



Graduate Study Program

School of Public Health

Adherence to Iron and Folic acid supplementation and its associated factors among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia ,2025

Investigator:Libnesh Alemayehu(Bsc)

A thesis report submitted to the school of public health of St Paul Hospital Millennium Medical Collage in partial Fulfillment of the requirements for the Degree of Mater's (MPH) in Epidemiology

January ,2025

Addis Ababa, Ethiopia

St. Paul's Hospital Millennium Medical College

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Investigator: Libnesh Alemayehu (Bsc)

Advisors: Frehiwot Worku (MPH, Assistant Professor)

Samson Zegeye (MPH, Assistant Professor)

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Declaration

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

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Abbreviations

AIDS: Acquired Immunodeficiency Syndrome

ANC: Antenatal Care

AOR: Adjusted odds ratio

COR: Crude odds ratio

DEFF: Design Effect

DHS: Demographic and Health Survey

EDHS: Ethiopia Demographic Health Survey

FMOH: Federal Ministry of health

HIV: Human Immunodeficiency Virus

IFAS: Iron folic acid supplementation

NNP: National nutrition program

NTDs : Neural tube defects

SPSS: Statistical Package for Social Sciences

TB: Tuberculosis

WHO: World Health Organization

Abstract

Introduction: Iron and folic acid supplementation during pregnancy is crucial for maternal and fetal health, preventing anemia and neural tube defects. However, adherence to IFAS recommendations remains a challenge, particularly in low-resource settings.

Objective: To assess adherence of Iron and Folic acid supplementation and its associated factors among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia, 2025.

Methods: An institutional-based cross-sectional study was conducted at St Paul Hospital, Zewditu Memorial Hospital, Gahandi Memorial Hospital, and Yekatit 12 Hospital, Addis Ababa, Ethiopia from the 1st of June to 30th of July, 2025 with a sample of 391 study participants using a systematic sampling method. Data was cleaned, edited, coded and entered into Epi-data version 3.0.1 and exported to SPSS version 25 for analysis. Variables having a P-value less than 0.25 in bivariable analysis were entered into multivariable analysis and variables having a P-value less than 0.05 and a 95%CI in multivariable logistic regression were declared as statistically significant. Results were presented using tables and graphs. Ethical approval was secured and informed consent was obtained from participants.

Results: A total of 391 pregnant women participated in the study, yielding a response rate of 100%. The mean age of the participants was 29.3 years (± 3.8 standard deviation). The overall adherence to iron–folic acid supplementation among pregnant women was 74.1%. In the multivariable analysis, the timing of the first antenatal care (ANC) visit (AOR = 2.73; 95% CI: 1.62–4.62), having four or more ANC visits (AOR = 2.92; 95% CI: 1.58–5.42), receiving counseling on iron–folic acid supplementation (AOR = 4.41; 95% CI: 1.94–10.04), presence of anemia during the current pregnancy (AOR = 5.03; 95% CI: 2.20–11.52), and good knowledge of iron–folic acid supplementation (AOR = 4.66; 95% CI: 2.60–8.34) were significantly associated with adherence to iron–folic acid supplementation during pregnancy.

Conclusion and recommendations: The study found a relatively high level of adherence to iron–folic acid supplementation among pregnant women; however, a substantial proportion remained non-adherent. Strengthening early and regular antenatal care attendance, enhancing

counseling services, and improving maternal knowledge through structured health education should be prioritized.

Key words: Adherence, Iron, Folic Acid, Pregnant Women, Antenatal care

CHAPTER 1: INTRODUCTION

1.1 Background

Iron deficiency anemia is one of the leading public health problems among pregnant women worldwide, particularly in low- and middle-income nations such as Ethiopia. Physiological changes during pregnancy raises the requirement for iron and folic acid , Influencing the fetus' growth and development. This state is critical for the mother's physiological function, fetus growth, and development throughout pregnancy and in later years. Pregnancy related adverse birth outcomes including neural tube defects and cardiac defects are linked to low IFA intake. Adherence to iron–folic acid supplementation throughout pregnancy may benefit both the mother and the fetus. Increased adherence lowers the risk of anemia, hemorrhagic infant illness, and congenital defects, making iron deficiency anemia the most prevalent hematological problem in pregnant women and children(1)

Antenatal care (ANC) is unique health care that women receive during pregnancy and delivery which aims to maintain good health for the child and the mother. One of the components that those women should receive during ANC follow up is blood testing for anemia and Iron Folic acid supplementation in order to prevent pregnancy-related complications and to ensure good infant health.(1,2) World health organization (WHO) recommends 60mg of elemental iron along with 400 microgram folic acid for 6 months so does the Ethiopian national guidelines for control and prevention of micronutrient deficiency recommend daily iron supplement for 6 months during pregnancy and 3 months post-partum. This is a very important step in the prevention of anemia which is one of the major indirect causes of maternal death because more than 50% anemia is due to iron deficiency. Adhering to a higher IFA regimen during pregnancy leads to increased productivity and a reduced risk of iron deficiency anemia, bleeding, sepsis, and maternal death. Conversely, low adherence can impair immune function, vitality, and brain development and can result in low birth weight, preterm birth, and postnatal complications. (3)

Despite clear WHO guidance and recommendations advocating routine iron and folic acid supplementation for pregnant women to reduce maternal anemia and prevent neural-tube defects, the actual use and adherence are still low in many countries, especially in low resource countries which makes anemia pervasive in public health issues since it is linked to

a higher risk of morbidity and mortality, particularly in young children and pregnant women.(4)

Globally the prevalence of anemia is 42.6%, Europe 19%, Asia 42%, N. America 7% and Africa 60%. In pregnant women aged 15-49 globally its 38.2%, Europe 24.5%, Asia 39.3%, N. America 17.8% and Africa 44.6 %.. In Ethiopia, 31.7% of pregnant women are anemic and other several studies in Ethiopia reviled that there is a high prevalence of anemia during pregnancy . (5,6)

1.2 Statement of the problem

Anemia during pregnancy has a significant adverse effect both on the mother and fetus . So far, micronutrient deficiency of iron and folic acid during pregnancy are the most risk factors for anemia and this contributes to the poor neonatal health and increased maternal mortality. Iron and folic acid is the most prevalent micronutrient deficiency in the world particularly among pregnant women especially in developing countries. Pregnant women are at high risk of iron and folate deficiency because of high nutritional demand. Additionally, in developing countries infections like HIV/AIDS, TB, and malaria increase the micro nutrients demand (6)

Folic acid deficiency at conception is associated with risk factor of neural tube defects(NTDs) and other adverse pregnancy outcomes such as preeclampsia, malformations like facial clefts, spontaneous abortion, fetal death, fetal growth restriction, and preterm delivery. Neural tube defects are among the most common birth defects, contributing to miscarriage, infant mortality, severe congenital abnormalities and disabilities. NTDs account for 10% of all neonatal mortality, 10% of the burden of all congenital conditions and these defects are responsible annually for 41,000 deaths. NTDs are affecting 0.5–2 per 1000 pregnancies and occurring in about 2–3% live births worldwide. The incidence of NTDs in developing countries have been reported to be up to fourfold higher than in developed ones . The lifelong medical and socioeconomic consequences of NTDs in affected children are equally known to be worse in low-resource settings. . It is a burden to patients, caregivers, healthcare systems and society.(6,7)

A study conducted in Ethiopia reported that hydrocephalus (35.5%) and neural tube defects (27.5%) were the major leading causes of admission to hospitals for surgical procedures among children .(7) Since folic acid has a major role in DNA and RNA synthesis, for cellular development and division, the metabolism of amino acids and the regulation of homocysteine in the blood ,NTDs could be reduced if women consume a folic acid supplement before and during the early weeks of pregnancy. WHO recommends all pregnant women in areas of malnutrition should receive iron and folate supplementation together with appropriate dietary advice to prevent anemia. It is important for pregnant women to prioritize their health and follow the recommended IFA regimen to ensure a healthy pregnancy and positive outcomes for both mother and baby.(7)

In Ethiopia, the prevalence of anemia among women of reproductive age and children of age 6 to 59 months was 16.6% and 44.2% respectively. In Ethiopia also one in every two women have iron deficiency while one in every three have folic acid deficiency. This means that both iron and foliate deficiencies are major micro nutrient deficiencies in Ethiopia. So iron deficiency is a serious public health issue because of both its prevalence and consequences like preterm delivery, low birth weight, still birth, and maternal and neonatal mortality. (8)

In our country, all pregnant women are targeted for free supplementation of iron and folic acid but there is still high prevalence of anemia. Poor compliance with IFAS is probable reason for ineffectiveness of such programs. Studies conducted in different parts of Ethiopia showed low adherence and the factors associated are not persistent and clearly known. Therefore, this study will be done to determine the adherence to IFAS and identify its associated factors among pregnant women attending ANC in selected government hospitals of Addis Ababa. (8)

1.3 Significance of the study

WHO and Ethiopian national nutrition program (NNP) advocates IFA supplementation as one of the strategies for anemia prevention and control and also to prevent neural tube defects. IFA supplements are dispensed for free in every governmental health facility for pregnant women but only 5% of pregnant mothers took iron supplement for recommended period during their last pregnancy. This low level of adherence suggests the need to study the factors influencing adherence to IFA supplements to facilitate initiatives towards strengthening the IFA supplementation programs and reduce poor maternal birth outcomes associated with its deficiencies. (9)

This study holds significant implications for improving maternal health outcomes in Addis Ababa particularly given that government hospitals serve the vast majority of pregnant women in the city. By identifying the key factors influencing adherence to iron and folic acid supplementation among pregnant women attending these facilities, this research provides critical evidence for tailoring antenatal care interventions to the specific needs and challenges faced by this population. The findings can inform the development of targeted health education programs, improve the accessibility and quality of ANC services, and contribute to the formulation of more effective public health policies aimed at reducing the prevalence of anemia in pregnancy and promoting optimal fetal development within Addis Ababa's government healthcare system.

CHAPTER 2: LITERATURE REVIEW

2.1 Anemia in pregnancy

Anemia during pregnancy is a major global public health problem affecting both developed and developing countries. The World Health Organization defines anemia in pregnancy as a hemoglobin concentration of less than 11 g/dL . Globally, it is estimated that 41.8% of pregnant women worldwide are anemic. At least half of this anemia burden is assumed to be due to iron deficiency with the rest due to conditions such as folate, vitamin B12 or vitamin A deficiency, chronic inflammation, parasitic infections and inherited disorders. The prevalence of iron deficiency anemia in pregnant women is estimated to be an average of 56% in developing countries whereas in industrialized countries the average prevalence is 18%(9)

Globally, IFA supplementation has been shown to reduce the risk of maternal anemia, iron deficiency, low birth weight, and neural tube defects. WHO recommends daily oral supplementation of 30–60 mg elemental iron and 400 µg folic acid for pregnant women, particularly in countries where anemia prevalence exceeds 20%.

In Sub-Saharan Africa, anemia affects a substantial proportion of pregnant women and contributes to adverse maternal and fetal outcomes, including preterm birth, low birth weight, impaired cognitive development, and increased maternal mortality .

In Ethiopia, anemia in pregnancy continues to be a public health problem. According to the Ethiopian Demographic and Health Survey (EDHS) 2016, 24% of pregnant women were anemic nationally, and in Addis Ababa, it was 9.3% (10). Federal Ministry of Health has adopted WHO recommendations and integrated iron and folic acid supplementation into routine antenatal care services. National guidelines recommend that pregnant women receive IFA tablets free of charge and take them for at least 90 days during pregnancy. However, the effectiveness of this intervention largely depends on women's adherence to the recommended regime.(10)

2.2 Adherence of Pregnant Women to Iron and folic acid supplementation

A cross sectional study done in South Australia showed that 23% of pregnant mothers adhered to IFA supplementation . In Malawi 37% of the pregnant mothers consumed the ideal minimum of 180 IFA tablets. Another Study conducted in India using district level household survey data showed that 37% of women received IFAS during their last

pregnancy and only 24% of women consumed for >90 days. Other study done in Indonesia revealed that 46.3% were non-adherent to IFAS (15). A study done in Kenya showed only 24.5% of the study participants were adherent to IFAS.(11)

In a study done on 22 sub-African countries on adherence to iron supplementation and its determinants, the overall prevalence of adherence to ≥ 90 days of iron supplementation during pregnancy was 28.7%, ranging from 1.4% in Burundi to 73.0% in Senegal.

According to 2019 Mini-DHS ,from women with a birth in the previous 5 years 60% received IFA supplement during pregnancy, but only 11% took it for more than 90 days of the recommended 180 days. And 15% of them took for less than 60 days; and 83% of women did not take IFA during their pregnancy.A cross sectional study done at the University of Gondar, in Northwest, Ethiopia, reported that 55% of pregnant women adhered to the recommended Iron and Folic Acid supplementation. Another study conducted in eight rural districts in SNNP, Ethiopia to assess the coverage compliance and factors associated with the use of antenatal iron supplement, Among women who gave birth in preceding year, 35.4% were given prescribed antenatal iron supplement and the average level of compliance was 74.9% (10,11) .In Addis Ababa facility based cross sectional study conducted in Yeka Sub-City governmental health centers 2019 , showed that 59.8% of pregnant women attending ANC took iron-folic acid supplementation for 90 days or more during pregnancy.

2.3 Factors Associated with Adherence to Iron and folic acid supplementation

Socio demographic characteristics

A cross sectional study conducted in Denbiya district health centers, Northwest Ethiopia showed that maternal Educational status of secondary school and above was a factor associated with adherence of IFAS (AOR =3.44, 95% CI: 1.09, 10.92). Another study conducted in Metema district, north west Ethiopia, revealed that maternal Educational status of secondary school was a factor associated with adherence of IFAS (AOR = 6.09 95% CI (3.26, 11.4). Similarly a study conducted in east Wollega zone, western Ethiopia showed that educational status of secondary school or above was a factor associated with adherence of IFAS (AOR = 2.00, 95% CI 1.5–3.05)(11)

Obstetric and health related factors

A multinational analysis done using data from nine East African countries reported that having four or more ANC visit was a factor associated with adherence of IFAS (AOR $\approx$ 1.79; (95% CI:1.70,1.88) .Study done in 22 sub Saharan African countries revealed that having four and above ANC visit was a factor associated with adherence of IFAS (AOR: 25.73(95% CI: 22.36, 29.60). A cross sectional study conducted in Denbiya district health centers, Northwest Ethiopia showed having three and above ANC visit was a factor associated with adherence of IFAS (AOR = 4.14, 95% CI: 2.14, 8.01). (5)

A systematic review and meta-analysis study conducted in Ethiopia indicated that early registration for ANC was a factor associated with adherence of IFAS (OR=2.41,95%CI:1.76,3.29). A cross sectional study conducted in Denbiya district health centers, Northwest Ethiopia revealed that for early registration for ANC was a factor associated with adherence of IFAS (AOR = 1.95, 95% CI 1.25, 3.06). Another study conducted in east Wollega zone, western Ethiopia showed that Early ANC enrollment by pregnant women was a factor associated with a adherence of IFAS (AOR = 1.93, 95% CI 1.47–2.62).(12)

A study conducted at public health facilities in Northwest Ethiopia showed that history of anemia during current pregnancy was a factor associated with adherence of IFAS (AOR = 4.21, 95% CI = 1.77). Another study conducted in Metema district health centers, Northwest Ethiopia showed history of anemia during current pregnancy was a factor associated with adherence of IFAS (AOR = 2.31, 95% CI 1.36, 3.94).Similarly study conducted in east Wollega zone, western Ethiopia showed that history of anemia during current pregnancy was a factor associated with adherence of IFAS (AOR = 1.60, 95% CI 1.11, 3.16)(13)

Client related factors

A study conducted in Zinder, Niger showed that Good knowledge of IFAS was a factor associated with adherence of IFAS (OR: 1.77, 95% CI 1.21, 2.60). A systematic review and meta-analysis study conducted in Ethiopia indicated that good knowledge about IFA supplement was a factor associated with adherence of IFAS [OR = 2.2, 95%CI: 1.05,5.24] A cross sectional study conducted in Denbiya district health centers, Northwest Ethiopia, showed that Good knowledge of IFAS was a factor associated with adherence of

IFAS (AOR = 1.61, 95% CI 1.06, 2.43). Another study conducted at public health facilities in Northwest Ethiopia showed that Good knowledge of IFAS was a factor associated with adherence of IFAS (AOR = 2.1, 95% CI = 1.29–3.44). (14)

Study conducted in east Wollega zone, western Ethiopia showed that Good knowledge of anemia was a factor associated with adherence of IFAS (AOR = 1.50, 95% CI 1.00, 2.11) (12)

Health service related factors:

A study conducted at public health facilities in Northwest Ethiopia showed that counseling obtained about IFAS during current pregnancy was a factor associated with adherence of IFAS (AOR) = 2.53, 95% CI = 1.37–4.66. A systematic review and meta-analysis study conducted in Ethiopia indicated that counseling obtained about IFAS during current pregnancy was a factor associated with adherence of IFAS (OR = 2.34, 95% CI: 1.05, 5.24). (13)

Conceptual frame work

This conceptual framework was developed by the researcher after reviewing various global, regional, and local studies on factors associated with adherence to iron–folic acid supplementation during pregnancy, it posits that a pregnant woman's adherence to iron and folic acid supplementation is a multifaceted outcome influenced by several key factors. Adherence status, the dependent variable, is proposed to be directly affected by a complex interplay of independent variables. The framework assumes that these factors can individually and collectively impact a pregnant woman's decision and ability to consistently take iron and folic acid supplements as recommended, ultimately affecting her adherence status and, consequently, maternal and fetal health outcomes.

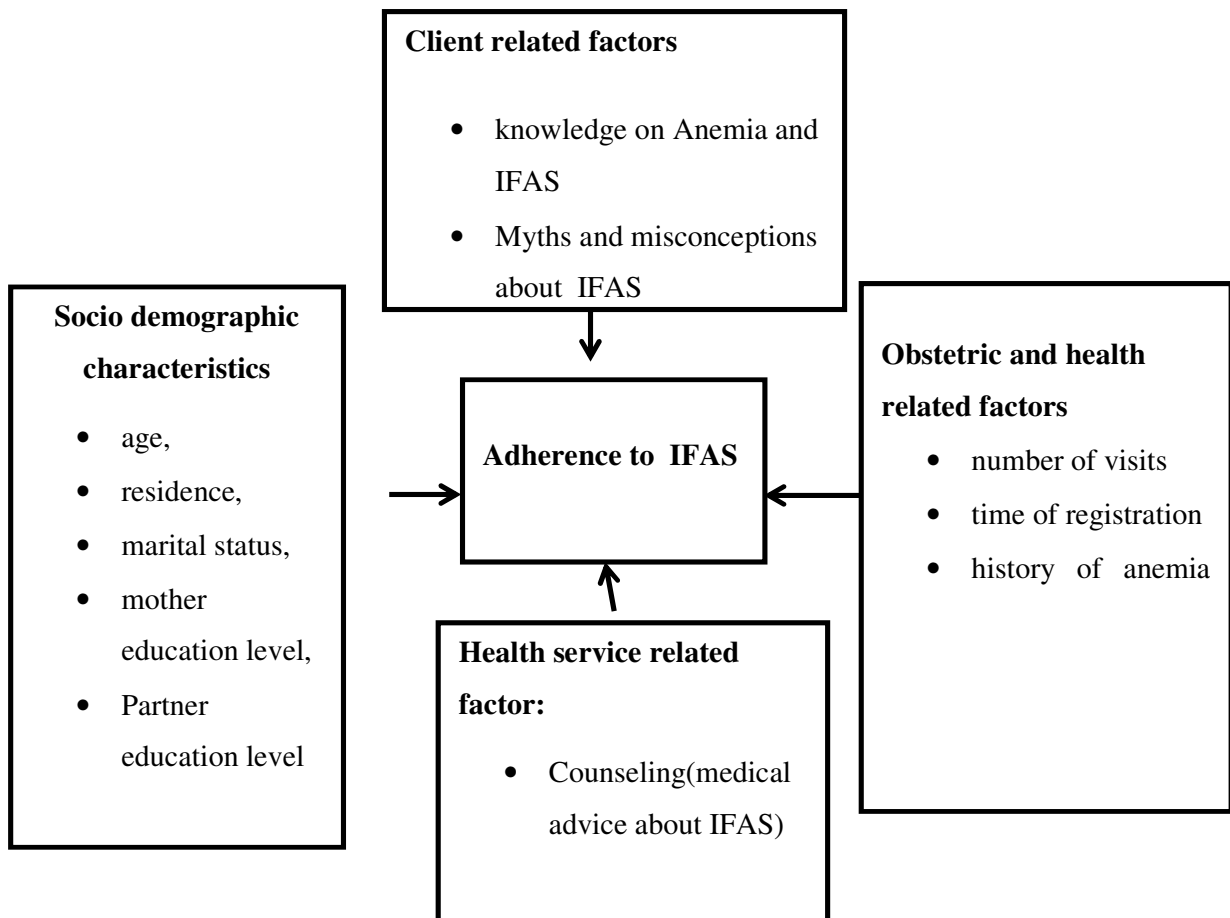


Figure 1 Conceptual frame work for the study on adherence of iron and folic acid supplementation among pregnant mother attending antenatal care in government hospitals of Addis Ababa,Ethiopia

CHAPTER3: OBJECTIVES

3.1 General Objective

To asses the level of adherence to Iron and folic acid supplementation and its associated factors among pregnant women attending Ante natal care in government Hospitals of Addis Ababa, Ethiopia ,2025

3.2 Specific Objectives

To asses the level of adherence to Iron and folic acid supplementation among pregnant women attending Ante natal care in government Hospitals of Addis Ababa,Ethiopia,2025.

To identify factors associated with adherence to Iron and folic acid supplementation among pregnant women attending Ante natal care in government Hospitals of Addis Ababa, Ethiopia,2025.

CHAPTER 4: METODOLOGY

4.1 Study area and period

This study was conducted from 1st of June to 30th of July, 2025 at ANC clinic of four randomly selected government Hospitals of Addis Ababa (St Paul Hospital, Zewditu Memorial Hospital, Gahandi Memorial Hospital, and Yekatit 12 Hospital).

4.2 Study design

Facility based cross –sectional study was conducted.

4.3 population

4.3.1 Source population

All pregnant women attending ANC clinics in government hospitals of Addis Ababa who had been taking iron–folic acid supplementation for at least three months (≥ 90 days) prior to the survey.

4.3.2. Study population

All pregnant women attending antenatal care (ANC) clinics in selected government hospitals of Addis Ababa during the study period who had been taking iron–folic acid supplementation for at least three months (≥ 90 days).

4.3.3 Sample population

All pregnant women from the study population who were selected and enrolled into the study using a systematic random sampling technique during the study period.

4.4 Eligibility Criteria

4.4.1. Inclusion Criteria

All pregnant women attending antenatal care (ANC) clinics in selected government hospitals of Addis Ababa, Currently in their third trimester of pregnancy who had at least two ANC visits for the current pregnancy previously supplemented with 60mg iron and 0.4mg folic acid tablets for at least three months before the date of the interview and Willing to provide informed consent and participate in the study.

4.4.2. Exclusion Criteria

Pregnant women with serious illness during the study period were excluded from the study.

4.5. Sample size determination and Sampling procedure

4.5.1 Sample size determination

Sample size is determined after calculating for both specific objectives

Sample size for first objective

Using single population proportion formula, 63.6% adherence rate of IFA supplementation among pregnant women was used from cross sectional study done in Metema Distric,northwest Ethiopia with 5% marginal error and 95% confidence interval (CI) of certainty ($\alpha=0.05$). (15)

Based on above assumption:

$$n = \frac{(Z \alpha/2)^2 pq}{d^2}$$

Where;

n = Minimum sample size for a statistically significant survey

Z = Normal deviant at the portion of 95% confidence interval two tailed test = 1.96

P = established prevalence from previous studies of the topic of interest (Adherence rate) in Metema distric, Northwest Ethiopia ($p=63.6\%$) (15)

$q= 1-p$,

d = margin of error acceptable was taken as $5\%= 0.05$ accordingly, $n = 355$

Adding 10% for non-response rate, the final sample size became, $n=355+36=391$

Sample size for second specific objective

Table 1 Sample size determination of study on adherence of iron and folic acid supplementation among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia

Variables	CI	AOR	Ratio (unexposed/ exposed)	Power	% of unexposed with outcome	Sample size	Total in adding 10%
Number of ANC visits (34)	95%	3.04	1	80%	79.2%	262	286
Good knowledge about IFAS (40)	95%	2.1	1	80%	59.0%	290	319
Adequate concealing from service provider (41)	95%	2.53	1	80%	70.3%	252	277

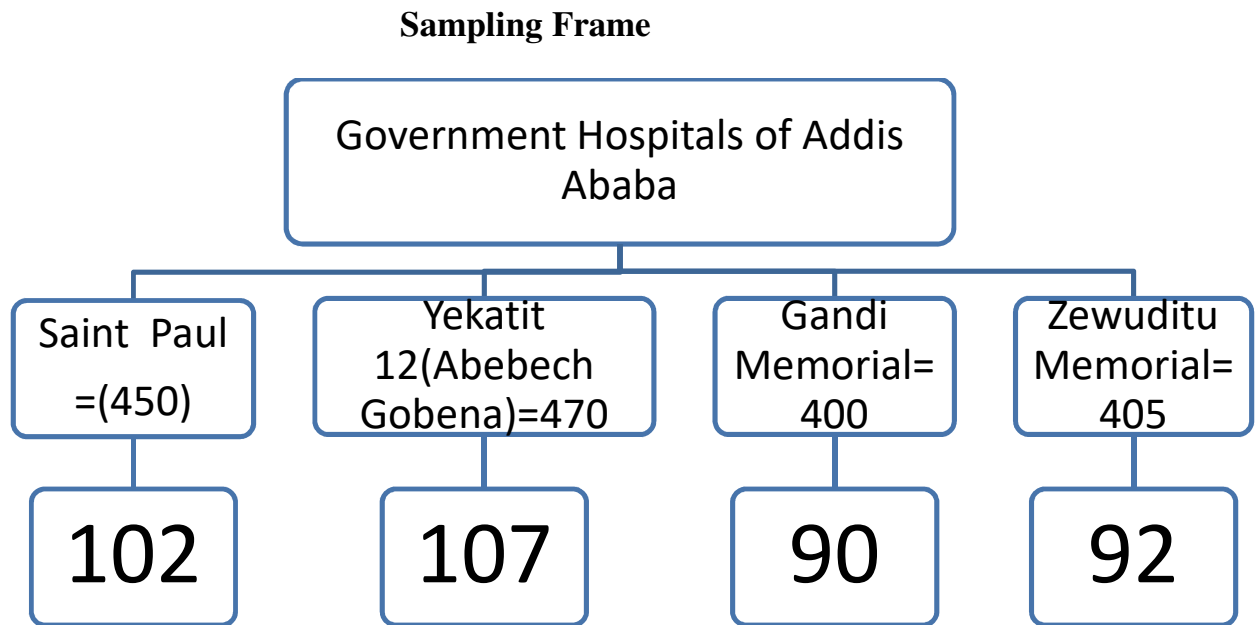
Taking the larger sample, sample size become 391

4.5.2 Sampling procedure

Multistage sampling technique was employed. In the first stage, four government hospitals were selected randomly from the list of all government hospitals in Addis Ababa (TASH, ZMH, GMH, SPMMC, Tirunesh B., Y12 HMC, ASH, Ras desta, Alert, Minilik II, Yeka, SPSH). In the second stage, the total sample size ($n = 391$) was proportionally allocated to the selected hospitals based on the average monthly ANC attendance. Finally, study

participants were selected systematically from each hospital's ANC registration lists using a fixed interval (k) calculated by dividing the number of eligible women by the allocated sample for each hospital.

Although a multistage sampling technique was employed, , design effect was not applied during sample size calculation($DEFF = 1$) because study participants were selected using systematic random sampling at the individual level with proportional allocation across hospitals, which minimizes clustering effects.



Total=391

Figure 2 sampling frame for the study on Adherence of iron and folic acid supplementations and its associated factor among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia

4.6 Study Variables

4.6.1 Dependent Variable:

Adherence to Iron and folic acid supplementation (1=yes, 0-No)

4.6.2 Independent Variables

Socio-economic and demographic factors: age, residence, marital status, mother education level, partner education level

Obstetric and health related factors: number of visits, time of registration, , history of current anemia

Health service related factor: Counseling about IFAS

Client related factors: knowledge on Anemia, knowledge on IFAS

4.7. Operational Definition

Adherence: Pregnant women are said to be adhered to IFA supplement if they took the supplement at least 4 days per week (13)

Non Adherent to IFAS: is defined as pregnant women taking IFA tablets less than 4 times per week in the previous one month preceding the survey (13)

Adherence rate: is the percentage of the prescribed doses of the medication actually taken by the patient over a specified period (13,16)

Early registration to ANC clinic: Those pregnant women who visit the ANC clinic before three months(twelve weeks) of gestation (17)

Late registration to ANC clinic: Those pregnant women who visit the ANC clinic after three months (16)

Good knowledge on anemia: those pregnant women who answered mean value and above on questions set to assess comprehensive knowledge of anemia in study participants. (17)

Good knowledge on IFA: those pregnant women who answered mean value and above on questions set to assess comprehensive knowledge of IFAS of the respondents (13)

4.8. Data Collection tool

The Data was collected using a structured interview administered questionnaire developed after reviewing various literature sources. In additions to that the clients medical records were reviewed to double check the data collected through the interview. The questionnaire addresses the women's socio-demographic factors, Obstetric and health related factors, Health service related factors and Client related factors .

4.9. Data collection procedures

The Data was collected by four trained BSc Holders in Nursing and supervised by Masters holders working in area different from the study area. The data collectors used a pretested questionnaire. The data were collected using face-to-face interviews and chart review through a structured interviewer-administered questionnaire

4.10 Data quality assurance and management

A properly designed data collection instrument was provided after translation into Amharic and appropriate training for data collectors and supervisors. Training was provided for both data collectors and supervisors by the principal investigator, which focused on the aim of the study, procedures, data collection techniques, the art of interviewing, ways of collecting the data, and clarification on how to manage the data collection process. Pre-testing of the questionnaire was carried out with 5% of the study participants at Ras Desta Memorial Hospital one week before the data collection period and all the necessary correction was made based on the pretest result to avoid any confusion and for better completion of the questions. Every day the collected data was reviewed and cross-checked for completeness before data entry.

4.11 Data processing, analysis and presentation

Data was coded, cleaned, and entered by Epi-data version 3.0.1 and exported to statistical package for social science (SPSS) version 25.0 and was recoded, cleaned for inconsistency and missing value and finally analyzed. Descriptive statistics like frequency distributions mean and standard deviation were computed. Bivariate analysis was done primarily to check which independent variables have an association with that of the dependent variable. Accordingly, variables with a p-value of less than 0.25 during Bivariate logistic regression analysis were entered into a multivariable logistic regression model to control for all possible confounders. All the assumptions of logistic regression (model adequacy and

multicollinearity of the independent variable) were checked using appropriate methods. The absence of multi-collinearity was checked by using standard error <2. Model adequacy was checked by using the Hosmer and Lemeshow goodness of fit test having a P-value >0.05. The odds ratio along with a 95% confidence interval was estimated to measure the strength of the association. The level of statistical significance was measured at a P value less than 0.05. Finally, the result was presented using tables, figures, and texts.

4.12. Ethical consideration

Ethical clearance was obtained from Saint Paul Millennium Medical College Public Health Research Management Directorate. Following ethical approval from research and publications office of Saint Paul Millennium Medical College, a letter of permission was also obtained from higher officials of selected government Hospitals of Addis Ababa. The actual data collection was carried out after obtaining informed consent from each study participant. All the necessary measures were taken to maintain and assure the confidentiality and all benefits of the study participants and those Non-adherents will be counseled as well.

4.13. Dissemination and utilization

The final report of the study will be presented and submitted to Saint Paul millennium Medical College. It is also planned to communicate the result with those government Hospitals with documentation and possibly with presentation. With the help of my advisors effort will be applied to send the paper for peer reviewed publication.

5. RESULT

5.1 Socio-demographic characteristics

A total of 391 pregnant women were involved in the study, yielding a response rate of 100%. The mean age of study participants was 29.3 (± 3.8 standard deviation (SD)) years. A large proportion of the study participants (82.1) were within the age range of 25-34 years. Almost all participants 389(99.5%) were married. Approximately half 192 (49.1%) of pregnant women were at the secondary education level and 236(60.4%) were house wife. Regarding pregnant women's husband's educational status 227(58.1%) were at the secondary education level. Urban residents made up more than four-fifths(85.9%) of the respondents and more than half 211(54%) had four to six family members.

Table 2 Socio demographic characteristics of pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia

Variables	Category	Frequency	%
Age (Years)	15–24	24	6.1
	25–34	321	82.1
	35–49	46	11.8
Residence	Rural	55	14.1
	Urban	336	85.9
Educational status	Cannot read and write	12	3.1
	Read and write	55	14.1
	Primary education	132	33.8
	secondary education and above	192	49.1
Occupation	House wife	236	60.4
	Government employee	78	19.9
	Merchant	25	6.4
	Self employed	52	13.3
Marital status	Married	389	99.5
	Other	2	0.5
Partner educational status	Can not read and write	6	1.5
	Read and write	4	1
	Primary education	154	39.4
	secondary education and above	227	58.1
Family size	One –three	172	44
	Four-six	211	54
	Above six	8	2

5.2 Obstetric and health facility-related characteristics of pregnant women

Out of 391 study participants, 92.1% of respondents were in their third trimester of the pregnancy during the data collection period. More than half of study participants (58.3%) came before three months of gestational age for their first ANC visit. Majority of pregnant women (66.5%) attended two to three ANC visits whereas the rest had four and above ANC visits. Three hundred forty eight (89%) of respondents were provided counseling on IFA tablets. Nearly three quarters (72.9%) of the study participants had good knowledge about anemia and 23.8% of pregnant women had anemia during their current pregnancy. A substantial majority of respondents (78%) had good knowledge about IFA tablet.

Table 3 Obstetric and health facility related characteristics of pregnant women attending antenatal care in Addis Ababa, Ethiopia

Variables	Category	Frequency	%
Living child	No	332	84.9
	Yes	59	15.1
Trimester	Second	31	7.9
	Third	360	92.1
First ANC visit	>3 month	163	41.7
	≤3 month	228	58.3
Number of ANC visits	2-3	260	66.5
	≥4	131	33.5
counseling about taking IFAS	No	43	11.0
	Yes	348	89.0
Anemia currently	No	298	76.2
	Yes	93	23.8
Knowledge of Anemia	Poor	106	27.1
	Good	285	72.9
Knowledge of IFAS	Poor	86	22
	Good	305	78

5.3 Adherence rate to IFAS

The prevalence of adherence to iron–folic acid supplementation among pregnant women attending government hospitals in Addis Ababa was 74% (95% CI: 69.7%–78.4%).

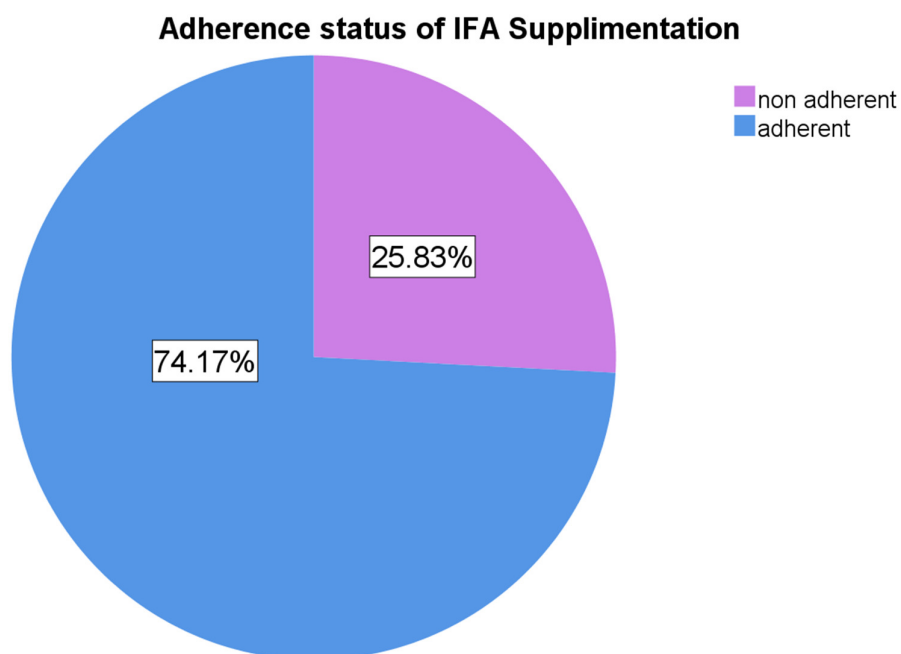


Figure 3 Level of adherence to iron and folic acid supplementation among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia

5.4. Reasons for taking IFA tablet

Among respondents who adhered to iron–folic acid (IFA) supplementation, the predominant reason for adherence was counseling and explanations provided by healthcare providers regarding the importance of the supplement, accounting for 71.4%. This was followed by fear of illness (17.5%). Family support contributed to adherence among 6.5% of respondents, while the remaining 4.6% reported that receiving the supplement free of charge motivated their adherence (Figure 4).

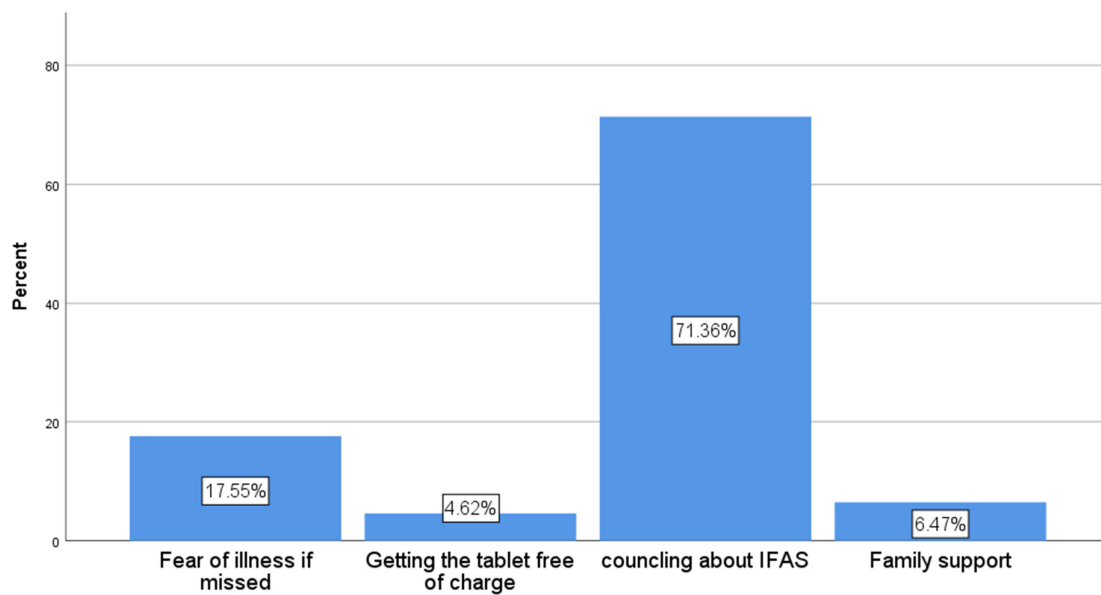


Figure 4 Reasons for taking IFAS tablet among pregnant women attending antenatal care in government hospitals of Addis Ababa, Ethiopia

5.5 Factors associated with non adherence to IFA supplementation

Bivariate analysis was conducted for variables including Fear of side effect, Fear that babies will become bigger, Forgetfulness and fear of too many tablets would harm the mother or baby. Among these : Fear of side effect, Forgetfulness and fear of too many tablets would harm the mother or baby were associated with poor adherence and were therefore included in the multi-variable analysis.

In multi-variable logistic regression Fear of side effect, Forgetfulness and fear of too many tablets would harm the mother or baby remained significantly associated with poor adherence to IFAS during pregnancy.

Fear of side effect was significantly associated with poor adherence, Pregnant women who reported fear of side effects were 86% less likely to adhere to iron–folic acid supplementation compared with those who did not report such fear. (AOR = 0.14(0.067,0.292). Forgetfulness was another factor significantly associated with poor adherence, Mothers who experienced forgetfulness were 82% less likely to adhere to IFAS compared to those who did not forget to take the tablets. (AOR=0.180(0.078,0.413)). A belief that too many tablets could harm the mother or baby also associated with poor adherence, Pregnant women who believed that taking too many tablets could harm themselves or their baby were about 19.3% less likely to adhere to IFAS compared to those who did not have this belief (AOR=0.807(0.708,0.899)).

Table 5: Factors associated with non adherence to IFA supplementation among pregnant women attending antenatal care in government hospitals of Addis Ababa

Variables	Categories	Adherence		COR(95% CI)	P(Biv)	AOR(95% CI)	P(multi)
		yes	no				
Fear of side effect	no	93	22	1	–	1	–
	yes	67	75	0.211(0.12,0.374)	0.000	0.140(0.067,0.292)	0.000
Forgetfulness	no	139	66	1	–	1	–
	yes	21	31	0.322(0.172,0.602)	0.000	0.180(0.078,0.413)	0.000
Too many tablets would harm the mother or baby	no	90	31	1	–	1	–
	yes	70	66	0.36(0.121,0.401)	0.000	0.807(0.708,0.899)	0.001

From those non adherent pregnant women 45% of them reported fear of side effects as the main reason for non-adherence, followed by forgetfulness (38.4%). The remaining respondents (16.5%) believed that taking multiple tablets could be harmful to both the mother and the baby.

Reason of missing IFA tablet

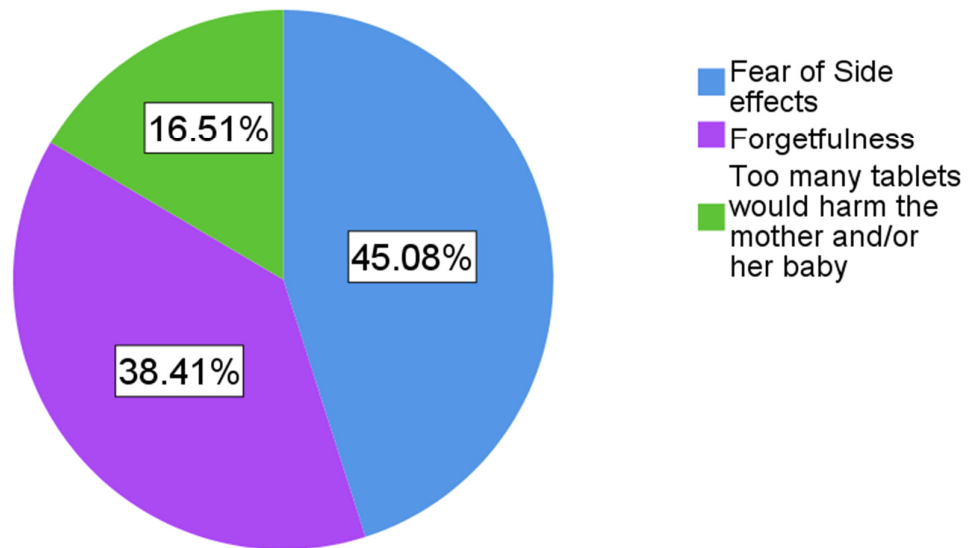


Figure 5 Reasons for missing IFA tablet among pregnant women attending antenatal care in government hospitals of Addis Ababa

5.6 Factors associated with adherence to IFAS supplementation

Bivariate analysis was conducted for variables including residence, occupation, mother's educational status, partner's educational status, marital status, monthly income, time of first ANC visit, number of ANC visits, counseling on IFAS, anemia during the current pregnancy, good knowledge about anemia, and good knowledge about IFAS. Among these, time of first ANC visit, number of ANC visits, counseling on IFAS, anemia during the current pregnancy, good knowledge about anemia, and good knowledge about IFAS were significantly associated with adherence and were therefore included in the multivariable analysis.

In multivariable logistic regression, time of first ANC visit, number of ANC visits, counseling on IFAS, anemia during the current pregnancy, and good knowledge about IFAS remained significantly associated with adherence to IFAS during pregnancy.

The odds of IFAS adherence among Pregnant women who initiated their first ANC visit within the first three months of gestation were 2.73 times higher than those who started ANC after three months (AOR = 2.73; 95% CI: 1.62–4.62). Adherence was also higher among mothers who attended four or more ANC visits. Pregnant mothers who attended four or more ANC visits had 2.92 times higher odds than those with fewer visits (AOR = 2.92; 95% CI: 1.58–5.42). Receiving counseling about IFAS significantly increased adherence, the odds of adherence among mothers who received counseling about IFAS were 4.41 times higher than those who did not receive counseling (AOR = 4.41; 95% CI: 1.94–10.04).

Current anemia status was another significant factor, the odds of IFAS adherence among pregnant women with anemia were 5.03 times higher than among non-anemic mothers (AOR = 5.03; 95% CI: 2.20–11.52). Additionally, good knowledge about IFAS was positively associated with adherence; women with good knowledge of IFAS had 4.66 times higher odds of adherence than those with poor knowledge (AOR = 4.66; 95% CI: 2.60–8.34).

Table 6 Factors associated with adherence of IFAs among pregnant women attending antenatal care in government hospitals of Addis Ababa

Variables	Categories	Adherence		COR(95% CI)	P(Biv)	AOR(95% CI)	P(Multi)
		Yes(%)	No(%)				
Residence	Rural	33(60)	22(40)	1	-	1	—
	Urban	229(68.2)	107(31.8)	1.427(.794,2.564*)	0.23	1.236(.586,2.604)	0.57
Educational status	Cannot read and write	8(66.7)	4(33.3)	1	—	-	—
	Read and write	30(54.5)	25(45.5)	.600(.162,2.22)	0.44	—	—
	Primary education	96(72.7)	36(27.3)	1.33(.379,4.700)	0.65	—	—
	secondary education and above	128(66.7)	64(33.3)	1.00(.290,3.446)	0.88	—	—
Occupation	House wife	158	78	1	—	—	—
	Government employee	59	19	1.5(.855,2.74)	0.60	—	—
	Merchant	18	7	1.26(.509,3.16)	0.15	—	—
	Self employed	27	25	0.533(.290,.979)	0.04	—	—
Marital status	Married	261	128	1	-	—	—
	Other	1	1	2.03(.127,32.86)	0.61	—	—
Partner educational status	Can not read and write	3	3	1	—	—	—
	Read and write	2	2	.474(.093,2.406)	0.72	—	—
	Primary education	103	51	.474(.065,3.43)	0.39	—	—
	secondary education	154	73	.9571(.619,1.48)	0.36	—	—

	and above						
Time of first ANC visit	>3months	77	86	1	-	1	—
	<=3	185	43	4.8(3.05,7.55)*	0.001	2.73(1.62,4.62)**	0.001
Number of ANC Visits	2-3	150	110	1	-	1	—
	>=4	112	19	4.323(2.50,7.40)*	0.001	2.92(1.579,5.422)**	0.001
Counseling on IFAS	No	13	30	1	-	1	—
	Yes	249	99	5.804(2.90,11.58)*	0.001	4.41(1.94,10.04)*	0.001
anemia during Current pregnancy	No	179	119	1	1	1	—
	Yes	83	10	0.18(0.90,.363)*	0.001	5.03(2.20,11.52)*	0.001
Knowledge of anemia	Poor	55	51	1	-	1	—
	Good	207	78	2.46(1.55,3.904)*	0.001	1.14(0.64,2.01)	0.65
Knowledge of IFAS	Poor	34	52	1	-	1	—
	Good	228	77	4.5(2.73,7.49)*	0.001	4.66(2.60,8.34)**	0.001

*variables having P- Value<0.25 in bivariate analysis , **Significant at P< 0.05 in multivariate analysis,1.00 = reference

6. DISCUSSION

This study was aimed to assess the IFA supplementation adherence and its associated factors among pregnant women who attend ANC in government hospitals of Addis Ababa, Ethiopia. Using interval estimation, this study indicated that the true prevalence of iron-folic acid supplementation adherence among pregnant women attending government hospitals in Addis Ababa lies between 69.7% and 78.4%. This finding was in line with the results of studies conducted in eight rural districts of Ethiopia (74.9%), Mizan Aman (71%) and Bench Maji Zone, Ethiopia (70.6%). However, the finding was higher than other studies conducted in South India (64%), Akaki Kality, Addis Ababa (60%), Gondar, Northwest Ethiopia (55%) and Assella (60%). The reason behind the difference may be that most of the pregnant women involved in this study were from urban areas and the pregnant women might get information from different sources like the media and health centers.(19)

Gestational age at first ANC visit, number of ANC visits, counseling on IFAS, anemia during, current pregnancy and good Knowledge of IFAS were independent factors positively affecting women's adherence to IFAS. On the other hand, the study revealed that fear of tablet side effects, Forgetfulness and misunderstanding about the IFA tablet were factors negatively affecting women's adherence to IFAS.(18)

This study showed that Gestational age at first ANC visits had a significant association with adherence to IFAS. Pregnant women who had first ANC visit before three months of gestational age were 2.73 times more likely to be adherent to IFAS than those pregnant women who had first ANC visit after three months of gestational age. It is in line with the study done at the Western Zone of Tigray, Amhara and Oromia regions of Ethiopia. The possible justification might be pregnant mothers who came early for ANC follow-up attend more ANC visits throughout their pregnancy and had a chance to get repeated counseling on the benefits of IFAS, take more IFA supplements, and adhere to IFA supplements. Early initiation of ANC increases opportunities for mothers to receive health education, repeated counseling, and timely initiation of supplements. It also improves maternal compliance with supplementation because of prolonged follow-up and reinforcement of messages.(19)

The number of ANC visits was another predictor that had a significant effect on adherence. Pregnant Mothers who had four or more ANC visits were 4.3 times more likely to adhere to IFAS than mothers who had less than four ANC visits. This finding is supported by study done in Indonesia, 22 Sub-Saharan African countries ,Uganda, Southern Senegal and Amhara, Ethiopia. The reason behind this might be frequent contacts with health professionals enhance reinforcement of messages, reminds about the importance of IFAS, and early detection of barriers to adherence. In addition when pregnant women come to ANC follow up, they might get iron and folate supplementation with counseling from health care professionals and hear about the benefits of adherence to the table and the consequences of discontinuation of the supplement. So that they might have to strictly adhere to IFAS.(20)

This study also revealed that counseling about IFAS had statistical significance with IFAS adherence status. the odds of adherence among mothers who received counseling about IFAS were 4.41 times higher than those who did not receive counseling. This is similar to the study done at Ugand, Debre Tabor General hospital,Misha district and Mizan Aman.(9) The possible justification may be that Counseling provides essential information about the purpose, dosage, side effects, and benefits of supplements, thereby improving motivation, increase level of knowledge, attitude and practice towards IFAS adherence.(13)

Furthermore, the study presented that anemia during current pregnancy is another predictor of adherence to IFAS. Pregnant mothers who had anemia currently were 5 times more likely to be adherent to IFAS than those pregnant mothers who didn't have anemia. This finding is similar with the study conducted in India, Tanzania, Tigray, Ethiopia, and Western Amhara, Ethiopia.The reason may be Experiencing anemia and its related symptoms may increase mothers' perceived severity and susceptibility, thereby motivating adherence to prescribed supplements. Another possible reason may be pregnant women who had anemia during their current pregnancy were counseled in detail about the consequence of anemia for the fetus and themselves and also about the benefit of taking iron with folic acid tablets to prevent and treat anemia which makes them more adherent to IFAS.(17)

Finally this study indicated that good knowledge about IFAS has significant association with adherence to IFAS. Pregnant women who had good knowledge about IFAS were 4.6 times more likely to be adherent to IFAS than those who have poor knowledge about IFAS. This result goes in line with the study done in Indonesia, Southern Ethiopia and Western Amhara, Ethiopia. This may be due to adequate knowledge about the role of IFAS in preventing maternal anemia, reducing complications, and improving birth outcomes enhances adherence. Additionally knowledge will increase the level of awareness about IFAS and in turn, it will increase the attitude and practice towards adherence of IFAS.(8,17)

Regarding reasons for non adherence ,Fear of side effects was the most frequently reported reason for missing IFA tablets in the present study, accounting for 45% of non-adherence. This fear may discourage continued intake of IFA supplements, particularly when pregnant women experience or anticipate common side effects such as nausea, vomiting, constipation, or abdominal discomfort. Such adverse perceptions can lead women to intentionally skip doses or discontinue supplementation altogether, thereby reducing overall adherence. Similar findings have been reported in facility-based studies, done in northwest and southern region ,Ethiopia where fear of side effects had consistently been identified as a major factor for non adherence to IFAS among pregnant women. These studies suggest that inadequate counseling on expected side effects and their management contributes to misconceptions and poor compliance.(13) The mechanism underlying this association is primarily behavioral: without adequate explanation that these side effects are usually mild and manageable, women may view tablets as harmful rather than beneficial. To address this, strengthening counseling on expected side effects and their management during ANC visits is critical. Providers should proactively discuss common side effects, and offer practical mitigation strategies, such as taking tablets with food or at specific times of day.

Forgetfulness was the second most common reason for non-adherence, reported by 38.4% of respondents. This may be attributed to busy daily routines, lack of consistent follow-up and reminder systems, or low prioritization of supplementation in the absence of immediate perceived benefits. Women who lack consistent follow-up, and reminder mechanisms, are more likely to miss doses, highlighting the importance of behavioral and system-level interventions.

The remaining 16.5% of respondents believed that taking multiple tablets could be harmful to both the mother and the baby. This misconception may reflect inadequate knowledge about the purpose and safety of IFA supplementation during pregnancy. Such beliefs can create fear and resistance toward regular tablet intake, ultimately lowering adherence. Comparable findings have been reported in study done in public health facilities in Northwest, Ethiopia which emphasize that misinformation and low maternal knowledge about IFA are strongly associated with non-adherence.(13) These findings implied the need for targeted health education and effective counseling to address misconceptions and improve adherence to IFA supplementation. Addressing these misconceptions requires enhanced health education that goes beyond basic messaging. Health workers should integrate culturally appropriate explanations of the benefits and safety of IFA into routine ANC counseling, correcting myths with evidence-based information. Involving community health extension workers and incorporating educational messages into broader maternal health campaigns can further disseminate correct information at the community level.

7. LIMITATION OF THE STUDY

The findings of this study should be interpreted with some limitations. Pill counting method which is the standard method for assessing adherence were not used in this study as it is expensive and information on adherence status was from a self-report of taking tablets. Therefore, this study could not reject the possibility of reporting those pregnant women who did not actually take the tablets and it might suffer from recall bias and social desirability bias.

8. CONCLUSION AND RECOMENDATIONS

8.1 Conclusion

This study assessed adherence to iron and folic acid supplementation (IFAS) and its associated factors among pregnant women attending ANC in government hospitals of Addis Ababa, Ethiopia. Nearly three-fourths of participants were adherent to IFAS. Early initiation of ANC within the first trimester, attending four or more ANC visits, receiving counseling on IFAS, having anemia during the current pregnancy, and possessing good knowledge about IFAS were independent predictors of adherence. Conversely, fear of tablet side effects, forgetfulness, and misconceptions about IFAS were the main reasons for non-adherence. These findings highlight the importance of improving ANC service utilization, enhancing maternal knowledge, and addressing barriers to strengthen IFAS adherence

8.2. Recommendations

For Health Care Providers

- Strengthen comprehensive ANC counseling on IFAS, including information on common side effects, their management, and reassurance, to reduce discontinuation and improve adherence.
- Routinely review upcoming and missed ANC appointments during service delivery, provide individualized counseling at subsequent visits, and initiate timely follow-up using available communication or referral mechanisms.

For Health Facilities

- Organize regular health education programs focusing on early ANC initiation, the importance of IFAS, and correction of misconceptions.
- Implement reminder mechanisms, such as SMS alerts or phone calls, to reduce forgetfulness

Ministry of Health

- Strengthen national and regional strategies promoting community-based health education on IFAS and ensure adequate resource allocation.
- Integrate IFAS counseling, adherence monitoring, and follow-up mechanisms into routine ANC services.

Researchers

- Further analytical studies with different study designs are recommended to better assess factors associated with iron folic acid supplementation adherence

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ANNEXES

Annex I- Participant information sheet and informed consent form

(English version)

Hello! My name is _____ and I am collecting data for a study on the Adherence to Iron and Folic Acid Supplementation and Its Associated Factors among Pregnant Women Attending Antenatal Care in government hospitals of Addis Ababa, by Libnesh Alemayehu, who is studying for her master's degree at St Paul Hospital Millennium Medical Collage . I kindly request you to lend me your attention to explain about the study and being you selected as the study participant.

The purpose of this study is to assess how well pregnant women follow the recommendations for taking iron and folic acid supplements and to identify factors that may influence their adherence. The findings will help to improve antenatal care services in Addis Ababa government hospitals and promote healthier pregnancies.

If you agree to participate, you will be asked to answer a questionnaire. This will take approximately 10-20 minutes. All the information that you are going to provide me will remain confidential and you don't need to mention your name. For this reason, I kindly request you to give me your sincere and truthful answer.

All of your participation is completely on voluntary bases and you have the right to refuse from participation. Participation or non-participation and refusal to answer questions will have no effect on your life. If you have further questions or would like to know the results of this study, please feel free to contact the principal investigator; with the following address

Principal investigator: Libnesh Alemayehu

Phone Number: 0926524584

Annex II : English version data collection tool Data Collection tool

Date of interview				
Institution's name				
Code number				
Interviewer's	Name		Signature	

Part I:Socio-demographic and economic characterestics		
Q . no	Question	Choices for response
101	How old are you?	
102	Where is your residence?	1.Rural 2.Urban
103	What is your educational status	1.Can not read and write 2. Read and write 3. Primary education 4. secondary education and

		above
104	What is your occupation(what kind of work do you mainly do)	1 House wife 2. Daily laborer 3. Government employee 4. Merchant 5. other(specify)
105	What is your current marital status	1 single 2. Married 3. divorced 4. other(specify)
106	If married what is your partner educational status	1. Can not read and write 2. Read and write 3. Primary education 4. secondary education and above

107	What is your family size?	1. One-three 2. Four-six 3. Above six
108	What is your family average monthly income? (In Birr)	Specify in number (s)
Part II- O obstetric and Health Facility related characteristics		

201	How many times you were pregnant?	Specify in number (s)
202	Do you have a child (children)?	1. Yes 2. No
203	If yes for Q no. 202, how many numbers of living child (children) do you have now?	Specify in number (s)
204	At what gestational age are you? (in months) (by considering your last normal menstrual period)	Specify in number (s)
205	During this pregnancy when did you first visit the ANC clinic? (gestational age in months)	1. <4months 2. 4-7months 3. >7months
206	How many ANC visits do you have? (in this pregnancy)	1. One-two 2. Three-four 3. >Four
207	How much time it takes from your home to the health facility by foot? (In minutes)?	Specify in number (s)
208	During any of your antenatal care visits, did a health care provider give you medical advice about taking IFAS?	1. Yes 2. No
209	If your answer for Question No. 208 is yes, about what aspect (s) of IFAS they told you? (Multiple answers allowed)	1. Importance 2. How and for how long it is taken 3. Possible side effects 4. Other (specify)
Part III: Knowledge of Anemia:		
301	Have you ever heard of Anemia?	1. Yes 2. No
302	Which one of the following is/are the sign/symptoms of anemia? (Multiple answers allowed)	1. Palmer Pallor 2. Tiredness 3. Blurring of vision 4. I don't know

303	Do you know any cause of Anemia? (Multiple answers allowed)	1. Poor nutrition (taking unbalanced diet) 2. Excessive Bleeding 3. Malaria 4. I don't know
304	Which one of the following will prevent Anemia? (Multiple answers allowed)	1. Taking Iron containing foods 2. Taking iron and folic acid supplements 3. Prevention of malaria 4. I don't know
305	What complication of Anemia do you know? (Multiple answers allowed)	1. Delivery complications 2. Increase risk of maternal disease 3. Low birth weight of infant 4. I don't know
306	Which food is/are rich/high in Iron? (Multiple answers allowed)	1. Red meat 2. Chicken 3. Fish 4. I don't know
307	Which food could inhibit/prevent iron absorption if eaten with iron rich foods? (Multiple answers allowed)	1. Tea 2. Coffee 3. Green leafy vegetables 4. I don't know
Part IV - knowledge of Iron and folic acid supplementation		
401	Have you ever heard about IFAS?	1. Yes 2. No
402	Taking IFAS during pregnancy is important for the mother	1. Yes 2. No
403	Taking IFAS during pregnancy is important for the infant	1. Yes 2. No
404	A mother should take IFAS starting from the date of confirmation and continues	1. Yes 2. No
	throughout pregnancy	
405	Taking iron and folic acid tablets during pregnancy helps to prevent anemia	1. Yes 2. No
406	Taking iron and folic acid tablets during pregnancy leads to too big baby	1. Yes 2. No

407	Taking iron and folic acid tablets during pregnancy may help to prevent birth defects	1. Yes 2. No
Part V - IFAS intake (Adherence) and other health related characteristics		
501	Do you have history of previous anemia?	1. Yes 2. No
502	Do you have history of anemia during current pregnancy (check chart)?	1. Yes 2. No
503	For how long did you take IFAS? (in months)	
504	During the previous one month, on average how many tablets (IFA) did you take per a week?	Specify in number (s)
505	What were the reasons for taking the IFA tablets? '(Multiple answers allowed)	1. Adequate explanation (medical advice) about the tablets by providers 2. Family support to take the tablet 3. Getting the tablet free of charge 4. Fear of illness if missed 5. Other (specify)
506	What were the reasons for not taking (missing) the IFA tablets? ' (Multiple answers allowed)	1. Too many tablets would harm the mother and/or her baby 2. Fear of Side effects 3. Fear that babies will become bigger 4. Forgetfulness 5. Other (specify)

Thank You very Much!!!

Name of the Data collector: _____

Date: _____ **Signature:** _____

Name of the Supervisor: _____

Date: _____ **Signature:** _____

Annex III:-Amharic Version of Information Sheet and Consent Form

ሰላም! ስሜ _____ እባላለሁ በአዲስ አበባ በሚገኙ የመንግስት ሆስፒታሎች ውስጥ በቅድመ ወሊድ እንክብካቤ በሚከታተሉ ነፍሰ ጡር እናቶች መካከል የ አይረን (የደም ማነስ መከላከያ) እና ፎሊክ አሲድ አወሳሰድ እና ተያያዥ ምክንያቶችን በተመለከተ ለጥናት መረጃ እየሰበሰብኩ ነው። ይህ ጥናት የምካሄደው በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ የማስተርስ ዲግሪዎን በምትከታተለው ልብነሽ አለማየሁ ነው።

ይህ ጥናት ነፍሰ ጡር ሴቶች የ አይረን (የደም ማነስ መከላከያ) እና ፎሊክ አሲድ ተጨማሪ መድሃኒቶችን ለመውሰድ መመሪያዎችን ምን ያህል በቅርበት እንደሚከተሉ ለመገምገም እና በእነሱ ላይ ተጽእኖ ሊያሳድሩ የሚችሉ ምክንያቶችን ለመለየት ያለመ ነው። ውጤቶቹ በአዲስ አበባ በሚገኙ የመንግስት ሆስፒታሎች የቅድመ ወሊድ እንክብካቤ አገልግሎቶችን ለማሳደግ እና ጤናማ እርግዝናን ለመደገፍ ይረዳሉ።

ይህን መጠይቅ ለመሙላት ከ30 እስከ 40 ደቂቃ የሚወስድ ሲሆን በዚህ ቃለ መጠይቅ ፈቃደኛ ካልሆኑ ያለመሳተፍ መብትዎ የተጠበቀ ነው። እርስዎ በዚህ ጥናት ተሳታፊ በመሆንዎ በቀጥታ ሊያገኙ የሚችሉት ነገር ላይኖር ይችላል፤ ነገር ግን የእርስዎ ተሳትፎ በአገልግሎቱ አጠቃቀም እና ምክንያት ዙሪያ ያሉ ችግሮች ወይም ክፍተቶች ለማሳየት እና ትክክለኛ የመፍትሔ አቅጣጫ ለመጠቀም እጅግ አስፈላጊ ነው። ጥናቱ ውጤታማ ሊሆን የሚችለው እርሶ በሚሰጡት ትክክለኛ መልስ ላይ የተመረከዘ በመሆኑ፤ ጥያቄዎቹን በጥንቃቄ እንዲመልሱልን ፍቃደኝነትዎን በትህትና እንጠይቃለን።

በተጨማሪም የሚሰጡት መረጃ ከተባለለት ጉዳይ ውጪ እንደማይውል እና ሚስጥራዊነቱ የተጠበቀ እንደሚሆን አረጋግጣለሁ። በቃለ መጠይቅ ወቅት ለእርስዎ ግልጽ ያልሆነ ነገር ካለ መጠየቅ ይችላሉ። ለመመለስ ፈቃደኛ ያልሆኑበት ጥያቄ ካለም ማለፍ ይችላሉ። በየትኛውም ምክንያት በመጠይቁ መሃል ማቋረጥ ቢፈልጉ ጥያቄዉን የማቋረጥ መብት አለዎት። ተጨማሪ ጥያቄ ካለዎትና እንዲሁም በቀጣይ

የተሰበሰበው መረጃ ውጤት ለማወቅ ከፈለጉ ከዚህ በታች በተጠቀሰው የጥናቱ ባለቤት ስልክ ቁጥርና አድራሻ ተጠቅመው ማግኘት ይቻላል።

እርሶም በዚህ ጥናት በመሳተፍ ከልብ አመሰግናለሁ!!!!!!

ልብነሽ አለማየሁ

+251926524584

Annex IV:- Amharic version data collection tool

Date of interview				
Institution's name				
Code number				
Interviewer's	Name		Signature	

ክፍል 1: አጠቃላይ መረጃ		
ተ.ቁ	መጠይቅ	ምላሽ/ አማራጭ
101	ዕድሜህ ስንት ነው?	
102	መኖሪያህ የት ነው?	1. ገጠር 2. ከተማ

103	የትምህርት ሁኔታ	1. ማንበብ እና መፃፍ የማይችል 2. ማንበብ እና መፃፍ የሚችል 3. የመጀመሪያ ደረጃ ትምህርት የተማረ 4. ሁለተኛ ደረጃ ትምህርት የተማረ
104	የስራ ሁኔታ	1. የቤት እመቤት 2. የቀን ሰራተኛ 3. የመንግስት ሰራተኛ 4. ነጋዴ 5. ሌላ ካለ ይጠቀስ_____
105	የጋብቻ ሁኔታ	1. ያገባ 2. ያላገባ 3. የተፋታ 4. ባሏ የሞተበት
106	ባለትዳር ከሆነ የትዳር ጓደኛዎ የትምህርት ደረጃ ምን	1. ማንበብ እና መፃፍ አይቻልም

	ይመስላል?	2. ማንበብ እና መጻፍ ይችላል 3. የመጀመሪያ ደረጃ ትምህርት 4. ሁለተኛ ደረጃ ትምህርት እና ከዚያ በላይ
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107	የቤተሰብ መጠን	1. 1-3 2. 4-6 3. ከ 6 ቤተሰብ በላይ
108	አማካኝ የወረ ገቢ	_____?
ክፍል 2 ከጽንሰና ከጤና ተቋም ጋር የተያያዙ መጠይቆች		
201	ለምን ያክል ጊዜ አርግዘሽ ታውቂያለሽ::	_____?
202	ልጅ አለዎት::	1. አዎ 2. የለኝም
203	202 ለጥያቄ አዎ ከሆነ፣ አሁን ስንት ልጆች አሉዎት?	_____?
204	አሁን እርግዝናዎ ስንተኛ ዕድሜው ነው	_____?
205	ለእርግዝና ክትትል ወደ ጤና ድርጅት የሄዱት መቸ ነበር::	1. ከአራት ወር በፊት 2. ከአራት - ሰባት ወር 3. ከሰባት ወር በኋላ
206	በእርግዝናዎ ወቅት ለስንት ጊዜ የእርግዝና ክትትል ነበተረዎት::	1. ከአንድ እስከ ሁለት ጊዜ 2. ከሶስት እስከ አራት ጊዜ 3. ከአራት ጊዜ በላይ
207	በእግር መንገድ ከቤትዎ ጤና ድርጅት ድረስ ስንት ሰዓት ይወስዳል::	_____?

208	ለእርግዝና ክትትል ሲመጡ በእርግዝና ጊዜ ስለሚወሰድ የአይረን(የደም ማነስ መከላከያ ትምህርት) ተምረው ያውቃሉ።	1.አዎ 2.አልወሰድኩም
209	ለጥያቄ ቁጥር 208 የሰጡት መልስ አዎ ከሆነ፣ ስለ የትኛው ነግረውዎታል? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. አስፈላጊነት 2. እንዴት እና ለምን ያህል ጊዜ መወሰድ እንዳለበት 3. ሊሆኑ የሚችሉ የጎንዮሽ ጉዳቶች 4. ሌላ (ይግለጹ)
ክፍል 3: የደም ማነስ እውቀት መጠይቆች		
301	ስለ ደም ማነስ ሰምተህ ታውቃለህ?	1. አዎ 2. አይ
302	ከሚከተሉት ውስጥ የደም ማነስ ምልክቶች የትኞቹ ናቸው? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. የእጅ መዳፍ ነጭ መሆን 2. ድካም 3. የእይታ መደበዝበዝ 4. አላውቅም
303	የደም ማነስ መንስኤዎችን ያውቃሉ? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. ያልተመጣጠነ አመጋገብ 2. ከመጠን በላይ የደም መፍሰስ 3. ወባ 4. አላውቅም
304	ከሚከተሉት ውስጥ የደም ማነስን ለመከላከል የሚረዳው የትኛው ነው? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. በ አይረን የበለጸጉ ምግቦችን መመገብ 2. የ አይረን እና ፎሊክ አሲድ ታብሌቶችን መውሰድ 3. ወባ መከላከል 4. አላውቅም
305	ምን ዓይነት የደም ማነስ ችግሮች ያውቃሉ? ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. የወሊድ ጊዜ ችግሮች 2. የእናቶች በሽታ የመጋለጥ እድልን ይጨምራል 3. በጨቅላ ሕፃናት ውስጥ ዝቅተኛ የወሊድ ክብደት 4. አላውቅም
306	በ አይረን የበለፀጉ/ከፍተኛ የሆኑ ምግቦች የትኞቹ ናቸው? (ከአንድ በላይ መልስ መምረጥ ይቻላል)	1. ቀይ ስጋ 2. ዶሮ 3. ዓሣ 4. አላውቅም
307	በ አይረን የበለፀጉ ምግቦች ጋር ከተመገቡ ወደ ሰውነታችን የምሄደውን አይረን መጠን ሊቀንሱ ሊከለክሉ/ሊከሉ የሚችሉ ምግቦች የትኞቹ ናቸው?	1. ሻይ 2. ቡና 3. አረንጓዴ ቅጠል ያላቸው አትክልቶች 4. አላውቅም
ክፍል 4		
ስለ አይረን እና ፎሊክ አሲድ ግንዛቤን የሚመለከቱ መጠይቆች።		
401	ስለ አይረን (የደም ማነስ መከላከያ) ሰምተው የሚያውቁት ነገር አለ?	1. ስምቸ አውቃው 2. ስምቸ አላውቅም
402	አይረን (የደም ማነስ መከላከያ) በእርግዝና ጊዜ መውሰድ ጠቃሚ ነው ብለው ያስባሉ?	1. አዎ 2. አይጠቅምም

403	አይረን (የደም ማነስ መከላከያ) በእርግዝና ጊዜ መውሰድ ለፅንሰ ጠቃሚ ነው ብለው ያስባሉ?	1. ይጠቅማል 2. አይጠቅምም
404	አንዲት እናት እርግዝናከተረጋገጠበት ቀን ጀምሮአይረን (የደም ማነስ መከላከያ) መውሰድ መጀመር እና በእርግዝና ጊዜ ሁሉ መቀጠል አለባት ብለው ያስባሉ	1. አዎ 2. አላስብም
405	በእርግዝና ወቅት አይረን (የደም ማነስ መከላከያ) እና ፎሊክ አሲድ ታብሌቶችን መውሰድ የደም ማነስን ለመከላከል ይረዳልብለው ያስባሉ	1. አዎ 2. አላስብም
406	አይረን (የደም ማነስ መከላከያ) በእርግዝና ጊዜ መውሰድ የፅንሱ ክብደት ይጨምረዋል ብለው ያስባሉ	1. አዎ 2. አላስብም
407	አይረን (የደም ማነስ መከላከያ) በእርግዝና ጊዜ መውሰድ በፅንሱ ላይ የሚደረስ የእርግዝናን የአካል ጉዳት ይቀንሳል ብለው ያስባሉ።	1. አዎ 2. አላስብም
ክፍል 5 - አይረን እና ፎሊክ አሲድ አወሳሰድ እና ሌሎች ከጤና ጋር የተያያዙ ጥያቄዎች		
501	በህይወት ዘመንዎ የደም ማነስ ህመም ነበረበዎት	1. አዎ 2. የለብኝም
502	ነፍሰ ጡር እናቷ የደም ማነስ ችግር አለባት።(ቻርት በማየት)	1. አዎ 2. የለባትም
503	አይረን (የደም ማነስ መከላከያ) ለምን ያህል ጊዜ ወስደዋል? (በወራት ውስጥ)	_____?
504	ባለፈው ወር በአማካይ በሳምንት ስንት የአይረን ታብሌቶችን ወስደዋል?	_____?
505	የ አይረን ታብሌቶችን ለመውሰድ ምክንያቶች ምን ነበሩ? (ብዙ መልሶች ተፈቅደዋል)	1. ከጤና እንክብካቤ አቅራቢዎች ስለ ታብሌቶች ትክክለኛ ማብራሪያ (የህክምና ምክር) 2. ከቤተሰብ ድጋፍ 3. በነጻ መቀበል

506	የ አይረን ታብሌቶችን ያልወሰዱበት ምክንያቶች ምን ነበሩ? (ብዙ መልሶች ተፈቅደዋል)	1. በጣም ብዙ ታብሌቶች እናትን እና/ወይም ህፃኑን ሊጎዱ ይችላሉ። 2. የጎንዮሽ ጉዳቶችን መፍራት 3. ህፃኑ በጣም ትልቅ ይሆናል ብለው መፍራት 4. መርሳት
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በጣም አመሰግናለሁ!