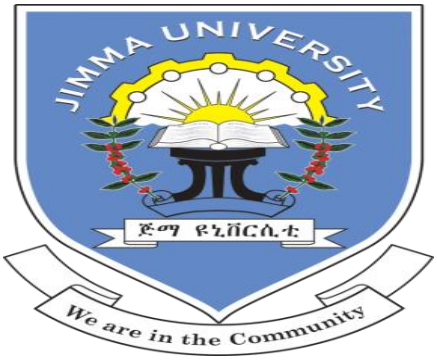

JIMMA UNIVERSITY

INSTITUTE OF HEALTH, FACULY OF MEDICINE AND

SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF ADHERENCE TO IRON SUPPLEMENTATION AMONG PREGNANT WOMEN AT JIMMA MEDICAL CENTER, ETHIOPIA.

PRINCIPAL INVESTIGATOR: DR. MASRESHA GETACHEW (MD)

January, 2026

JIMMA, ETHIOPIA

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THESIS TO BE SUBMITTED TO THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, COLLEGE OF HEALTH SCIENCES AND MEDICINE, JIMMA UNIVERSITY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR A SPECIALITY CERTIFICATE IN OBSTETRICS AND GYNECOLOGY

JANUARY, 2026

JIMMA, ETHIOPIA

ACKNOWLEDGEMENT

First, I would like to express my deepest gratitude to Jimma University, institute of health, faculty of medicine, department of obstetrics and gynecology for giving me the chance to do this thesis. Then, I am also grateful to my advisors, Dr. Habtamu Kifle (assistant professor of gynecology and obstetrics), Dr. Woubishet Girma (Associate professor of gynecology and obstetrics, Gynecologic oncologist) and Mr. Zerihun Assefa, for their equipping & generous support. Last but not the least I also appreciate the dedicated helps and provision of assistance advices made by my colleagues in the development of this Thesis. Lastly but not least, I would like to thank all women who were willing to participate in this study.

Abstract

Background: Anemia poses a significant public health challenge worldwide, impacting population in both developed and developing nations. WHO 2023 report indicates that 37% of pregnant women are globally affected by anemia; Iron deficiency anemia being the leading pathologic anemia. Even though WHO recommends iron supplementation to decrease this burden, its efficacy is compromised due to poor adherence to the supplementation regimen. Hence, this study was explored determinants of adherence to iron supplementation at Jimma University medical center.

Objective. To assess the determinants of adherence to iron adherence among pregnant women attending antenatal care at Jimma medical center

Methods and material: A facility-based cross-sectional study was conducted at Jimma Medical Center from September 30 to November 30, 2025. Data were collected from 410 pregnant women using a pretested structured questionnaire administered through the Kobo Toolbox application. Descriptive statistics were used to summarize the data. Bivariate and multivariable logistic regression analyses were performed, and variables with $p < 0.05$ were considered statistically significant.

Results The proportion of women adherent to iron supplementation was 53% (95% CI: 48.4–58.0). Women with educational status of diploma (AOR = 2. 9, 95% CI= 1.07, 7.90), with partners educational status secondary education (AOR = 6.9, 95% CI =1.83, 25.64), and Diploma and above (AOR = 4.4, 95% CI = 1.01, 19.36), whose partners were private employee (AOR = 3.3 95% CI = 1.26, 8.40), know how to prevent anemia (AOR = 5.0, 95% CI = 1.72, 14.27) and counselled on iron supplementation (AOR = 5.58, 95% CI =1.58, 19.73) were more likely to adhere to iron supplementation. In contrast, multiparous women were 68% less likely to adhere IS than nullipara. The main reasons for non-adherence were fear of side effects (49.1%)**,** lack of medication at health facilities (23.4%), and lack of information on Iron supplementation (16.1%)**.**

Conclusion and Recommendation: Adherence to iron supplementation was suboptimal. Strengthening counseling services on iron supplementation, and involving partners during antenatal care are essential strategies to improve adherence.

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ACRONYMS AND ABBREVIATIONS

ANC – Antenatal care

CDC – Center of Disease Control

DM – Diabetes mellitus

EDHS – Ethiopian Demographic Health Survey

GA – Gestational age

HIV – Human immunodeficiency virus

HTN – Hypertension

IDA – Iron deficiency anemia

IS – Iron Supplementation

JMC – Jimma medical center

SPSS – Statistical Package for Social Sciences

WHO – World Health Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background

Anemia is a global public health issue impacting both developing and developed countries. Around two billion people are anemic; mainly due to iron deficiency. WHO estimates that 40% of children 6-59 months of age, 37% of pregnant women, and 30% of women 15-49 years of age worldwide are anemic. (1)

Anemia is a condition in which red blood cells are insufficient to meet the body's physiological needs. Anemia during pregnancy is defined by the World Health Organization and Center for Disease Control and Prevention (CDC) as a hemoglobin concentration of less than 11 g/dL. (2)(3) Iron deficiency, the most prevalent micronutrient deficiency worldwide, is the leading cause of anemia during pregnancy. It affects around 30-40% of pregnancies. Due to an increase in iron deficiencies throughout gestation, about 75% of pregnancies in the third-trimester experience iron deficiency anemia. (4)(5).

Iron is a trace mineral essential for fetal growth and development. It is present in red blood cells, where it carries the oxygen needed throughout the body. Additionally, iron is crucial for normal neuronal development. (4).

Folic acid is another important micronutrient that plays a role in synthesizing neurotransmitters, particularly during early pregnancy. It is vital for DNA synthesis during organogenesis. The high physiological requirements for iron and folic acid during pregnancy are challenging to meet through a typical diet. Therefore, it is recommended that pregnant women routinely receive iron and folic acid supplements. (4).

Maternal iron deficiency is linked to increased complications for the fetus, including low birth weight, small for gestational age, and higher rates of fetal distress. Moreover, neonates face increased risk of neurological complications, such as autism spectrum disorder, attention deficit disorder, and other intellectual disabilities. (6).

Adherence to a medication regimen is generally defined as the degree to which patients take medications as prescribed by their health care providers. It serves as the primary determinant of treatment success; poor adherence results in suboptimal clinical outcomes, leading to limited benefits within the health system. Adherence rates for individual patients are commonly expressed as the percentage of the prescribed doses of the medication that the patient actually takes over a specified period. (7).

1.2 Statement of the problem

Anemia is a widespread global public health concern that impacts individuals of all age groups. Worldwide, a total of 1.93 billion people are affected by anemia. In this population, women of reproductive age, especially pregnant women, are among the most vulnerable group. (1). According to a WHO report, in 2023, 30% of non-pregnant women and 38% of pregnant women aged 15–49 years were anemic globally. (1)

A systematic review and meta-analysis conducted to show the prevalence of anemia and determinant factors among pregnant women from sub-Saharan Africa found that the pooled prevalence was 36%. Iron and folic acid (IFA) supplementation was identified as the second significant determinant, following intestinal parasites.(8). Ethiopia is one of the countries that faces this burden. The Ethiopian Demographic Health Survey 2016 (EDHS) showed that the overall prevalence of anemia among pregnant women was 41%, with 20% classified as moderately anemic, 18% as mildly anemic, and 3% as severely anemic. (9)

A meta-analysis indicated that supplementation with iron and folic acid (IFA) during pregnancy can result in a 60% reduction in the incidence of iron deficiency anemia (IDA) at term and a 20% decrease in low birthweight rates. (10).

Daily iron and folic acid supplementation is recommended by WHO as part of antenatal care to reduce the risk of low birth weight, maternal anemia and iron deficiency. The recommended supplement contains 30-60 mg of iron, along with 400 µg of folic acid. Daily supplementation throughout pregnancy, starting as early as possible after conception, is advised in all settings. (3)

Despite WHO recommendations, the adoption of iron/folic acid supplementation remains low in many countries, particularly in low-resource countries. The 2019 Ethiopian Demographic and Health Survey (EDHS) shows significant differences in the consumption of iron supplements between urban and rural residents (61% vs 39%). (11)

Even though many developing countries, including Ethiopia, are now implementing IFA supplementation through ANC programs, only a few countries have reported significant improvement in IFA supplementation and in the control and prevention of anemia. (11)

Iron/folic acid supplementation is affected by various factors, with maternal non-adherence to the regimen being the primary reason for the strategy's ineffectiveness in reducing maternal and child complications related to iron/folic acid deficiency. (3).

1.3 Significance of the study

Adherence to medication is crucial for achieving treatment success, and poor adherence is a significant barrier to the effectiveness of iron and folic acid (IFA) supplementation strategies. IFAS during pregnancy is a crucial in preventing anemia by 60-73% at term and also pregnancy adverse effect indirectly.(10,12) .

Even though poor iron adherence is the second cause of anemia next to intestinal parasitosis and the prevalence of anemia is 31.4% in this facility, there is no single research done on IFAS adherence so far at this facility.(13).

The findings from this investigation will provide: evidence to guide policy and program development for better iron supplement adherence, contributes valuable data to the existing knowledge base on maternal health in Ethiopia, facilitates tailored health education and counseling strategies, supports community awareness and stakeholder engagement, Serves as a reference for future research on maternal health and adherence behaviors and also improves maternal and neonatal health outcomes by identifying adherence barriers.

Improving the use and adherence to IFA supplements is expected to significantly reduce maternal mortality and morbidity associated with maternal anemia and hemorrhage. (9).

CHAPTER TWO

2. LITERATURE REVIEW

Adherence to iron and folic acid supplementation (IFAS) during antenatal care (ANC) varies considerably across the globe, with notable differences between developed and developing countries. Evidence from earlier studies in developed settings shows relatively high compliance rates, ranging from 77% in Denmark to 85% in Sweden. (14,15).

In India, adherence to iron–folic acid supplementation (IFAS) during pregnancy remains inconsistent, with rates ranging from 57% to 77% in various settings. A mixed-methods investigation in rural Maharashtra (2020–21) found that about 57% of pregnant women adhered to IFAS; poor palatability, side effects, and cultural misconceptions—such as beliefs that supplementation causes excessive weight gain or larger babies—were significant deterrents to compliance.(16). At a tertiary-care center in Puducherry, adherence was higher at 63.8% (95% CI: 58.6–68.6), with factors such as being primigravida, not being anemic in the first trimester, and experiencing no side effects associated with better adherence. (17). Additionally, a facility-based study in Ballabgarh, North India reported an even higher compliance rate of 77.1%**,** where direct family monitoring**,** health-professional counseling, and improved hemoglobin levels significantly improved adherence, while adverse effects like vomiting and abdominal pain hindered it.(18)

In Pakistan, recent research highlights both progress and persistent challenges in IFAS adherence during pregnancy. A national trend analysis based on Pakistan Demographic and Health Survey (PDHS) data shows that the overall iron supplementation rate among pregnant women has risen to 65.4%, with rural areas seeing a 61.7% increase and urban areas 19.9% since earlier surveys; however, rural women still face barriers such as limited ANC visits, lower literacy, and restricted access to.(19) The National Nutrition Survey 2018 reported a lower uptake of 33.4%**,** with side effects (nausea, constipation), forgetfulness**,** and lack of counseling as the leading reasons for non-adherence, while strong family support and early initiation of ANC promoted adherence (National Nutrition Survey, 2018). In a randomized controlled trial at Aga Khan University Hospital, 97.7% of women reported taking IFAS at least once during pregnancy, with high adherence linked to continuous follow-up**,** good health literacy, and consistent supplement supply while forgetfulness and perceived lack of need are being the reason for not taking. (20)

A study conducted in Yaoundé indicated varying levels of adherence to iron supplementation among antenatal care (ANC) attendees. The results showed that 16.4% of participants were highly compliant with their iron supplementation regimen, 27.6% had moderate compliance, and 56% were classified as having low compliance. Key reasons for non-adherence included experiencing side effects (19.7%), forgetting to take the supplements (70.1%), and inaccessibility to iron supplements (20.1%). Furthermore, 28% of participants reported finding the daily medication routine monotonous and burdensome. (21).

A cross-sectional study in Uganda involving ANC attendees with four or more antenatal visits, approximately 12% of mothers adhered to iron supplementation over a 30-day period. The study highlighted that prior health education significantly improved adherence rates, while inadequate drug supply and side effects were identified as the major factors contributing to low adherence. (22).

In a large population-based study across 22 sub-Saharan African countries, the overall adherence rate to iron supplementation for 90 days or more during pregnancy was found to be 28.7%. This adherence varied widely by country, with rates ranging from just 1.4% in Burundi to 73.0% in Senegal. Higher adherence was linked to several factors, including older maternal age, having more than four antenatal care (ANC) visits, higher educational levels, greater socioeconomic status, and exposure to mass media. In contrast, living in rural areas was associated with lower adherence, likely due to difficulties in accessing medication despite attending ANC visits. (23).

An institution-based cross-sectional study conducted in Gulele Sub-city, Addis Ababa, revealed that 62.3% of mothers adhered to iron and folic acid supplements, with a 95% confidence interval of 57.5% to 67.0%. Several factors were linked to non-adherence, including a lack of formal education (AOR=2.37; 95% CI=1.25–4.51), poor knowledge about anemia (AOR=1.97; 95% CI=1.24–3.13), experiencing other health issues during the current pregnancy (AOR=2.59; 95% CI=1.55–4.32), participation in health information sessions on iron/folic acid supplements (AOR=2.06; 95% CI=1.08–3.92), and forgetfulness (AOR=2.23; 95% CI=1.40–3.56). These factors were significantly associated with a higher likelihood of non-adherence compared to their respective counterparts. (24).

A study at Felege Hiwot Hospital in Bahir Dar showed that 67.4% of pregnant women adhered to iron-folic acid supplementation (IFAS). Key factors associated with adherence included receiving counseling on IFAS (AOR=2.30; 95% CI: 1.21-4.34), having good knowledge about IFAS (AOR=4.22; 95% CI: 2.43-7.31), attending more than three antenatal care (ANC) visits (AOR=3.50; 95% CI: 1.55-7.92), previously receiving ANC follow up at a tertiary hospital (AOR=2.61; 95% CI: 1.30-5.27), and having no history of hypertension (AOR=3.07; 95% CI: 1.37-6.89). The study highlighted that insufficient counseling on anemia and IFAS significantly contributed to non-adherence among pregnant women. (25).

In a study conducted in Lay Armachiho, Northwest Ethiopia, adherence to iron and folic acid supplementation among pregnant women was reported at 28.7%, with a 95% confidence interval of 24.3% to 33.6%. The research identified several factors that significantly influenced adherence, including the educational level of the husband, family size, average monthly income, and the timing of initiation of antenatal care (ANC) visits. These factors were strongly associated with the likelihood of adherence among pregnant women in the study area. ((26).

In a facility-based cross-sectional study conducted in the primary health care units of Sire district, the overall adherence rate to iron and folic acid supplementation (IFAS) was 59.4%. Positive factors influencing adherence included maternal access to information, receiving medical advice during antenatal care, a history of anemia, and current anemia diagnosis. On the other hand, having children and knowledge of IFAS's role in preventing low birth weight were negatively associated with adherence. These findings highlight the complex interplay of various factors affecting IFAS adherence among pregnant women in the study setting. (27).

A study done in Debre Tabor General Hospital in West Ethiopia in 2017 found that adherence to iron and folic acid supplementation was 44%. Several factors were significantly associated with adherence: gravidity (AOR = 2.92, 95% CI [1.61, 5.30]), gestational age at the first ANC visit (AOR = 3.67, 95% CI[1.94, 6.97]), receiving advice about IFAS (AOR = 2.04, 95% CI [1.12, 3.75]), current anemia (AOR = 2.22, 95% CI [1.45, 4.29]), and having knowledge about IFAS (AOR = 3.27, 95% CI [1.80, 5.95]). (28). In a facility-based cross-sectional study conducted in Jigjiga town, Somali region, adherence to iron supplementation was reported at 54.9%. Significant

determinants of adherence included the number of ANC visits, women's education, knowledge about iron and folic acid supplementation, history of stillbirth, and age.(29)

A community-based cross-sectional study in Wolita, southern Ethiopia, revealed that 11.5% (95% CI =9.9-13.1%) of participants adhered to iron supplementation for the recommended duration of three months 11or more. Factors associated with adherence included maternal education, the timing of antenatal care initiation, and awareness of the benefits of iron supplements. In addition, a systematic review and meta-analysis from 2019 reported a pooled adherence prevalence of 46% for iron supplementation in Ethiopia, with the highest rates found in Addis Ababa (60%) and Tigray (58.12%). Factors positively associated with adherence included knowledge about iron and folic acid (IFA) supplementation, early initiation of ANC, and guidance from healthcare providers. Fear of side effects and forgetfulness were identified as barriers to adherence. (30).

A cross-sectional study conducted in a governmental institution in Adwa, Tigray, found that adherence to iron/folic acid supplementation was 40.9%. Women in the age group of 25-29 who received partner support, had knowledge about iron and folic acid supplements, and received counseling from healthcare providers demonstrated higher odds of adherence. (31). In another facility-based cross-sectional study in the Simada district of northwest Ethiopia, the adherence rate for iron and folic acid supplementation was 67.6%. Significant factors associated with adherence were receiving counseling about the supplements and having a history of preterm delivery. (32).

In an Institutional based cross-sectional study conducted in the Jimma town public health facilities, the overall adherence rate to iron and folic acid supplementation (IFAS) was 60%. Getting medical advice being the leading reason for adherence in 79.6% of cases.(33).

2.1. Conceptual frame work

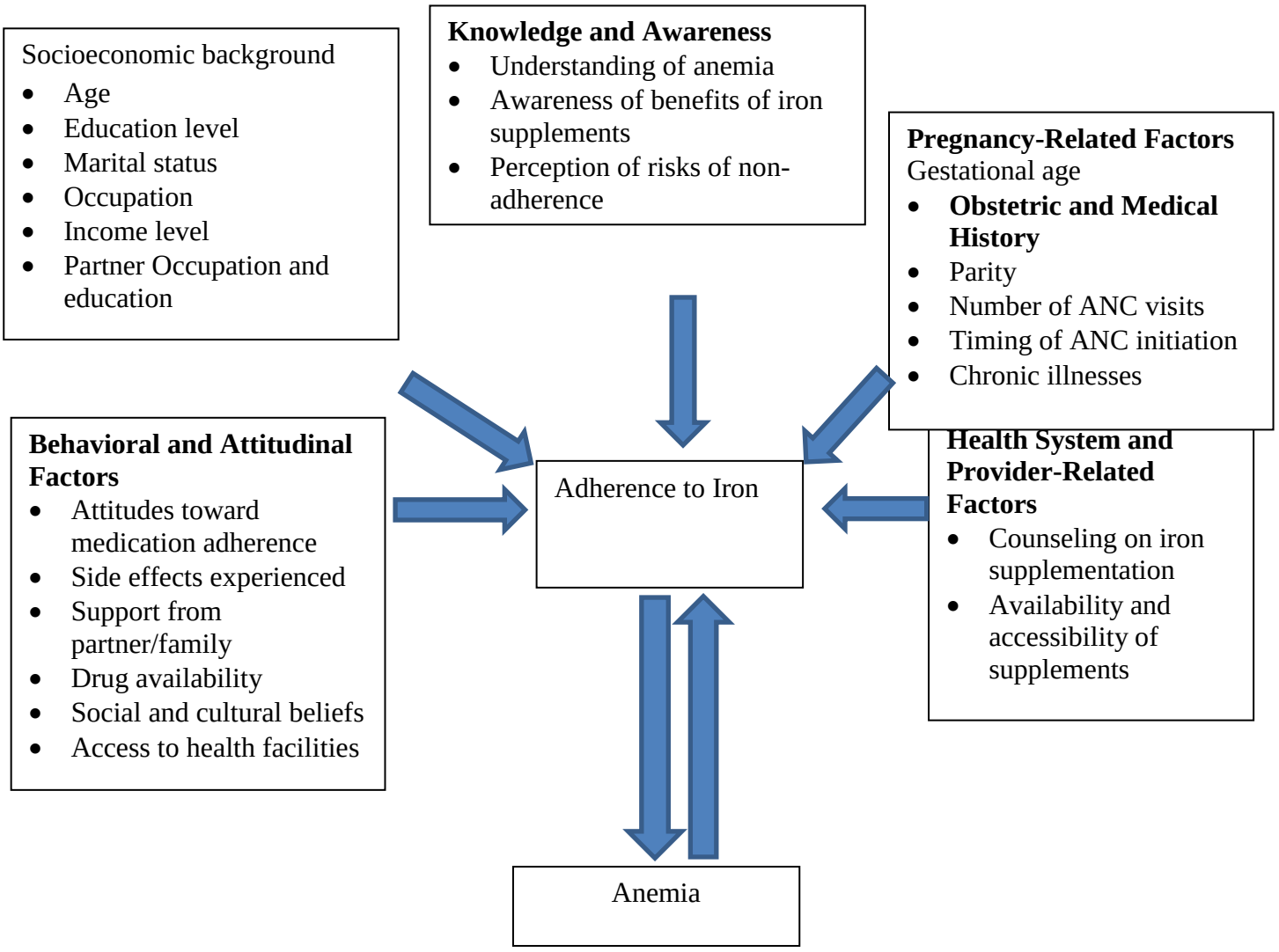

Figure 1 Conceptual framework for Iron adherence among women attending ANC clinic

CHAPTER THREE
3. OBJECTIVES

3.1 GENERAL OBJECTIVE:

- To assess the determinants of adherence to iron supplementation among ANC attendees at Jimma medical center from September to November 30 2025

3.2 Specific objectives:

- To determine the magnitude of adherence to iron supplementation among ANC attendees in Jimma medical center.
- To assess knowledge and attitude toward iron supplementation during pregnancy among ANC attendees in Jimma medical center
- To identify factors associated with adherence to iron supplementation among ANC attendees in Jimma medical center
- To assess the potential reasons for non-adherence to iron supplementation among ANC attendees in Jimma medical center

CHAPTER FOUR

4. Methodology

4.1. Study setting and Design:

A facility-based cross-sectional study was conducted at Jimma medical center, from September 2025 – November 2025. Jimma is located in Southwest Ethiopia 352 km from Addis Ababa. Jimma Medical Center (JMC) is part of Jimma University (JU) which is established in 1930 and located in the main campus. It is a referral hospital with bed capacity of more than 800. Provides services for approximately 16,000 in patient and 220,000 outpatient attendances, 12,000 emergency cases and around 4,500 deliveries in a year with a very wide catchment population of over 15 million people in southwest Ethiopia.

4.2. Source and Study population

The source population comprised all pregnant women attending antenatal care at Jimma medical center, while the study population consisted those pregnant women who fulfill the inclusion criteria and attending antenatal care at JMC.

4.3. Inclusion and exclusion criteria

4.3.1. Inclusion criteria:

- Pregnant women attending ANC services at JMC during the data collection period (sept. 1 - Nov 30, 2025), who are able to provide consent.
- Pregnant women for whom iron was prescribed for at least 3 months at the time of data collection and their ANC follow up was at JMC

4.3.2. Exclusion criteria:

- Pregnant women who cannot give consent or have mental illness,
- Pregnant women who began supplementation for other reasons prior to pregnancy,
- Pregnant women who were not supplemented or supplemented for less than 3 months
- Pregnant women who were taking therapeutic iron during study period (anemic at any time during this pregnancy)
- Pregnant women with multiple gestation
- Pregnant women who have malarial attach during this pregnancy

4.4. Sample size and sampling technique

4.4.1. Sample size

The sample size was determined using the single population proportion formula, a proportion of 60% adherence to iron supplementation during antenatal care was used based on findings from a previous study on adherence to iron among pregnant women in Jimma town public health facilities.(33).

The detailed calculation:

$$n = \frac{(\frac{Z\alpha}{2})^2 \; x \; p \; x \; (1 - p)}{d^2}$$

Where, n= required sample size, $Z_{1/2}$=the critical value at 95% confidence level of certainty (1.96), p= the proportion of iron supplementation adherence (60%), d= the margin of error between the sample and the population (5%). Then;

$$n = \frac{(1.96)^2 \text{ x } 0.6 \text{ x } (1\text{-}0.6)}{(0.05)^2} = 369$$

Adding 10% non-respondent rate the final sample size was 410.

4.4.2. Sampling procedure:

For this study, all mothers coming to JMC ANC during the study period were taken; then, study participants who fulfilled the inclusion criteria were selected with consecutive sampling technique over the study period until adequate sample was obtained.

4.5. Study variables

4.5.1. The dependent variable

The adherence of pregnant women to iron supplementation

4.5.2. The independent variables

● Socio-demographic characteristics of clients: age, marital status, educational status, occupation and place of residence

● Partner education and occupation status

● Knowledge about anemia and iron supplementation

Attitude toward iron supplementation

● Health related factors: other chronic illnesses such as, Diabetes Mellitus, Hypertension, HIV, etc.

● Current pregnancy related factors: gestational age (GA), parity, birth interval, number of ANC visits, and gestational age at the initiation of ANC.
● Past-obstetric history: stillbirths, alive children, abortions
● Supplement related factors: availability of drugs.
● Health provider related factors: counseling on iron supplementation.

4.6. Data collection procedures:

Data on adherence to iron supplementation, hemoglobin level, as well as the services provided to pregnant women attending ANC clinics at JMC, was gathered through exit interviews conducted after obtaining informed consent.

A questionnaire was developed in English based on a review of relevant literature. It was then translated into different language (Afan Oromo and Amharic) then back to English to see the consistency. Then kobo tool box was prepared in different language. Face-to-face interviews was conducted with pregnant women attending ANC clinics at JMC to administer the questionnaire.

To ensure data quality, training was provided to those selected as data collectors. They were 3 BSC midwifes and 2 MSC Midwifes (supervisors)

After completing their ANC visits, potential participants were approached by data collectors who explained the study and obtained consent to review their ANC clinical records and conduct interviews.

Interviews were conducted privately using a questionnaire prepared on Kobo toolbox, with trained collectors overseeing the data collection process. The principal investigator supervised the process, offering support, ensuring smooth communication, and following established data collection procedures. A pre-test involving 5% of the sample size (approximately 20 pregnant women who met the inclusion criteria) was carried out to refine the questionnaire before starting the actual data collection. After the data collector explained about the research and got her consent the mother was sent for CBC update then after she arrived with the result the interview was held accordingly. Those mothers with anemia were linked to get appropriate treatment then finally they were checked to be sure as they got treatment for anemia

Every day, data collectors reviewed completed questionnaires before participants left the setting, with the principal investigator making any necessary adjustments. The principal investigator also

managed the overall coordination of the data collection process to ensure consistency and quality throughout the study.

4.7. Operational definitions

Adherence to Iron supplementation and treatment: is defined as taking the supplement on at least 65% of the recommended days, which translates to a minimum of four days per week over a three-month period. (3)

Anemia during pregnancy: Maternal hemoglobin level less than 11mg/dl in 3rd trimester and less than 10.5mg/dl in 3rd trimester pregnancy

Attitude toward iron supplementation: A mother is considered as having good attitude toward iron supplementation if she answers “No” to at least 57% of the questions (4 out of 7) assessing her attitude. In contrast, she is classified as bad attitude if she answers “No” to 50% or fewer of the questions (less than 4 out of 7).

Knowledge of iron supplementation: A mother is considered knowledgeable about iron supplementation if she answers 'yes' to at least 66% of the questions (4 out of 6) assessing her knowledge. In contrast, she is classified as not knowledgeable if she answers 'yes' to 50% or fewer of the questions (less than 4 out of 6).

4.8. Data management

Confidentiality was prioritized in the handling of data. Upon completion of the data collection, the data was checked for completeness, and data entry and validity checks were performed using SPSS software version 23. Significant efforts were made to ensure data quality throughout the entire process, including the careful selection and training of data collectors, as well as the implementation of data quality checks during data collection, compilation, cleaning, and entry.

4.9. Data analysis procedure

Descriptive statistics was computed to evaluate the extent of iron supplement provision for pregnant women attending ANC clinics at JMC. To examine the association between various independent variables and the outcome variable, analyzed as mean and standard deviation (e.i.

age) while category data was put in percentage then presented with tables and graphs. All variables were analyzed by bivariate logistic regression and those variables with P value less than 0.25 was included in the multivariate analysis. Additionally, multiple logistic regression analysis was performed to identify the key predictors of adherence to iron supplementation while controlling for confounding factors and variable with p value < 0.05 was taken as significant.

4.10. Ethical consideration

Ethical clearance was obtained from the Institutional Research Review Board (IRRB) of Jimma University. Before the beginning of data collection, the study's objectives, procedures, and potential risks was thoroughly explained to each participant to ensure informed participation. Informed verbal consent was obtained from all participants, as they provide with comprehensive information regarding the purpose of the study and their involvement. Participants was aware that their participation is voluntary and that they have the right to withdraw from the study at any time without any impact on the quality of services them received.

During data collection, confidentiality and anonymity was emphasized. Participants was assured that all collected data will remain confidential and would only be used for the purposes of this study. Information is securely stored and handled to protect the privacy of the participants. All participants diagnosed with anemia got appropriate treatment. These procedures ensure that ethical standards were upheld throughout the study, promoting the participants' rights and well-being.

4.11. Dissemination of results

The findings of the study will be submitted to Jimma University Department of medicine and Zonal health bureau. Dissemination will be an essential component of my project in order to achieve the purpose of fostering policy change based on research findings. The manuscript will be prepared and be sent to the reputable journal for potential publication and then become accessible for any concerned bodies

CHAPTER FIVE

5. Results

5.1. Socio-demographic characteristics of the study participants

In this study, 410 participants were included, achieving a response rate of 100%. 59.5% of the participants were in the 25-34 age group, with a mean age of 25.4 years (SD ±4.5). Nearly all participants were married (98.8%), 85.9% of the participants were from Urban, and majority of the participants (76.4%) attended primary school and above, while 38.5% of their partners completed secondary school. Majority of the participants were housewife (72.4%) while 29% and 26.6% of their partners were government and private employee respectively.

Table 1. Sociodemographic status of pregnant women at JMC, Jimma, Ethiopia, 2025

Category	Variable	Frequency	Percent
Age	15-24	151	36.8
	25-34	244	59.5
	>=35	15	3.7
	Total	410	100.0
Marital status			
	Married	405	98.8
	Single	5	1.2
	Total	410	100.0
Place of residence			
	Rural	58	14.1
	Urban	352	85.9
	Total	410	100.0
Educational status			
	No formal education	97	23.7
	Primary education	131	32.0
	Secondary education	121	29.5
	Diploma and above	61	14.9
	Total	410	100.0

Occupation	Daily laborer	5	1.2
	Housewife	297	72.4
	Government employee	64	15.6
	Merchant	17	4.1
	Private employee	27	6.6
	Total	410	100.0
Educational status husband/partner	No formal education	57	13.9
	Primary education	87	21.2
	Secondary education	158	38.5
	Diploma and above	108	26.3
	Total	410	100.0
Occupation of Husband/Partner	Daily laborer	55	13.
	Farmer	34	8.3
	Government employee	119	29.0
	Merchant	93	22.7
	Private employee	109	26.6
	Total	410	100.0

5.2. Obstetrics characteristics of the study participants

In this study showed 35.9% of participants were nullipara, and 56.3% of participants started ANC follow up after 16 weeks of gestation, while 58.5% had an interpregnancy interval of more than two years. 95% of the participants had no known medical chronic disease.

Table 2. Obstetric characteristics of study participants among pregnant women at JMC, Jimma Ethiopia, 2025

	Variables		**Frequency**	**Percentage**
Gravidity	Primigravida		135	32.9
	Multigravida		275	67.1
	Total		410	100.0
Parity	Nullipara		147	35.9
	Primipara		143	34.9
	Multipara		120	29.3
			410	100.0
Initial gestational age				
	<16		179	43.7
	>=16		231	56.3
			410	100.0
No. ANC	2-4		141	34.5
	5-7		193	47.1
	>=8		76	18.5
			410	100.0
Interpregnancy interval	<24 months		114	41.5
	>=24months		161	58.5
			275	100
Known Chronic medical illness	No		386	94.1
	Yes		24	5.9
		Diabetes	3	0.7
		Hypertension	9	2.2
		HIV	6	1.5
		B.Asthma	6	1.5
	Total		410	100.0

5.3. Knowledge and attitude of the study participants on Iron supplementation

Three quarters of the study participants have heard about anemia, while 64.4% of those who heard about anemia were knowledgeable about the symptoms of anemia (palpitation, dizziness, headache, easy fatigability and the like). Among those who heard about anemia majority (82.8%) know how to prevent anemia, and 69.8% of the participants were identified as knowledgeable on fetal effect of while more than half (59.8%) of them identified at least one of the effects of anemia on the fetus anemia (decreased fetal growth, still birth and prematurity). Around 94.4% of participants were heard about Iron supplementation, out of which 89.1% know the benefits of Iron supplementation. This study showed that almost all of the participants (99.3%) were identified as having good attitude toward IS anemia during pregnancy.

Table 3. Knowledge and attitudes of the study participants on anemia and iron supplementation at JMC, 2025

Category	**Variable**	**Frequency**	**Percent**
Ever heard about Anemia	No	102	24.9
	Yes	308	75.1
	Total	410	100.0
Know symptoms of anemia	I don't know	44	14.3
	Know at least one symptom	264	85.7
	Total	308	100
Know Anemia prevention	I don't know	53	17.2
	know at least one prevention mechanism	255	82.8
	Total	308	100
Know effect of anemia on fetus	No	124	30.2
	Yes	286	69.8
	Total	410	100.0
What fetal effect do you know?	I don't know	115	40.2
	know at least on effect	171	59.8
	Total	286	100
Ever heard about Iron supplementation	No	23	5.6
	Yes	387	94.4
	Total	410	100.0
Benefits of Iron supplementation	I don't know	42	10.9
	Know at least one benefit	345	89.1
	Total	387	100

Over all Knowledge on Iron supplementation	Poor	100	24.4
	Good	310	75.6
	Total	410	100.0
Attitude	Poor	3	0.7
	Good	407	99.3
	Total	410	100.0

5.4. Adherence of iron supplementation and maternal Anemia status

In this study, 218 (53.2%) of the study participants were adhering to iron supplementation, with a 95% confidence interval of 48.4 -58 (Fig. 2). Majority (49.1%) of nonadherence were due to maternal side effect like dyspepsia and the second reason for nonadherence were lack of adequate medication in the health facility (23.4%) while 9.2% of the participants were avoiding iron for fear of fetal side effects (Fig. 3). 86% of the participants were counselled on importance of iron supplementation, and around 18.3% of participants were anemic at the time of data collection. 86.7% of anemic mothers were those identified as nonadherent to iron supplementation (Table.4)

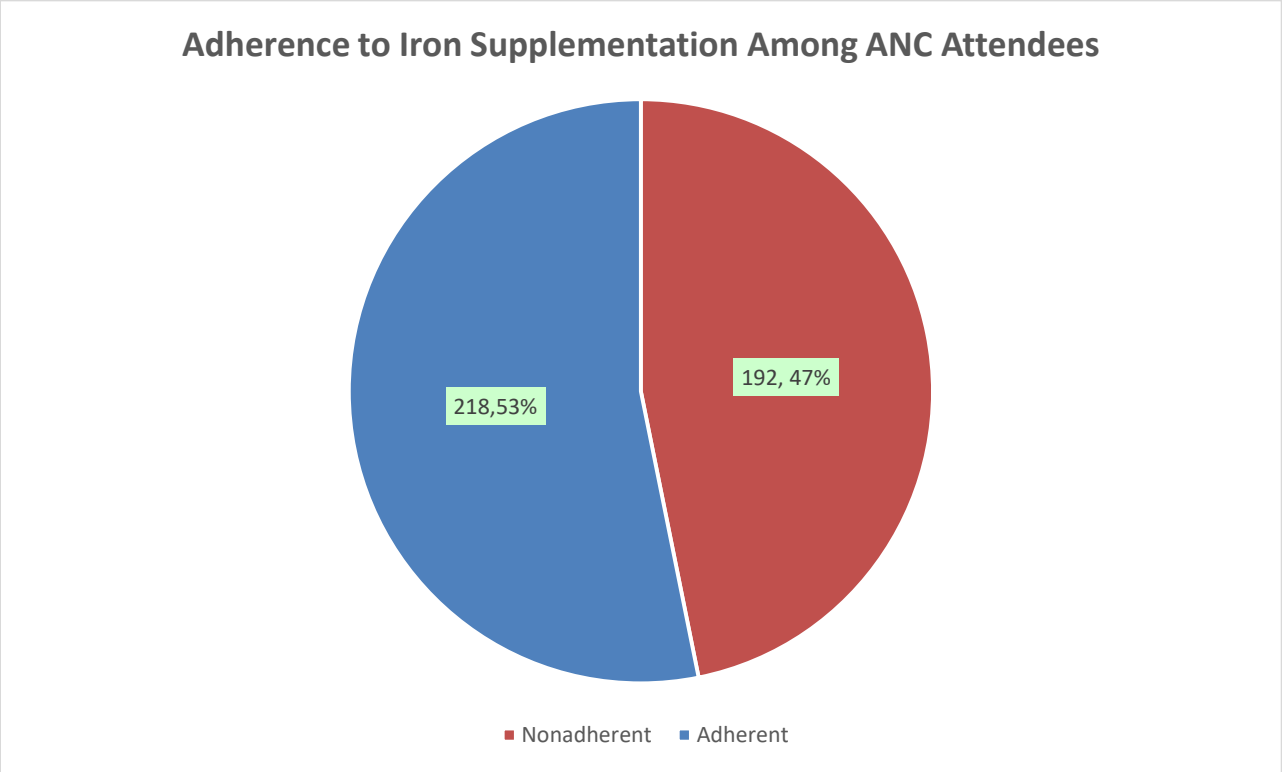

Figure 2. Iron adherence levels among the study participants among pregnant women in JMC, Jimma Ethiopia, 2025

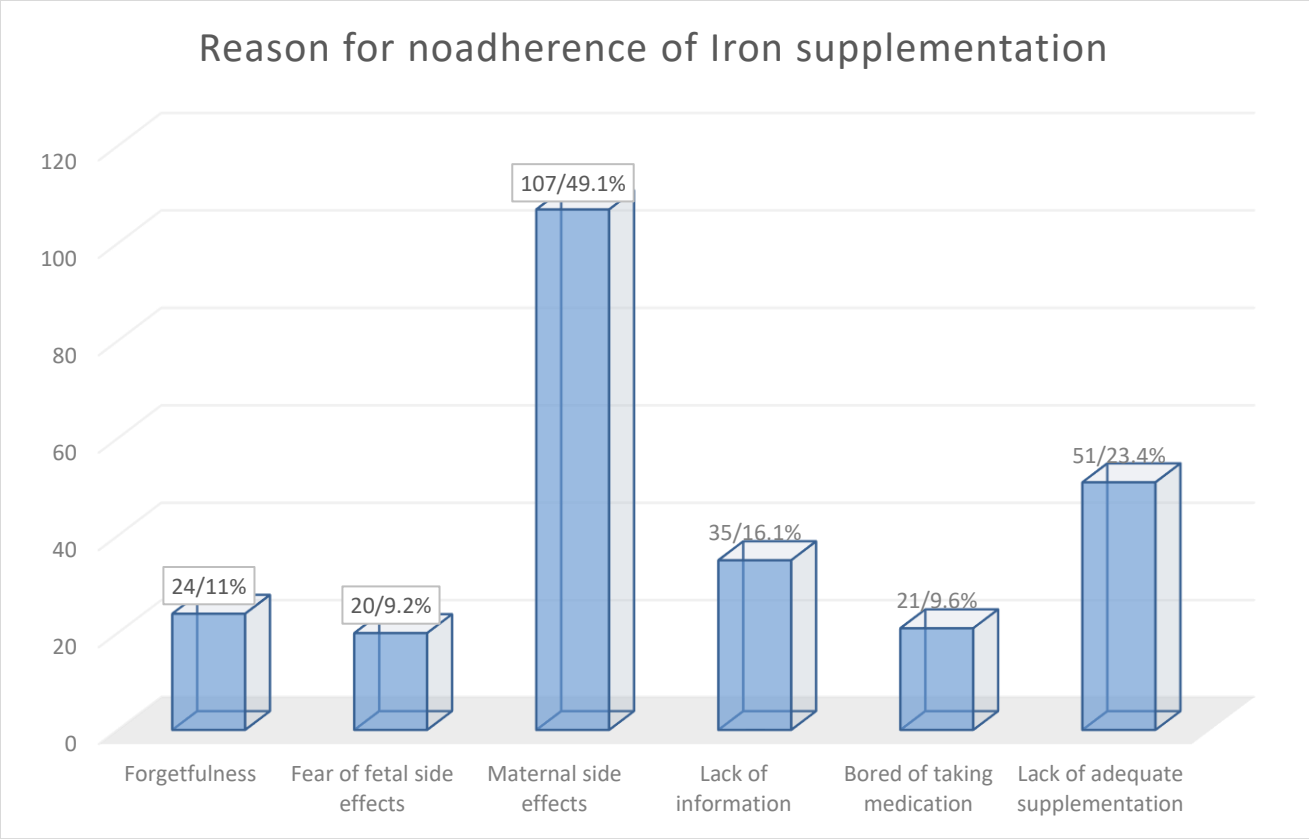

Figure 3. Reasons for nonadherence to Iron supplementation among the study at JMC, Jimma Ethiopia, 2025

Table 4. Maternal anemia and counselling on iron adherence of pregnant women at JMC, Jimma Ethiopia, 2025

Category	Variable	Frequency	Percent	
Counselled on iron adherence	No	57	13.9	
	Yes	353	86.1	
	Total	410	100.0	
		Iron Adherence		
	Category	Yes	No	Total
Maternal Anemia	Yes	10 (2.4%)	65(15.9%)	75(18.3%)
	No	208 (50.7%)	127(31%)	335(81.7)

5.5. Determinant factors associated with adherence to Iron supplementation

This study identified multiple factors influencing adherence to iron supplementation among pregnant women. Those variables with P value <0.25 on bivariate logistic regression analysis were analyzed using multivariate logistic regression which indicated that participants with educational status of diploma and above 2.9 times more likely to adhere to iron supplementation than those who have no formal education (AOR = 2.9, 95% CI= 1.07, 7.90) and those participants with partners educational status secondary education, and Diploma and above have 6.9 and 4.4 times more likely to be adherent than whose partners with no formal education respectively. Women with a partner whose occupation was private employee have 3.3 odds ratio to be adherent to IS than partners of daily laborer (AOR = 3.3, 95% CI = 1.26, 8.40). Those participants who know how to prevent anemia were 5 times more adherent to iron supplementation than those who don't know how to prevent anemia (AOR = 5.0, 95% CI = 1.72, 14.27). Furthermore, participants who were counselled on iron supplementation were 5.6 times more likely to adhere than those who didn't counselled (AOR = 5.6, 95% CI =158, 19.73). This study also showed that multiparous women were 68% less likely to adhere than nulliparous women (AOR =0.32, 95% CI =0.13, 0.79). Both crude and adjusted odds ratios with 95% confidence intervals are presented in a single table for comparison as follow.

Table 5. Determinant factors associated with adherence to Iron supplementation *among pregnant women at JMC, Jimma, Ethiopia, 2025*

Variable	**Iron adherence**		**COR with CI at 95%**	**AOR with CI at 95%**
	No	**Yes**		
Age				
15-24	74	77	4.2(1.13, 15.34)	3.4(0.60, 19.18)
25-34	106	138	5.2(1.43, 18.92)	2.5(0.46, 13.26)
>=35*	12	3		
Place of residence				
Rural*	39	19		
Urban	153	199	**0.4(0.21, 0.67)**	0.5(0.15, 1.36)
Educational status				
No formal education*	64	33		
Primary education	53	78	**2.9(1.65, 4.93)**	1.3(0.30, 5.67)

Secondary education	55	66	**2.3(1.34, 4.04)**	1.4(0.29, 6.84)
Diploma and above	20	41	**3.9(2.01, 7.85)**	**2.9(1.07, 7.90)****
Educational status husband/partner				
No formal education*	31	26		
Primary education	53	34	**2.9(1.65, 4.93)**	1.2(0.40, 3.84)
Secondary education	58	100	**2.3(1.34, 4.04)**	**6.9(1.83, 25.64)****
Diploma and above	50	58	**3.9(2.01, 7.85)**	**4.4(1.01, 19.36)****
Occupation of Husband/Partner				
Daily laborer*	35	20		
Farmer	23	11	1.0(0.39, 2.67)	0.9(0.19, 4.67)
Government employee	57	62	**2.3(1.12, 4.83)**	1.1(0.43, 3.05)
Merchant	41	52	**2.7(1.28, 5.78)**	1.0(0.39, 2.73)
Private employee	36	73	**4.3(2.05, 9.19)**	**3.3(1.26, 8.40)****
Parity				
Nullipara*	64	83		
Primipara	65	78	0.9(0.58, 1.47)	0.7(0.31, 1.5)
Multipara	**63**	**57**	**0.7(0.43, 0.82)**	**0.32(0.13, 0.79)****
ANC				
2-4*	71	70		
5-7	93	100	1.1(0.71, 1.68)	0.63(0.32, 1.24)
>=8	28	48	**1.7(0.98, 3.08)**	1.5(0.61, 13.11)
Ever heard About Anemia				
No*	53	49		
Yes	139	169	**1.3(0.84, 2.86)**	0.9(0.29, 2.73)
Know Anemia prevention methods				
I don't know*	33	20		
Hear prevention mechanism	106	149	**2.3((1.26, 4.26)**	**5.0((1.72, 14.27)****
Does anemia have Effect on mother and fetus				
No*	33	20		
Yes	106	149	**1.7(1.09,2.54)**	2.2(0.85, 5.54)
What benefit of IS do you know				
I don't know*	24	18		
Know at least one benefit	159	186	**1.6(0.82, 3.99)**	1.1(0.802, 5.80)
Counselled on iron adherence				
No*	36	21		
Yes	156	197	2.2(1.21, 3.86)	**5.6(1.58, 19.73)****

NB. * = reference category and ** = variable with p value <0.05

CHAPTER SIX

5. Discussion

In this study, the prevalence of adherence to iron supplementation among pregnant women was 53%**.** This finding is comparable with studies conducted in Jigjiga Town, Somali Region and primary health care units of Sire District (27,29). However, it is lower than reports from Gulele Sub-City, Addis Ababa, Felege Hiwot Comprehensive Specialized Hospital in Bahir Dar, and Sidama District.(24,25,32). Some of these studies included women who had taken iron supplementation for less than three months, whereas the current study included only women who had taken iron supplements for at least three months. Adherence tends to decline with prolonged duration of drug intake due to factors such as pill burden and side effects, which may lower adherence estimates in this study. In addition, better drug availability, improved health infrastructure, and frequent counseling in urban settings and referral hospitals may contribute to higher adherence levels in those studies.

Conversely, adherence in this study was higher than findings from Uganda, multiple sub-Saharan African countries, Lay Armachiho District, Northwest Ethiopia, Debre Tabor General Hospital, Wolaita Sodo Town, the Ethiopian systematic review, and Adwa Town, Tigray (22,23,26,28,30,31,34). These lower adherence levels may be attributed to differences in study design, sample size, study period, and health facility level. Some studies were community-based or conducted at the health center level, where counseling frequency, staffing, and follow-up may be limited.

The study identified that the most common reason for non-adherence to iron supplementation was maternal side effects**,** accounting for 49.1% of cases. This is comparable with findings from Lay Armachiho District (49.3%), a systematic review and meta-analysis in Ethiopia (46.4%), and Felege Hiwot Comprehensive Specialized Hospital (45.7%). ((25,26,30)). Lack of adequate supply of iron supplements at health facilities was reported by 23.4% of participants as a reason for non-adherence. This is consistent with studies conducted in Debre Tabor General Hospital**,** Adwa Town, and Lay Armachiho District**,** as well as the Ethiopian systematic review and meta-analysis, all of which highlighted stock-outs and interruptions in the supply of iron as major contributors to non-adherence (28, 31, 30). In addition, lack of information or insufficient counseling about iron

supplementation was reported by 16.1% of non-adherent participants, ranking as the second or third most common reason. Similar findings were reported in Gulele Sub-City, Addis Ababa**,** and Felege Hiwot Comprehensive Specialized Hospital, where poor knowledge about anemia and the benefits of supplementation contributed to reduced adherence (24, 25). Collectively, these findings emphasize that maternal experience of side effects, inadequate health facility supply, and insufficient knowledge remain key reasons to iron supplementation adherence in Ethiopia, highlighting the need for improved counseling, supply chain management, and targeted health education interventions

In this study, pregnant women with an educational status of diploma level or above were 2.9 times more likely to adhere to iron supplementation compared with those who had no formal education (AOR = 2.9, 95% CI: 1.07–7.90**).** This finding is consistent with several studies conducted in Ethiopia, including research from Lay Armachiho District, Gulele Sub-City in Addis Ababa, Debre Tabor**,** Adwa Town**,** and Jimma, which reported significantly higher adherence among women with secondary education or above compared to those with no formal education (24,26,28,33). These findings suggest that educated women are more likely to comprehend health education messages, recognize the benefits of iron supplementation, better manage potential side effects, and engage more effectively with antenatal care services, all of which contribute to improved adherence to iron supplementation during pregnancy.

Women whose partners had secondary education **(**AOR = 6.9, 95% CI: 1.83–25.64**)** and diploma level or above **(**AOR = 4.4, 95% CI: 1.01–19.36**)** were significantly more likely to adhere to iron supplementation. Similarly, women whose partners were employed in the private sector were more likely to adhere to supplementation **(**AOR = 3.3, 95% CI: 1.26–8.40**).** These findings are consistent with studies conducted in Ethiopia, including those from Adwa Town**,** Debre Tabor**,** Gulele Sub-City in Addis Ababa**,** and Lay Armachiho, which reported that higher partner educational status and formal employment were positively associated with maternal adherence to iron supplementation (24, 26, 28, 31). These associations may be explained by increased household income, improved decision-making support, and greater awareness of maternal nutrition and anemia prevention among educated and employed partners. Overall, these findings emphasize the importance of male partner involvement and socioeconomic empowerment in improving maternal adherence to iron supplementation during pregnancy.

Participants who knew how to prevent anemia were five times more likely to adhere to iron supplementation than those who lacked this knowledge (AOR = 5.2, 95% CI: 1.72–14.27). This finding is consistent with studies from Ethiopia (Gulele Sub-City, Lay Armachiho, Debre Tabor, and Adwa Town) and other sub-Saharan African countries (Uganda and Cameroon), as well as a national systematic review and meta-analysis, all of which reported that maternal knowledge of anemia prevention significantly improves adherence to iron supplementation. (22,24,26,28,30,31)These consistent findings across diverse settings highlight that improving maternal knowledge on anemia prevention plays a crucial role in enhancing adherence to iron supplementation and emphasize the need for strengthened health education interventions during antenatal care services.

The present study found that pregnant women who received counseling on iron supplementation were 5.6 times more likely to adhere than those who were not counseled (AOR = 5.6, 95% CI: 1.47–6.79). This finding is consistent with studies from Ethiopia (Debre Tabor, Lay Armachiho, and Adwa Town), a national systematic review and meta-analysis, and evidence from other low- and middle-income countries including Uganda, India, and Pakistan. (18,20,22,26,28,30,31) Where adequate counseling during antenatal visits was associated with improved knowledge, reduced concerns about side effects, and better adherence to iron supplementation.

This study also found that Multiparous women were 68% less likely to adhere to iron supplementation compared with nulliparous women. This finding aligns with studies conducted in Lay Armachiho District and Debre Tabor General Hospital, which reported higher adherence among first-time pregnant women (26,28). A systematic review and meta-analysis in Ethiopia also indicated that primiparous women were more likely to follow supplementation recommendations, possibly because they are more attentive to antenatal care advice and more motivated to prevent complications during their first pregnancy (30). In contrast, multiparous women may perceive themselves as experienced in pregnancy management and may underestimate the importance of routine iron supplementation, leading to lower adherence rates. These findings suggest that targeted counseling and reinforcement of the benefits of supplementation for multiparous women are essential to improve overall adherence rates during pregnancy.

5.1. Strengths and Limitations

This study has limitations. Adherence was assessed using self-reported data, which is less objective than electronic or observational methods and may be prone to recall bias. The cross-sectional design limits causal inference and long-term assessment of associations. In addition, other causes of maternal anemia beyond iron non-adherence were not evaluated. Despite these limitations, the study provides useful information to guide future research.

CHAPTER SEVEN

6. Conclusion and Recommendation

6.1. Conclusion

In this study, 53% of participants adhered to iron/folate supplementation. Reasons for non-adherence were mainly due to fear of side effects, Lack medication supplementation and lack of information. The determinants influencing adherence to iron supplementation were:

Maternal Education: Pregnant women with diploma-level education or above were 2.9 times more likely to adhere to iron supplementation compared with women with no formal education, indicating that maternal educational status is an important determinant of adherence.

Partners education and occupational level: Women whose partners had secondary education and diploma level or above were 6.9 and 4.4 times more likely to adhere to iron supplementation respectively. Similarly, women whose partners were employed in the private sector were 3.3 times more likely to adhere to supplementation**.** Emphasizing the importance of partners involvement in iron supplementation adherence during ANC follow up

Maternal Knowledge on Anemia Prevention: Participants who had knowledge of how to prevent anemia were five times more likely to adhere to iron supplementation, showing that the importance of maternal understanding and awareness in promoting adherence. This highlights the importance of health education in empowering women to prioritize iron supplementation.

Counselling on iron adherence. Women who received counseling on iron supplementation during antenatal care were 5.6 times more likely to adhere, highlighting counseling increases awareness of the benefits of iron supplementation and also addresses misconceptions, potential side effects, and correct timing of intake, which reduces fear or forgetfulness—common reason to adherence.

Parity**:** Multiparous women were 68% less likely to adhere to iron supplementation compared with nulliparous women, suggesting that parity influences adherence behaviors during pregnancy.

In conclusion, adherence to iron supplementation was significantly higher among Nulliparous, participants who were educated to the level of diploma and above, those with knowledgeable and supportive partners, women aware of anemia prevention, and those who received counseling

during antenatal care. These findings highlight that both individual knowledge and family support, combined with effective health education and counseling, are critical for improving iron supplementation adherence among pregnant women**.**

6.2. RECOMMENDATIONS

Based on the findings and discussions from this study on iron supplementation adherence among pregnant women, the following recommendations are proposed to improve adherence rates and maternal and fetal health outcomes:

National Level

- **Strengthen national iron supplementation programs:** Ensure consistent supply and distribution of iron supplements to all health facilities to prevent stock-outs and interruptions.
- **Integrate maternal education initiatives into national health policy:** Develop campaigns to improve women's and communities' knowledge on anemia prevention and the benefits of iron supplementation.
- **Promote male partner involvement:** Encourage policies and programs that engage partners in antenatal care education to support maternal adherence.
- **Develop monitoring and evaluation frameworks:** Track adherence rates and barriers at regional and national levels to identify gaps and improve program effectiveness.

Health Facility Level

- **Provide regular counseling and health education:** ANC providers should routinely educate pregnant women about the importance of iron supplementation, management of side effects, and anemia prevention strategies.
- **Ensure uninterrupted supply of supplements:** Maintain adequate stock of iron tablets at all antenatal care units.
- **Target high-risk groups:** Pay special attention to multiparous women and those with lower education levels to reinforce adherence messages.
- **Train healthcare workers:** Enhance skills of ANC staff to deliver effective counseling, manage side effects, and monitor adherence during follow-up visits.

Participant (Individual) Level

- **Increase awareness and knowledge:** Pregnant women should actively seek information on anemia, its prevention, and benefits of supplementation.
- **Adhere to recommended supplementation:** Follow daily iron intake for the recommended duration, even if side effects occur, after consulting with healthcare providers.
- **Engage partners and family support:** Encourage involvement of partners in ANC visits and discussions about maternal nutrition and supplementation.
- **Report challenges promptly:** Inform healthcare providers about side effects, supply shortages, or other barriers to adherence to receive guidance and support.

Further studies should employ objective measures of iron intake to reduce reporting bias and comprehensively assess other contributing factors associated with anemia.

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Annex I

INFORMATION SHEET AND CONSENT FROM

Research Project: assessment of adherence to iron/folate supplementation among pregnant women at Jimma medical center, Ethiopia.

Name of Principal Investigator: Masresha Getachew

Introduction

This information sheet and consent form is prepared by the investigator whose main aim is to study the level of adherence to iron/folate supplementation among pregnant women and factors associated with it. The investigator is a gynecology and obstetrics resident at Jimma University Medical center.

Purpose: to determine the level of adherence to iron supplement and treatment among pregnant women and factors associated with it.

Procedures: you are kindly invited to take part in our research because we believe you can provide the necessary information for the research. Participation in the study is on a voluntary basis. If you are willing to participate in our project, you need to understand and sign the consent form. Then, you will be asked to give your response by the data collectors. All the responses given by the participants and the results obtained will be kept anonymous and confidential. No one outside the research team will have access to your responses.

Risk and/or Discomfort: Since you just came out of the ANC clinic you might feel a little exhausted to be asked again.

Benefits: the research will help us to know the level of adherence to iron supplement and treatment among pregnant women and factors associated with it to determine the possible mitigation to reduce anemia and ultimately maternal death.

Confidentiality and Anonymity: The information that we will collect from this research project will be kept confidential. Information about you that will be collected from the study will be stored in a file, which will not have your name on it, and it will not be revealed to anyone except the principal investigator

Right to Refuse or Withdraw: you have the full right to refuse from participating in this research (you can choose not to respond to some or all of the questions) if you do not wish to participate; and this will not affect you. You also have the full right to withdraw from this study at any time you wish to, without losing any of your rights as a resident of this site.

If you agree to participate in this study, I appreciate your truthfulness. And after having this consent form read to you, please put a sign below to show if you are willing to participate (No need of writing your name).

Are you willing to participate in this study?

Yes [ ] No [ ]

Annex II:

Questionnaire on Adherance of Iron- supplementation among women attending ANC follow up at Jimma Medical Center

Part I: Socio-demographic Characteristics

1. Age: _____
2. Marital status:
    a. Single
    b. Married
    c. Divorced
    d. Widowed
3. Place of residence
    a. Urban
    b. Rural
4. Educational status:
    a. Unable to read and write
    b. Able to read and write
    c. Primary education
    d. Secondary education
    e. Diploma and above
5. Educational status husband/partner:
    a. Unable to read and write
    b. Able to read and write
    c. Primary education
    d. Secondary education
    e. Diploma and above
6. Occupation:
    a. Housewife
    b. Government employee
    c. Private employee
    d. Merchant
    e. Student
    f. Daily laborer
    g. Other specify ___
7. Occupation of Husband/partner:
    a. Government employee
    b. Private employee
    c. Merchant
    d. Student
    e. Daily laborer

f. Other specify ___

8. Monthly family income: _____ ETB

Part II: Obstetric History

1. Gravidity: _____
2. Parity: _____
3. History of still birth
   a. Yes
   b. No
4. if yes how many? _____
5. Any history of abortion:
   a. Yes
   b. No
6. If yes how many? _____
7. GA in months ____
8. Inter pregnancy interval from the last pregnancy? _____
9. GA or month of amenorrhea when ANC initiated _____
10. Number of ANC visits in this pregnancy: _____
11. Any Known Chronic medical illness?
    a. Yes
    b. No
12. If yes
    a. Cardiac disease
    b. Diabetes
    c. HTN
    d. RVI
    e. Renal illness
    f. Any know cancer
    g. Others _____

Part III: Knowledge of Anemia and Iron Supplementation

1. Have you ever heard about anemia?
   a. Yes
   b. No
2. If yes, what are the causes of anemia? (Multiple answers possible)
   a. Blood loss
   b. Poor nutrition
   c. infection/Malaria
   d. Others (specify): _____
3. If Yes, What are the sign and symptoms of anemia?

a. Pale face and palm
b. Dizziness
c. Easy fatigability
d. Headache
e. Palpitation
f. Blurring of vision
g. I don't know
h. Other specify _____

4. If yes, do you know how to prevent anemia ?
    a. Yes
    b. No
5. If yes, what are preventive methos during pregnancy?
    a. Iron reach food
    b. Avoiding post meal tea and coffee
    c. Vitamin C rich fruits
    d. Taking Iron tablets
    e. Others _____
6. Do you think anemia affects the health of the mother and fetus?
    a. Yes
    b. No
7. If yes, what is the effect of anemia?
    a. Decreased fetal growth and development
    b. SB
    c. Prematurity
    d. LBW
    e. I don't Know
    f. Other specify
8. Have you ever heard about iron tablets supplementation?
    a. Yes
    b. No
9. If yes, What is your source of information?
    a. Health workers
    b. Media
    c. Friend
    d. School
    e. Other _____
10. If yes, what are the benefits of iron supplementation? (Multiple answers possible)
    a. Prevents anemia
    b. Strengthens mother's health
    c. Prevents birth defects

d. I don't now
e. Others (specify): _____

Part IV: Adherence to Iron Supplementation

1. Did you receive iron tablets during this pregnancy?
    a. Yes
    b. No
2. If yes, how long have you been taking them? _____ months
3. How many tablets did you take per week during the last month?
    a. 1 per week
    b. 2 per week
    c. 3 per week
    d. 4 per week
    e. 5 per week
    f. 6 per week
    g. Daily
4. If you are taking less than 4 per week what were the reasons for missing the tablets? (Multiple answers possible)
    a. Forgetfulness
    b. Fear of side effects on the fetus
    c. Maternal side effects like dyspepsia
    d. Unpleasant test of the medication
    e. Too many pills
    f. Lack of adequate supplementation in health facilities
    g. bored of taking medication
    h. Lack of information about iron supllementation
    i. Others (specify): _____
5. Were you counseled about the importance of taking iron tablets?
    a. Yes
    b. No
6. Who provided you with information about iron?
    a. Health professional
    b. Friends/family
    c. Media
    d. Others (specify): _____

Part V. Attitude toward IFAS

1. Does taking IFA during pregnancy harm the baby?

    a. Yes
    b. No
2. Does taking IFA during pregnancy increase BP?
    a. Yes
    b. No
3. Does taking IFA during pregnancy increase fetal weight?
    a. Yes
    b. No
4. Does taking IFA during pregnancy is against your religion?
    a. Yes
    b. No
5. Does taking IFA during pregnancy is not acceptable in your community?
    a. Yes
    b. No
6. Is there any family member you discourage you taking IFA?
    a. Yes
    b. No
7. Dou you think as IFAS is not important for healthy pregnant women?
    a. Yes
    b. No

1. Current Hb level _____