8
Gestational age			
	First trimester	80	19.6
	Second trimester	149	36.5
History of abortion	Third Trimester	179	43.9
	Yes	80	19.6
Mother Counselling	No	328	80.4
	Yes	323	79.2
The Mothers' Counselor	No	85	20.8
	H. professional	256	79.3
	Non H. professional	67	20.7

Magnitude of Iron –Folic Acid Use

The current study on Iron and Folic Acid (IFA) utilization among pregnant women in Jigjiga city administration is 57.4% with 95% CI: (52.0–62.5) (Fig. 3)

DISCUSSION

Iron folic acid utilization is critical in the prevention and treatment of iron deficiency anemia, specifically for the pregnant women due to increase the iron requirements for the fetal and maternal (46). Thus, the purpose of this study was to assess iron-folic acid utilization and its associated factors among pregnant women attending at Jigjiga Primary Hospital in Jigjiga city administration.

This study found that 57.4% with 95% CI: (52.0 - 62.5) of the pregnant women attending at Jigjiga Primary Hospital utilize iron-folic acid. Similar conclusions were reached by other studies, for instance: a cross-sectional study carried out at University of Gondar Hospital, Northwest Ethiopia that revealed 55.3% IFA utility among women (23), and a cross sectional study done in West Dembia district, northwest Ethiopia, that reported 52.9% adherence to ironfolic acid supplementation among of pregnant women (10). A possible explanation for this similarity might be sharing with geographical territory and some cultural similarities.

However, the finding of the current study is lower than the results of other studies, for instance, a study conducted in public hospitals of Dire Dawa, Eastern Ethiopia that revealed 71.8% of pregnant women attending antenatal care in public hospitals of Dire Dawa have adhered to ironfolic acid supplements (38).

A cross-sectional study done in North Wollo Zone northern Ethiopia that found the magnitude of adherence of IFA supplementation among pregnant women attending antenatal care was 67.6% (30), a cross-sectional study performed in Khartoum, Sudan, that found 92.1% of pregnant women utilization of iron-folic acid (27). Possible reason may be the difference in study areas where the clients had been adequately advised both benefit and possible side effects related with taking the supplementation in these settings.

In contrast, the finding of this study is higher than the results of previous studies, for instance; a cross-sectional study conducted in Debre Tabor General Hospital, Ethiopia that found 44% adherence of pregnant women to iron-folic acid supplementation (28). Similarly, our finding is higher than the results of studies conducted in Pakistan that revealed 45% of pregnant women took antenatal iron and folic acid supplements in their most recent pregnancy (34), and a district level household survey carried out in India that reported 37% of women consumed IFA during their last pregnancy (33). This discrepancy might be attributed to cultural, socioeconomic, educational, and healthcare system variations.

CONCLUSION AND RECOMMENDATION

The purpose of this study was to investigate the utilization of iron-folic acid and to identify factors that may influence among pregnant women in Jigjiga city administration. Based on the current study finding, the utilization of iron-folic acid among pregnant women, though lower than the recommended level, shows an improvement compared to the national pooled prevalence.

This study has revealed important insights into the factors influencing adherence to iron-folic acid supplementation. The study findings suggest a significant correlation between the timing of initiating antenatal care follow-up and the likelihood of pregnant women using iron-folic acid supplements.

In addition, pregnant women who have not experienced side effects from iron-folic acid utilization were more likely to continue using this essential nutrient. The absence of adverse reactions plays a crucial role in promoting adherence to iron-folic acid utilization among pregnant women. This highlights the importance of monitoring and managing side effects to ensure the continued use of iron-folic acid during pregnancy for optimal maternal and fetal health outcomes.

The major barrier, associated with the lower consumption of IFA supplements, was the side effects, which was also listed in other studies as a major obstacle for the consumption and compliance. This finding is important to design strategic policies and to prevent anemia and congenital anomaly resulted from inadequate intake of iron and folic acid. Therefore, it is recommended that healthcare workers in the facilities promote early ANC initiation and correct about IFA consumption as well as instruct women on how to manage the potential side effects of IFA supplementation.

Based on the study findings, the investigator proposed several recommendations to enhance ironfolic acid utilization among pregnant women:

- Promote Early ANC Initiation: Strengthen community and healthcare provider efforts to encourage pregnant women to initiate ANC services early in their pregnancies, ideally during the first trimester.
- Healthcare providers should counsel effectively the pregnant women on the benefits of early ANC and iron-folic acid supplementation. Emphasize the role of providers in promoting adherence through personalized care and ongoing support.
- A system tracking ANC initiation rates and iron-folic acid supplementation uptake among pregnant women should be established.
- Advocacy: Healthcare givers should advocate for the importance of ANC attendance for maternal health education and support.
- Policy Support: Advocate for policies that prioritize early ANC initiation and comprehensive maternal health services. Ensure adequate resource allocation and infrastructure to support timely and effective ANC delivery nationwide.
- Research and Evaluation: Encourage further research to explore additional factors influencing iron-folic acid utilization among pregnant women. Longitudinal studies can provide deeper insights into barriers and facilitators to adherence.

STRENGTH AND LIMITATION OF THE STUDY

Even though this study is community-based study that could be one side of its strength, however, certain limitations should be acknowledged in future research. One drawback of this study is being cross-

sectional in nature that might not show the temporal relation. Another limitation, since the study was based on the previous one-month intake of IFA tablets it might be subject to potential recall bias. In addition, the finding of the utilization of iron-folic acid, in this study was determined by the participant's response (self-reported compliance measuring method) which might alleviate the actual compliance rate of the source population.

Abbreviations

ACO American Congress of Obstetricians and Gynecology **ANC** Ante Natal Care **ASOG** American Society of Obstetricians and Gynecologists **BMI** body mass index **DALYS** Disability Adjusted Life Years **EDHS** Ethiopian Demography and Health Survey **FANC** Focused Ante Natal Care **GNMF** Global Nutrition Monitoring Framework **HC** Health Center **IDA** Iron Deficiency Anemia **IFA** Iron and Folic Acid **IFAS** Iron Folic Acid Supplementation Program **SPSS** Statistical Packages for Social Science **UNICEF** United Nations International Children's Emergency Fund **WHO** World Health Organization

Declarations

Authors' contributions

All the authors participated in the study design, data organization, data analysis, manuscript drafting, writing, reviewing, and editing. All authors have read and approved the final version to be published and agreed to be accountable for all aspects of this work.

Ethical considerations

The current study was carried out in accordance with the Helsinki Declaration. Ethical approval was obtained from the College of Medicine and health science, institutional review board (IRB), Jigjiga University (Ref. No. RERC/124/2023), and Jigjiga Health science collage. Moreover, before commencing the study, written informed consents were obtained from all the study participants. Patient results were communicated to concerned health professionals.

Funding

No funding was received for this research project

Competing interests

The authors declare no conflict of interest concerning the research, authorship, and/or publication of this article.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Acknowledgment

We appreciate Jigjiga University, Sheikh Hassen Yabere Comprehensive Specialized Hospital, Jigjiga primary hospital, and Karamara General Hospital for permitting and creating favorable conditions for conducting this study. Our appreciation also goes to all study participants for their volunteer and cooperative participation in the study.

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Figures

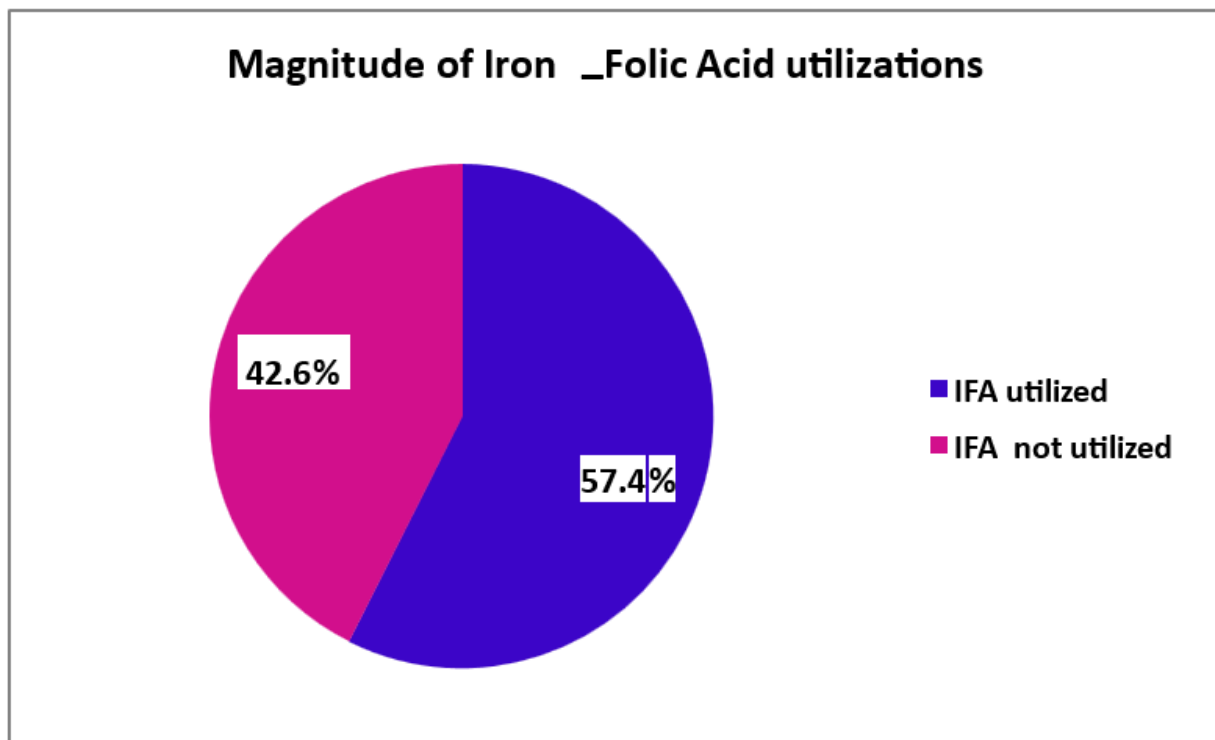


Figure 1

Figure 3 Magnitude of Iron –Folic Acid utilizations of pregnant women in of pregnant women attending Jigjiga City

Health facilities, Fafan Zone, Somali Regional State, Eastern Ethiopia.