ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF PUBLIC HEALTH

Could Self-report a valid method to measure adherence to iron folic acid supplementation among pregnant women attending antenatal care service in Addis Ababa, Ethiopia

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ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE
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COULD SELF-REPORT A VALID METHOD TO MEASURE ADHERENCE TO IRON FOLIC ACID SUPPLEMENTATION AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE SERVICE IN ADDIS ABABA, ETHIOPIA

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ANC – Antenatal Care

BMQ - Brief Medication Questionnaire

CDC – Communicable Disease Control

DHS - Demographic Health Survey

EDHS – Ethiopian Demographic Health Survey

EMD – Electronic Monitoring Device

FA – Folic Acid

HGB – Hemoglobin

ID – Iron Deficiency

IDA – Iron Deficiency Anemia

IFA – Iron Folic Acid

IFAS – Iron Folic Acid Supplementation

LBW – Low Birth weight

LMIC – Low and Middle Income Country

MASRI -Medication Adherence Self-report Inventory

PC – Pill count

RCT – Randomized Control Trail

SES – Socio-economic status

SPSS – Statistical Package for Social Science

WHO – World Health Organization

ABSTRACT

Background: Iron folic acid supplementation during pregnancy is one of the major intervention given for pregnant women to alleviate the risk of anemia. According to WHO 2012 report anemia prevalence among pregnant women is highest in Africa including Ethiopia. The major problem with increased prevalence of anemia during pregnancy is noncompliance as the women fails to take their pills properly.

Objective: Aimed to validate self report to measure adherence to iron folic acid supplementation among ante-natal care attending pregnant women in Addis Ababa Ethiopia.

Methods: Longitudinal was employed among 361 pregnant women in Addis Ababa from March to July 2019. A multi-stage random sampling procedure was employed. The study participants was prospectively observed over three months using pill count and self report methods. Data were entered using Epi-Info version 7 and analyzed using STATA SE Version 14.1. Estimation of the prevalence of adherence was done using both methods. Sensitivity, specificity and positive predictive value was computed to check the validity on the performance of self report in estimating Adherence. McNemar test was done to assess if there was significant difference in adherence rate between the methods. P-value of <0.05 was considered to indicate a significant difference in prevalence.

Result: The prevalence of iron folic acid supplementation of 82.8% (at 95% CI, 78.5 – 86.6) was obtained by self report where as adherence rate of 58.2% (95% CI of 52.9 - 63.3) was observed using pill count method. Descripance of 24.6 % difference was observed between both methods of adherence measurement. The sensitivity, specificity and RUC curve of self-report was showed 97.7%, 37.7% and 0.68% respectively at a P-Vvalue of < 0.05.

Conclusion: Valid measurment is extremely important in assessing adherence rate. Self report adherence estimation to IFA supplementation continues to be problematic and difficult in determining how pregnant women are using their supplement.

Self-report adherence measurement had poor validity in measuring those who were correctly adhered as compared to pill count. There was a statistically significant difference in estimation of adherence between the self report and pill count methods.

1. INTRODUCTION

1.1 Background

Anemia is a global public health problem affecting two billion people worldwide and approximately 50% of all anemia can be attributed to iron deficiency(1).Particularly pregnant women and preschool-age children take its disproportionate burden. Globally, almost half of all preschool children (47.4%) and pregnant women (41.8%) and close to one third of non-pregnant women (30.2%) are anemic(1, 2). Though anemia has multifaceted causes, half of its burden is attributed to Iron Deficiency (ID)(2). Iron deficiency is due primarily to a lack of bio-available dietary iron(3, 4)or increased requirements during childhood, pregnancy, post-partum periods(5, 6). Anemia prevalence among pregnant women is highest in Africa (57.1%) followed by South East Asia (48.2%)(7).

According to the 2016 report of Ethiopian Demographic and Health Survey, moderate anemia are abundant among the pregnant or breast feeding (29% for both groups) and non-pregnant mothers (21%) in the country. Women living in rural areas are more likely to be anemic (25%) than those living in urban areas (17%)(8). Iron and Folic Acid deficiency during pregnancy are risk factors for anemia, preterm delivery, low birth weight, and this contributes to the poor neonatal health and increased maternal mortality(9).

One of the major interventions to prevent anemia and folic acid deficiency is combined iron folic acid (IFA) supplementation. World Health Organization (WHO) recommends that all pregnant women should receive a standard dose of 30–60 mg Iron and 400 μg folic acid during gestation as part of their ANC follow up (10-12). In Ethiopia, the national guideline for control and prevention of micronutrient deficiencies highlights the need of daily iron supplementation for at least 6 months during pregnancy and 3 months postpartum(12). Despite this program, in Ethiopia, <5% took an iron folic acid supplement for the recommended period (90 days or more), <6% took 60 – 89 pills, about 30% took <60 pills and around 58% did not take any iron tablets during their most recent pregnancy(8).

Therefore, the major problem with iron-folate supplementation in pregnancy is compliance, as women often fail to take the supplements regularly as supplemented by their health workers due to varies factors(9, 12).

1.2 Statement of the Problem

Worlld Health Organization and Ethiopian national guideline for prevention of micronutrient deficiencies highlights the need for daily IFA supplementation for at least 6 months during pregnancy and 3 months postpartum (13). But, effectiveness and success of such interventions depend on the adherence to IFA tablets. Adherence describes the degree to which a patient correctly follows a medical advice. Many experts believe that one of the main reasons that national iron supplementation programs have failed was women's "noncompliance" (14, 15).

Valid measurement of adherence of IFA supplementation during pregnancy is essential at global and national levels to guide policy, program planning and evaluation. Self-reported receipt and consumption of iron supplements during pregnancy is used to calculate population-level coverage of iron supplementation during pregnancy. A commonly reported indicator is the percentage of women with a birth in the 5 years preceding the survey who took iron-containing tablets or syrup for 90 days or more in their most recent pregnancy (16)

According to WHO recommendation, the use of iron and folic acid supplementation is still low in many countries(17). According to the Ethiopia Demographic Health Survey (EDHS) of 2016, less than 5 % of pregnant women took IFA supplement for recommended period during their pregnancy. These might be due to different factors lack availability of supply (it is a pre-requisite for utilization)(18) fear of side effect, forget fullness, lack of women's comprehensive knowledge of anemia, obstetric complications and iron folic acid supplementation (19-22)

However, recall may be incorrect if women do not know or remember receiving supplements or the number of days consumed. Women may also provide positive responses to IFA receipt and consumption if they perceive it is thought by others to be good for themselves or their fetuses, even if they did not consume supplements (social desirability bias). Factors that contribute to the validity of self-reported information may include demographic factors such as age, level of education and socioeconomic status, and survey-related factors such as the sensitivity of questions, the length of the recall period, and the timing(e.g. intrapartum period)(23-27).

Suboptimal adherence to medication regimens continues to be problematic, and poor adherence is compounded by difficulties in determining how patients are using their medications. However, selfreported methods are the preferred choice for most researchers because of ease of administration, although, they have the potential of over-reporting adherence

or failing to disclose non-adherence due to recall bias, missing data, social desirability concerns, and faults in self-observation(28, 29).

In different types of adherence questionnaires and patient interviews, the phrasing of questions, the way a question is asked, the mode of communication (face-to-face, paper and pen, or telephone interview), the skills of the interviewer, and the aptitude of the respondent to understand the question and walingness to provide information can influence the accuracy of responses(30). These differences play an important role and further question the validity of self-report methods used to estimate adherence.

1.3 Rationale and Significance

Adherence is a major problem in implementing IFA supplementation program as of daily recommendation limited information about adherence to iron-folic acid supplementation and valid adherence measurement method in Ethiopia. However, adherence improvement strategy were not designed sufficiently. A few studies have assessed the validity of maternal recall of the content of health services received at or around the time of birth; however, concerns remain about recall.

Therefore, understanding the potential for errors can help the development of indicators, improve adherence measurment design and optimize data collection. Despite the wide use of self-reported information on consumption of iron supplements during pregnancy, limited validation tool exists. So, it would be useful to have a tool that gives the more accurate information.

This study argued that Self report adherence measurement had been used widely. However, we are exploring methods for measuring adherence with greater validity. This study was the first study attempted in Ethiopia to assess iron folic acid self-report measurement validity and to advance the knowledge on relationships between different measurement of adherence (Self Report and Pill Count). So, the objective of this study was aimed to validate self-report adherence measurement compared to pill count method as a reference measurement which is considered to be superior measurement method in indicating the p adherence status.

2. LITERATURE REVIEW

2.1 Valid measurment of iron folic acid supplementation

Valid and reliable measurement of adherence of IFA supplementation during pregnancy is essential at global and national levels to guide policy, program planning and evaluation. Self-reported receipt and consumption of iron supplements during pregnancy is used to calculate population-level coverage of iron supplementation during pregnancy. A commonly reported indicator is the percentage of women with a birth in the 5 years preceding the survey who took iron-containing tablets or syrup for 90 days or more in their most recent pregnancy (16).While definitions of indicators to track coverage of iron supplementation during pregnancy vary, the most common source of coverage data in LMICs is the Demographic and Health Surveys (DHS).

The DHS collect data on the content of ANC received during the last pregnancy, including antenatal iron supplementation. Women of reproductive age (15–49 years) with a live birth in the previous 5 years are asked: "During this pregnancy, were you given or did you buy any iron tablets or syrup? During the whole pregnancy, for how many days did you take the tablets or syrup?" To aid recall, enumerators use visual aids with pictures of common iron supplements. An underlying assumption in these population-based surveys is that women can accurately report on the receipt and consumption of iron supplements for recall periods extending up to 5years(31). However, recall may be inaccurate if women do not know or remember receiving supplements or the numberof days consumed. Women may also provide positive responses to IFA receipt and consumption if they perceive it is thought by others to be good for themselves or their fetuses, even if they did not consume supplements (social desirability bias).

Factors that contribute to the validity of self-reported information may include demographic factors such as age, level of education and socioeconomic status, and survey-related factors such as the sensitivity of questions, the length of the recall period, and the timing (e.g. intrapartum period) (9, 12, 19, 32, 33). Self-reporting on the timing and sequence of events is even more problematic especially among vulnerable populations and during the intrapartum period (34, 35).

The validity and reliability of self-reported data can impede the accuracy of inferences. Therefore, understanding the potential for errors can help the development of indicators, improve measurment design and optimize data collection. Despite the wide use of self-reported information on receipt and consumption of iron supplements during pregnancy, limited validation data exists(36). A few studies have assessed the validity of maternal recall of the content of health services received at or around the time of birth; however, concerns remain about recall (37-41)

2.2 Prevalence of Adherence to iron-folic acid supplementation per recommendation

Adherence to IFA supplementation continues to be problematic, and poor adherence is compounded by difficulties in determining how pregnant women are using their supplement. Valid adherence measuring is extremely important in assessing the effects of supplement in and the mothers response. Many of the currently available methods use different frameworks, and each method has particular strengths and weaknesses, depending on the intended use. When selecting specific methods for adherence analysis, an assessment of each method's validity should be undertaken, and the purpose of the study, accuracy requirements, and available resources should be considered. A combination of measurement methods is recommended as the most effective analysis of adherence measurement.

National IFA supplementation programmes in many countries have had difficulty in achieving the high levels of adherence necessary to effectively reduce anaemia (42). In most countries, antenatal care (ANC) services act as the key entry point for delivery of IFA supplements to pregnant women; women who attend ANC are more likely to use IFA supplements, and the number of tablets consumed increases with the number of ANC visits(43). Yet the often poor quality of ANC and lack of attention to nutrition, including inadequate counselling and supplement supply, make it difficult for women to consume the recommended number of IFA tablets during pregnancy(44). Consumption of the recommended dose is also often hampered by personal and social barriers, including management of side effects, low priority given to IFA and anaemia, forgetfulness and lack of Availability of supply (45-47). Different Studies conducted in SPNN, Amhara, Addis Ababa and EDHS 2016 in Ethiopia reported 39.2%, 20.4%, 60%,<5%, and<3.5% prevalence of IFA supplementation respectively(19-21).

2.3 Impact of Poor Adherence to IFA Supplementation During Pregnancy

Around 2 billion people, accounting to over 30% of the world's population are anaemic, mainly due to iron deficiency (48). Around 40% of women begin their pregnancy with low or absent iron stores (serum ferritin <30mg/l) and up to 90% have iron stores of<500mg (serum ferritin <70mg/l) worldwide, which is insufficient to meet the increased iron needs during pregnancy and postpartum (49). Both Iron and Folic Acid deficiency during pregnancy are risk factors for anemia, preterm delivery, low birth weight, and this contributes to the poor neonatal health and increased Maternal mortality (9). In Africa the prevalence of anemia among pregnant women was 57.1% (48) which is associated with adverse health outcomes for both mother and infant, like maternal mortality, perinatal mortality, growth restriction and low birth weight (50-52).

As one of the developing countries, Ethiopia shares the burden of the problems of anemia.

According to the 2016 report of Ethiopian Demographic and Health Survey, moderate and mild types of anemia are abundant among the pregnant or breast feeding (29% for both groups) and non-pregnant mothers (21%) in the country(8). Therefore, Iron supplementation program is a globally recommended intervention to overcome this problem since it is almost impossible to meet the need of iron during pregnancy by dietary intake(12). However, the major problem with iron-folate supplementation in pregnancy is compliance, as women often fail to take the supplements regularly as supplemented by their health workers due to varying factors (9, 12). This is ascertained by A study in four major regions of Ethiopia (Tigray, Amhara, Oromiya, and Southern Nations Nationalities and Peoples) shows fewer than 3.5% took the supplements for more than 90 days (19) and EDHS 2016 report in which only <5% of pregnant women were took 90+tabs during the recent pregnancy (8).

2.4 Determinant Factors of Adherence to IFA Supplementation

Iron supplementation during pregnancy has been recommended for women in the developing world, since usually no basic changes occur in the composition of the diet. The major obstacle to iron supplementation is compliance with treatment. Some studies were revealed that poor compliance are due to fear of experienced as well as perceived side effect and forget fullness(46, 53-55), and Lack of women's comprehensive knowledge of Anemia, Obstetric complications and Iron–Folic acid supplementation (19-22).

Previous studies done in Ethiopia showed large differences in the proportion of pregnant women who did comply with iron supplementation guidelines, ranging from 3.5 % to 60% (8, 21, 55). Some studies found that the most important factors associated with non-compliance were maternal illiteracy, lack of adequate antenatal care follow up, socio demographic variation (pregnant women's who lives in the rural area were less comply to the recommendation as compared to urban) and house hold wealth index were important determinant factors (8, 21, 22, 56, 57). Other factors were an availability of supply, poor counselling skill of health workers, distance to health center and low autonomy of the mother.

RESEARCH QUESTION / HYPOTHESES

Is self-report a valid method to measure adherence to iron folic acid consumption?

3. OBJECTIVE

3.1 General Objective

- To assess validity of self report adherence measurment to iron folic acid supplementation as compered to pill count as reference method among ante-natal care attending pregnant women in Addis Ababa, Ethiopia.

3.2 Specific Objectives

- To assess validity of self response adherence estimation to iron folic acid supplementation as per recommendation when compared to pill count.
- To estimate the degree of discrepance between self response and pill count in measuring adherence to iron folic acid supplementation
- To estimate proportion of pregnant women who adhered to IFA supplementation among ante-natal care attending pregnant women.

4. METHODS

4.1 Study Area and Period

The study was conducted in Addis Ababa, the capital and the largest city of Ethiopia which covers an area of 527 square kilometers. It is found with an altitude of 2355 meters above sea level and is located at 9^0 1'48"N 38 $^{0\,44'24"}$ with subtropical highland climate. The city has three layers of administration: city government, 10 sub cities namely: Arada, Yeka, Gulele, Addis Ketema, Akaki-Kality, Nifas silk-Lafto, Lideta, Bole, Kolfe-keraniyo and Kirkos and 99 district administrations. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), it is home for various ethnicities with a total population of 3,384,569 with annual growth rate of 3.8%, but population counts as of 2017 are growing closer to 4 Million. All of the population is urban inhabitant.

According to 2016 report of Addis Ababa City Administration Health Bureau (AACAHB), there are 168 health facilities in all sub cities. Out of total health facilities 32 are Hospitals, 100 are Health centers, MCH centers are 16, MCH clinics are 09, and Specialty clinics are 11. The study was conducted form March 1, to July 15, 2019 in Addis Ababa, Ethiopia.

4.2 Study Design and Setting

Facility based Longitudenal study was conducted among pregnant women attending ANC service in public health facility in Addis Ababa.

4.3 Population

4.3.1 Source population

All pregnant women who was attend antenatal care follow up in government health centers of Addis Ababa city during the study period.

4.3.2 Study population

All Pregnant Women of GA (≤) **26 wks** came for ANC serves for the first time to the selected health facilities during the study period.

4.3.3 Inclution criteria

Women who get positive pregnancy test and to whom iron supplement was started

Pregnant women whose Gestational age is $\leq$ **26** wks at the time of enrollment

Who had willingness to participate throughout the study period

4.3.4 Exclution criteria

Temporary resident (less than three months)

A mother with known medical or mental disorders who were unable to respond to the interview

4.4 Sample Size Determination

4.4.1 For the first specific objective

The Sample size was calculated using the sample size estimation formula for diagnostic tests (60): $n = \frac{[SLF \times \sqrt{\psi + PF \times (\psi - d^2)^{1/2}}]^2}{d^2}$

ψ= probability of disagreement between the reference test and contender test

$d = P_2 - P_1$

P_1= sensitivity of reference test

P_2 = sensitivity of contender test

SLF= significance level factor corresponding to 95% CI

PL= power factor corresponding to a power of 80% = 0.84

In this study: P1= Sensitivity of pill count = 93% (38)

P2 = sensitivity of self-response = 88% (38)

SLF=1.96

PL= 0.84

D= 88% - 93% = 5%

$$N = \frac{[1.96 \times \sqrt{0.15 + 0.84\sqrt{(0.05-(0.20)^2)}}]^2}{(0.05)^2}$$

= 482 total sample size was obtained.

4.4.2 For the second specific objective IFA

Quantitative: the sample size was calculated by using single population proportion formula:

$$\mathbf{no= \frac{(Z_{\alpha/2})^2 * P (1-P)}{d^2}}$$

Where, no = the desired sample size

P= the prevalence of adherence to IFA supplementation among pregnant women who took 90+ tablets from EDHS 2016 were (18%).

Z= is the standard normal score set at 1.96

d= is the margin of error to be tolerated (5%)

$$n = \frac{(Z\alpha/_2)^2 * p (1-p)}{d^2} = \frac{(1.96)^2 X (0.18x0.82)}{(0.05)^2} = 227$$

Considering design effect =1.5: 1.5*227 = **341**

A 18% adherence rate of IFA supplementation among pregnant women was used from EDHS 2016 study, with 5% marginal error and 95% confidence interval (CI), (alpha=0.05). And by considering 10% non-respondent rate a total of **375** (341 + 34= 375**)** pregnant mothers was participated in the study.

Finally the large sample (**n = 482)** was participated in the study to assess prevalence of adherence to IFA supplementation by pill count among ante-natal care attending pregnant women.

4.5 Sampling Procedures:

A Multi stage sampling was employed to get representative sample size of study participants. Among ten administrative sub cities three sub cities were selected by simple random sampling. Three health centers were selected from each sub-city by simple random sampling. A total of nine health centers were selected by simple random sampling. The final sample size was allocated proportionally to the size of average estimation of the last six months ANC follow up to selected Health centers. Pregnant women who came for antenatal care service under the selected health center and fulfil the criteria were selected by systemic random sampling method for the study until the required sample size was obtained.

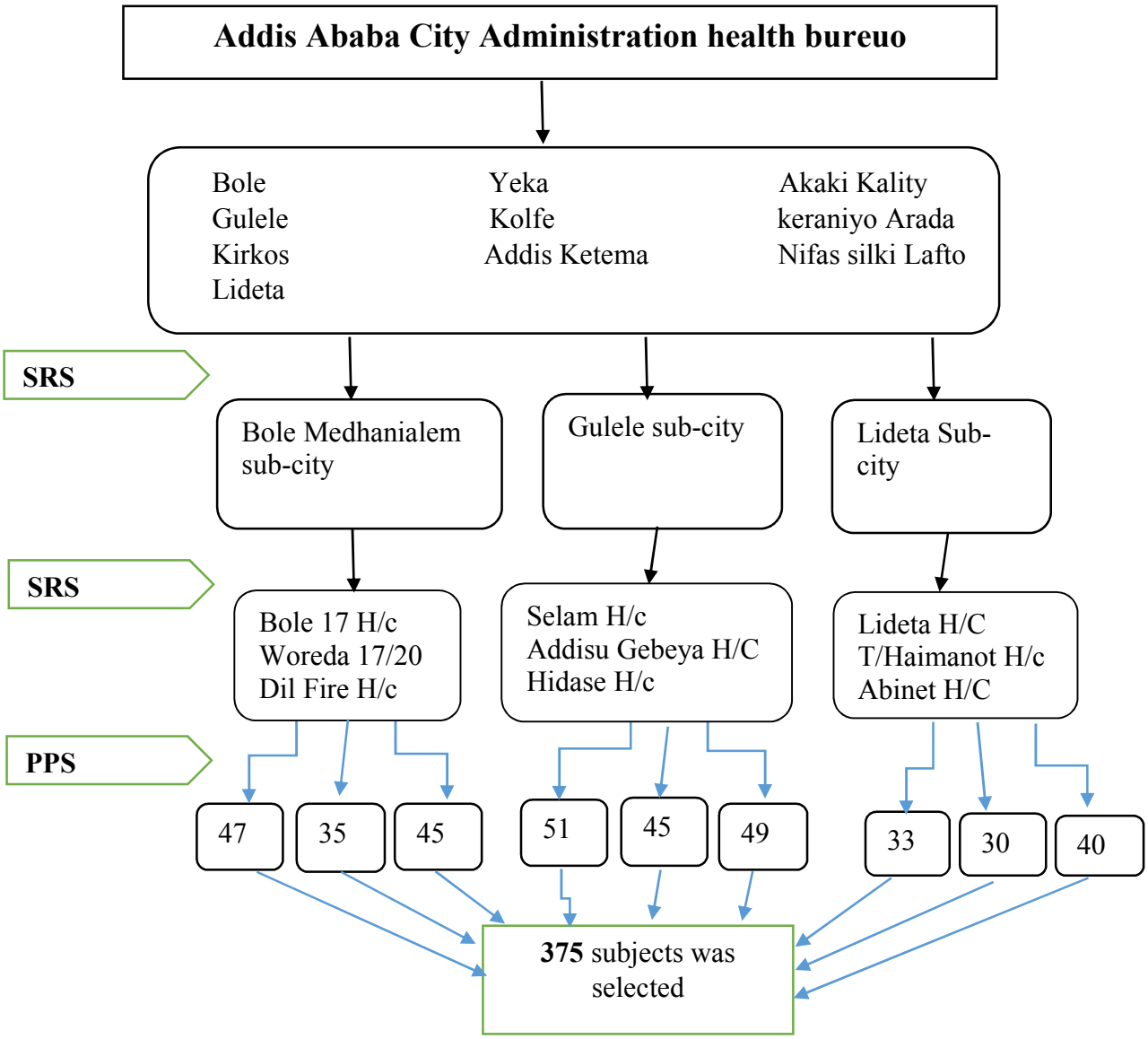

Figure 1. Schematic presentation of sampling technique

4.6 Data Collection Procedures and Tools

4.6.1 Data collection instrument

Interviewer administered structured questionnaires

The purpose of the study was verbally explained to women by trained study interviewers, if they agreed to be interviewed pregnant women was recruited into the study at their first antenatal visit if they met the inclusion criteria. Standardized questionnaire that is adopted from EDHS was used to collect data on sociodemographic characteristics, socio economic and obstetric history. Face to face interview was conducted by the trained data collectors using structured questionnaire. Before starting the interview clear explanation on the purpose, benefit and risk of the study was given and informed consent was obtained from the mothers. After obtaining the consent study participants was followed for 90 days of supplementation period. During the first day of interview information on maternal demographic, socioeconomic characteristics (age, educational status, marital status, occupation and wealth index), obstetric history, health service related issues, mother's knowlegde about anemia and IFA supplement was collected. Women was also asked whether they had received nutritional counselling, folic acid or iron supplements and the reason for taking the supplements or not. The health worker in charge of the ANC was also interviewed about supplement stock-outs and its reason during the study period.

During the subsequent monthly follow up visit data on maternal recall related to iron-folic acid consumption, any problem associated with the use of IFA supplements was collected using face to face interviewer administered questionnaire. Pill count of the remaining unused pills was observed and recorded monthly based by data collectors. Maternal recalls and pill count was conducted starting from the end of first month to the end of third month. During recall interview, mother was asked to recall one month IFA supplement consumption practice. Pill count was conducted by data collector without the knowledge of mother.

The questionnaire was initially developed in English after an extensive search and review of relevant studies done on the issue under caption and then it was translated into Amharic version. The Amharic version is again translated back to English to check for consistency of meaning. The Amharic version questionnaire was pre-tested to check for clarity in similar health facility outside of the study facility prior to the actual data collection.

Pill count measurment

The mother was given iron-folic acid supplements along with an appointment date for the next prenatal visit and supplement refill. The mothers are instructed to keep/ retain/ the prescribed strips/bottles with or without unused pills and bring back to the health center without disposing. Adherence to supplement use was assessed by pill count is based on the number of remaining pills in the retained prescribed bottles/strips. Upon recruitment into the study, participants filled prescriptions for supplements at the Health center ANC clinic, where they given bottles/strips with pills. The number of unused pills in the retained pill bottles/strips was counted and recorded at every subsequent visit, which occurred roughly every 4wks for consecutive three months.

Pill count adherence was defined as the proportion of supplements taken as prescribed and was calculated using the following formula(58).

$$\text{Adherence} = \frac{90 - \text{Number of pills remaining in the bottle}}{\text{Number of days between dispensing date and return date of pill bottle}} \times 100$$

Iron and folic acid supplementation tablets which prescribed to pregnant women, remain tablets was counted after the completion of every one month for consecutive three months(at 4, 8 and 12 weeks of the study) of intake to determine how many pills taken by women from all prescribed tablets. Pill count adherence is defined women as adherent if they took 90 plus tabs of the prescribed supplements during the whole pregnancy period, but in this study if women took 65% or more supplement during the study period it was concedered as adherent, which translates to take the supplements at least 4 d/wk based on previous study( ). Adherence rates were calculated based on the number of pills initially given, the number of pills remained and the interval between the baseline visit and the follow up visit(19, 55)**.**

4.6.2 Data collectors

Nine data collectors (clinical nurses / midwives) and one supervisors (health officer) was recruited from the study facilities. The principal investigator also took the responsibility to control quality of data collected. A two days training was given for the data collectors and supervisor about the main purpose of the study, data collection techniques based on the questionnaires and pill count technique (how to count the remaining unused pills during data

collection). The training was given by the principal investigator (PI). An additional training was given to the supervisor on data completeness, cross-checking and correction actions.

4.7 Study Variable

4.7.1 Dependent variable

- Adherence to IFA supplements

4.7.2 Independent variable

- ✓ IFA Supplementation
- ✓ Socio demographic variation – (Age, Marriage, Education, occupation, family's ownership of fixed household assets and housing condition)
- ✓ Maternal knowledge about anemia and IFAS
- ✓ Gravidity, Parity and Gestational age
- ✓ Availability of supply
- ✓ Distance to Health Center

4.8 Operational and Standard Definitions

Adherent: Pregnant women is defined as adherent if they took 59tabs or more of the prescribed supplements during the study of period of 90 days.

Compliance/ Adherence: The extent to which a patients behavior coincides with medical advice (Bilimale, Anjum, Sangolli, & Mallapur, 2010). In this study it is measured if they took more than 65% of the prescribed supplements, which translates to taking the supplements at least 4 d/wk considered as compliant with iron-folate supplement.

Non-compliant: who consumed less than four IFA supplement per week was considered as noncompliant

Self Response adherence: mothers were said to be adherent if she responded as taken the supplement for 59 or more days (≥65%) of supplementation period of 90 days.

Pill count adherence: was defined as the proportion of supplements taken as prescribed in relation to number of days of supplementation which was 65% (≥ 59 tablet) of the prescribed supplement.

It was calculated using the following formula(58).

$$\text{Adherence} = \frac{90 - \text{Number of pills remaining in the bottle}}{\text{Number of days between dispensing date and return date of pill bottle}} \times 100$$

Satisfactory knowledge on anaemia: Pregnant women were said to have satisfactory knowledge on anaemia if they respond correctly ≥ 4 questions out of seven.

Satisfactory knowledge on IFAS: Pregnant women said to have satisfactory knowledge on IFA supplement if they responds correctly ≥ 2 questions out of three

IFA supplement: A tablet containing 30-60gm of iron and 400ug folic acid compound that prescribed to pregnant women.

4.9 Data Quality Management

Data quality was assured before, during and after data collection process.

Befor data collection: To maintain data quality, data collectors was selected and adequately trained about prenciples of data collection, data collection tool and purpose of the study. Pre-test was conducted on similar facility with selected facility to see for the consistence of responses, language clarity, and appropriateness of the tools. Then the necessary amendments was done based on the findings of the pretest.

During data collection: the amended tool was used for actual data collection at the selected health centers. The collected data was reviewed and checked for mistakes, legibility of handwriting, completeness and consistency and any mistake or ambiguity by principal investigator and supervisor on daily basis during data collection at the site of collection and before data entry.

Aftre data collection: The principal investigator and supervisor together was recheck for completeness and consistency, collected data was coded, manually checked and entered by using Epi-Info version 7. It was cleaned and edited by simple frequencies and cross tabulation before analysis. For analysis, the data was exported from Epi-Info to STATA SE Version 14.1 and was checked for missing values before analysis.

4.10 Data Analysis Procedures

The collected data was coded, manually checked and entered by using Epi-Info 7. For analysis, the data was exported from Epi-Info to STATA SE Version 14.1 and was checked for missing values before analysis. Adherence refrence was used as standared refrence (59+ tabs) for classifying the mother as adhered or nonadhered based on the number of pills the mother was taken.

Principal component analysis was used to generate wealth index from fixed assets: first all study participants were asked on the questionnaire about the family ownership of fixed assets in their house with a score of "1" given to those who own the asset and score of "0"given to those who did not own. Then, all the items asked were assessed for internal consistency. Wealth index was categorized into quintiles to give poorest, poor, medium, wealthy and wealthiest status.

Descriptive characteristics of the sample was calculated from the baseline visit. Descriptive statistics and categorical variables and numerical summary measures are presented using frequencies distribution tables and graphs (diagrams) to describe the study population in relation to relevant variables. Participants that have consumed greater than 65% of the prescribed supplements, which translates to taking the supplements at least 4 d/wk considered as compliant with iron-folate supplement and who consumed less than four IFA tablets per week was considered as noncompliant.

McNemar test was done to assess if there was significant difference in adherence rate between the methods. P-value of <0.05 was considered to indicate a significant difference in prevalence. Sensitivity, specificity and positive predictive value was computed to check the validity on the performance of each method in estimating Adherence to IFAS by respondent based recall against the pill count which is considered to be a reference method. Receiver operating characteristics curve (AUC) was done to compare specificity of the different methods. Kappa agreement was estimated among the methods. Finally result was presented by using appropriate tables and graph.

4.11 Ethical Consideration

Ethical clearance was obtained from the Research Ethics Committee (REC) and permission from the Addis Ababa Health bureau to Sub-cities Health Bureau and their respective offices prior to intiation of the study, then the study facility was visited for data collection. The subjects was selected based on inclusion criteria using simple random sampling method till the required sample size of 375 was reached. The study subjects was explained about the objectives of the study in their vernacular language in clear words, is provided with the information sheet and a verbal informed consent was obtained from each. Confidentiality was maintained at all levels of the study by avoiding the use of names and other identifiers. Participation is purely based on willingness & participant have the right to choose not to take part in this study. Health education was given for the participants to increase their awareness and to improve their adherence status.

5. RESULT

5.1 Socio Demographic Characteristics

Of the total 482 pregnant mother recruited initially, complete data were obtained from 361 pregnant women, yielding a response rate of 75%. The remaining 14 pregnant mother were lost to follow up. The socio demographic characteristics of the study population were shown in Table 1. The mean age of study subjects was 26years (± 4.55 SD) and ranged from 17–43 years. Age distribution of the mother revealed that the large proportion (36.84%) (133) belobged to age group of 25 and 29 years. The distribution of marrietal status was showed 304 (84.21%) mothers were married.

The distribution mother by educational status showed that the majority 307(85.05%) were litrate. With respect to occupation, the highest proportion of women 128(35.46%) was house wife and 100(27.7%) were working in private organization.

Table 1. Socio-demographic & economic characteristics of women attending antenatal care at government health centers, Addis Ababa, Ethiopia, 2019(N=361)

Variables	Frequency	Percent (%)
Age Category		
<20 years	16	4.43
20-24 years	120	33.24
25-29 years	133	36.84
30-34 years	70	19.39
>35 years	22	6.09
Marital status		
Married	304	84.21
Living together	43	11.91
Widowed	1	0.28
Separated	2	0.55
Single	11	3.05
Mathers education		
No Formal education	54	14. 96
Primary school	125	34.63
Secondary school	115	31.86
Higher*	67	18.56

Mothers occupation		
Government employee	38	10.53
Private organization	100	27.7
House wife	128	35.46
Marchant	18	4.99
Daily laborer	46	12.74
Student	15	4.16
Other	16	4.43
Family size		
1-5	326	90.3
>5	35	9.7
Wealth Index		
Poorest	73	20.22
Poor	72	19.94
Middle	72	19.94
Rich	73	20.22
Richest	71	19.67

Higher* includes higher education and technical and vocational education

5.2 Adherence to Iron Folic Acid Supplementation

Iron folic acid (IFA) supplementation adherence is the extent to which patients take medication/supplement or condition of sticking to the recommended dose over time period for taking the supplements as per recommendations. In this study women are said to be adhered to iron folic acid supplement in case of both methods if they took 65% or more ($\geq$ 59 tablets) of the supplement over the supplementation period of ninty(90) days.

Pill count adherence

Adherence to iron folic acid supplementation by pill count was conducted for ninty consecutive days. A 58.2% (95% CI of 52.9 - 63.3) consumed at least 59 tabs was obtained from consecuative ninty days follow up observation of 361 pregnant mother who was fully engaged in the study period (Table 2).

Recall based Self response

A proportion of 82.8 % (at 95% CI, 78.5 – 86.6) of adherence to iron folic acid supplementation was observed based on self report among pregnant women who consumed at least 59 IFA supplements during ninty days of supplementation period.

5.3 Comparison between the recall based self- response and pill count methods

The result obtained from recall based self-response were compared to the pill count method. A discripance was observed between the two adherence estimation methods. A 24.6 % (95% CI 20.8 – 28.4) difference was observed between self-report in interviews and pill count methods of adherence measurement as shown on table 4 below. Out women of 361 pregnanat 299(82.8%) mothers were identified as adherent by self- report where as 210(58.2%) were identified as adhered by pill count method. This was found by using pill count as a reference method. And the difference was strongly statistical significant where p-value was 0.000.

Table 2. Difference in estimates of IFAS adherence prevalence between recall based self-response and pill count methods among pregnant women attend ANC, Addis Ababa, Ethiopia, 2019 (n=361)

Period of observation	Self- reported adherence (95% CI)	Pill count adherence (95% CI)	% of over estimation (95% CI)	McNemar's p-value
Three months	82.8% [78.5 - 86.6]	58.2 [53 - 63.3]	24.6 [20.8 – 28.4]	0.000*

* McNemar's test p value <0.05

5.4 Comparison of Sensitivity and Specificity of different Methods used to estimate adherence to IFA Supplementation

To evaluate the ability of the methods in estimating adherence to iron folic acid supplementation the estimate from recall based self-response were tried to compare with pill count methods. Table 5 below shows the different methods recall based self-response and Observation based pill count in estimating adherence to IFA supplementation. The Sensitivity, Specificity, PPV, NPV and the ROC for each comparison methods were calculated and documented. The meaning of Sensitivity in this analysis is the extent to which self report method correctly identify those women who adhered to IFA supplementation regimen. While Specificity indicat the extent to which self report method correctly identify those women who do not adhered to IFA supplementation regimen.

Positive predictive value is the tests ability to correctly identify those pregnant women who are truly being adhered to IFA supplementation.

The data obtained from self-response recall showed the highest Sensitivity 97.7% (94.5 - 99.2) and lowest Positive predictive value 68.6% (63.0 - 73.8) meaning recall based self-response were correctly identify those pregnant women who had been adherent and poorly identify those women who had been non adhered, this means there were some women who were being classified as adhered where they were non adhered (Table 4). These findings suggest that women may not be consumed 59 days' worth of supplements or may not be taken 65% of the supplements they received. ROC curve analysis shows 0.68% meaning it shows the total accuracy of self report. This indicating self report had poor agreement with reference gold standard in estimating adherence to iron folic acid supplement.

Table 3. Sensitivity and specificity of self-report using pill count as reference method among pregnant women attends among ANC, Addis Ababa, Ethiopia, 2019 (n=361)

Test method	**Sensitivity %**	**Specificity %**	**PPV%**	**NPV%**	**AUC%**
Recall based self response	97.6 [94.5 - 99.2]	37.7 [30.0 - 46.0]	68.6 [63.0 - 73.8]	91.9 [82.2 - 97.3]	0.68 [0.64 - 0.72]

PPV - Positive predictive value NPV- Negative predictive value AUC - Area Under ROC Curve

Sensitivity and specificity of recall based self-response using pill count observation as a reference

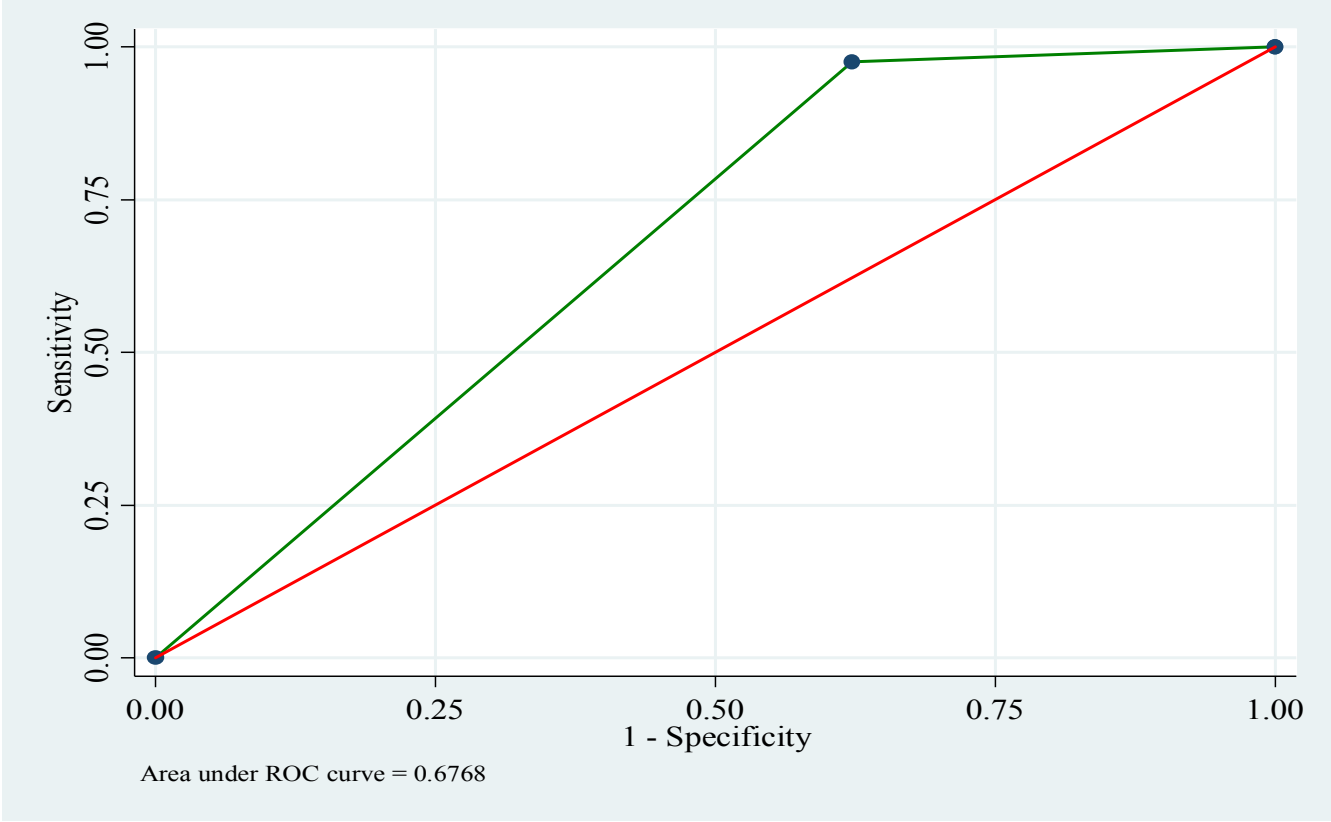

Figure 2. Sensitivity and specificity of recall based self-response using pill count observation as a reference

Sensitivity, Specificity and PPV of recall based self-response using pill count as a reference method were calculated and data were obtained across different socio-demographic variables. The specificity of recall based self-response was higher among age group of women > 35years (41.7) and lower among 30-34years (30.8%). This may be due to difference in sample size. Mothers whose educational status were college and above had better adherence to iron folic acid supplementation but lower adherence rate was obsedved among batter the highest specificity was observed among mother whose Wealth Index was in the thrid quantile (49.6%) as compared to the rest.

Table 4. Sensitivity and specificity of recall based self-response using pill count as reference method across different socio demographic variables, Addis Ababa, Ethiopia, 2019 (n=361)

Variables	Sensitivity%	Specificity%	PPV%	NPV%	AUC%
Age group					
<20 years	100[69.2-100]	33.3[4.3-77.7]	71.4[41.9-91.6]	100[15.8- 100]	0.67[0.46-0.87]
20-24years	96[88.8-99.2]	40.0[25.7-55.7]	72.7[62.9-81.2]	85.7[63.7-97.0]	0.68[0.60-0.76]
25-29years	97.2[90.2-99.7]	38.7[26.6-51.9]	64.5[54.6-73.5]	92.3[74.9-99.1]	0.68[0.62-0.74]
30-34 years	100[92.0-100]	30.8[14.3-51.8]	71.0[58.1-81.8]	100[63.1-100]	0.59[0.53-0.64]
>35years	100[69.2-100]	41.7[15.2-72.3]	58.8[32.9-81.6]	100[47.8-100]	0.71[0.56-0.85]
Mother's Education					
No Formal Edu	93.8[79.2-99.2]	36.4[17.2-59.3]	68.2[52.4-81.4]	80.0[44.4-97.5]	0.65[0.54-0.76]
Primary School	96.9[89.2-99.6]	39.3[27.1-52.7]	62.6[52.3-72.1]	92.3[74.9-99.1]	0.68[0.62-0.75]
Secondary School	98.6[92.6-100]	38.1[23.6-54.4]	73.5[63.6-81.9]	94.1[71.3-99.9]	0.68[0.61-0.76]
≥College	100[91.4-100]	34.6[17.2-55.7]	70.7[57.3-81.9]	100[66.4-100]	0.67[0.58-0.77]
Mather's Occupation					
Working	97.7[93.5-99.5]	38.2[28.8-48.4]	67[59.9-73.6]	92.9[80.5-98.5]	0.68[0.63-0.73]
House Wife	97.5[91.2-99.7]	36.7[23.4-51.7]	71.3[61.8-79.6]	90[68.3-98.8]	0.67[0.60-0.74]
Wealth Index					
Poorest	97.7[88.0-99.9]	37.9[20.7-57.7]	70.5[57.4-81.5]	91.7[61.5-99.8]	0.68[0.59-0.77]
Poor	97.7[88-99.9]	35.7[18.6-55.9]	70.5[57.4-81.5]	90.9[58.7-99.8]	0.67[0.57-0.76]
Middle	97.1[85.1-99.9]	48.6[31.9-65.6]	64.2[49.8-76.9]	94.7[74.0-99.9]	0.73[0.64-0.82]
Rich	100 [92-100]	20.7 [8.0-39.7]	65.7[53.1-76.8]	100[54.1-100]	0.60[0.53-0.68]
Richest	95.3[84.2-99.4]	42.9[24.5-62.8]	71.9[58.5-83.0]	85.7[57.2-98.2]	0.69[0.59-0.79]

Although Sensitivity, Specificity and PPV of self- response adherence data was obtained across different variables (Table 6) using pill count as reference method. Higher Specificity was observed among pregnant women developed side effect from IFA supplementation (57.6%), this is indicating mothers who developed side effect against iron folic acid supplemente were alikely to take full recommended dose compared mohers with no side effect 25%. Variability was also observed among women having knowledge anemia and has no (40.6% to 32% respectively). Similar variability were observed among women having knowledge of IFAS and not having (38.1% v 37). But the specificity among mother not counselled for nutritional was slightly higher than those counselled for nutrition.

Table 5. Sensitivity and specificity of recall based self-response using pill count as reference method across different variables, Addis Ababa, Ethiopia, 2019 (n=361)

Variables	Sensitivity%	Specificity%	PPV%	NPV%	AUC%
Satisfactory Knowledge of Anemia					
Yes	98.1[94.4-99.6]	40.6[30.9-50.8]	71.7[65.1-77.7]	93.2[81.3-98.6]	0.69[0.64-0.74]
No	96.4[87.5-99.6]	32[19.5-46.7]	60.9[19.5-46.7]	88.9[65.3-98.6]	0.64[0.57-0.71]
Satisfactory Knowledge of Iron Folic Acid supplementation					
Yes	97.1[98.2-99.2]	38.1[28.5-48.6]	69.2[62.2-75.6]	90.2[76.9-97.3]	0.68[0.63-0.73]
No	98.6[92.4-100]	37[24.3-51.3]	67.3[57.4-76.2]	95.2[76.2-99.9]	0.68[0.61-0.74]
Facility supplement availability					
Yes	100[78.2-100]	26.7[7.8-55.1]	57.7[36.9-76.6]	100[39.8-100]	0.63[0.52-0.75]
No	97.4[94.1-99.2]	39.0[30.7-47.7]	69.6[63.8-75]	91.4[81-97.1]	0.68[0.64-0.72]
Side Effect					
Yes	87.5[71.-96.5]	57.6[44.1-70.4]	52.8[38.6-66.7]	89.5[75.2-97.1]	0.73[0.64-0.81]
No	99.4[96.9-100]	25[16.6-35.1]	72[65.9-77.5]	95.8[78.9-99.9]	0.62[0.58-0.67]

Forgetfulness					
Yes	94.7[86.9-98.5]	35.8[24.5-48.5]	62.352.7-71.2]	85.7[67.3-96]	0.65[0.59-0.72]
No	99.3[95.9-100]	39.3[28.8-50.5]	72.4[65.4-78.7]	97.1[84.7-99.9]	0.69[0.64-0.75]
Paid for IFA Supplementation					
Yes	98.5[91.8-100]	31.6[17.5-48.7]	71.4[61-80.4]	92.3[64-99.8]	0.65[0.57-0.73]
No	97.2[93-99.2]	39.8[30.7-49.5]	67.3[60.5-73.6]	91.8[80.4-97.7]	0.69[0.64-0.73]
Counselled on Nutrition					
Yes	99.1[94.9-100]	26.7[20.1-34.1]	46.5[39.8-53.2]	97.8[88.2-99.9]	0.63[0.59-0.66]
No	96.2[80.4-99.9]	32.8[21.6-45.7]	36.8[25.4-49.3]	95.9[77.2-99.9]	0.64[0.58-0.71]

6. Discussion

Adherence to antenatal IFA supplementation is a core indicator of progress towards the reduction of anemia and can be used to monitor and evaluate programs and policies for antenatal IFA supplementation.

Household surveys have been widely used to track coverage of health interventions including antenatal IFA supplementation. Therefore, the validity of measures obtained from household surveys is important to assess as inaccurate recall has implications for program planning, monitoring country progress, and evaluating programs(25).

Compliance with iron folic acid is a key means to prevent and control of physiological anemia during pregnancy. Iron folic acid supplement adherence is stated that the woman take four tablet at least per week (≥ 4times per week) or for ≥ 90 days at third trimester of pregnancy. This study sought to assess the accurate measurement method of iron folic acid supplementation. Where the availability of iron supplements at health facilities was a problem.

In our study adherence estimates using self- response are much higher than adherence estimates based on pill count that suggest a half of women consume IFA supplements for 90 days or more during pregnancy. While our methods and indicator definitions vary, these findings suggest that women may not be receiving 90 days' worth of supplements or may not be taking all the supplements they receive.

This study was conducted with the aim of assessing an alternative method that could accurately measure adherence to iron folic acid supplementation. In order to come up with an alternative method we compared interview based self-response methods againest pill count observation as the best comparison method. When we compared the result of pill count with self-response using mean adherence rates a considerable disagreement was observed between the two methods used. The highest prevalence was found when recall based self-response was used 82.8.% (95% CI 77.0 - 85.3). The prevalence of adherence was significantly lower to 58.2% (95% CI 31.6 - 41.8) using Pill count method producing over estimation prevalence of 24.6% by self-response.

A disagreement on the adherence rate to IFA supplementation was observed among the different methods of accuracy measurement.

In this study, there were no time difference between self-report adherence (90 days) and pill count adherence (90 days) assessment. This may have help the comparison to be unbiased. We examined the agreement of self-response adherence with a reference method pill count adherence measured during the same study period to reduce disparity in assessment duration.

We attempted to assess adherence by both self-reports and pill counts at 4-wks intervals in our study, which coincided with the intervals between prenatal clinic appointments of our participants which was finally sum up to give us 90 days follow up period.

Analysis of data on multiple pill counts and self- response in those women who did keep most of their clinic appointments showed that within-person variability does accurately represent IFAS adherence status over the entire supplementation period this is coincide with(59)

Adherence estimation was conducted between interview based self-response and pill count method. Discrepancy was observed between the two adherence estimation methods 24.6 % as shown on table 3 above. Self- report identified prevalence of 299(82.8%) mothers as adherent with sensitivity, specificity and PPV of 97.8%, 37.7% and 68.5% respectively. The observation obtained was higher this may be patients responded in a manner that was socially desirable that could concealed their actual behavior or poor recall of receipt of supplements. Another difficulty in getting accurate measurement of adherence rate through SR is that the length of the recall period, time frame used by researchers, for the patient to recall their adherence behavior differs in time length (60).

Factors that contribute to the accuracy of self-reported information may include demographic factors such as age, level of education and socioeconomic status, and survey-related factors such as the sensitivity of questions and the timing(e.g. intrapartum period)(9-13). Although there were major stock-outs of IFA supplements at public facilities during the time of the study, women may have received supplements from pharmacies or private facilities or hinder to receiving the supplement due to shortage of out of pocket money.

A larger proportion of women were classified as having full adherence using self-report measure (82.8%)(78.5 - 86.6). However, the pill count methods produce lower estimate when compared to self- response which was 58.2% (95% CI of 52.9 - 63.3). This was found by using pill count as a reference method. And the difference was strongly statistical significant where p-value was 0.000

Sensitivity and specificity of self- response was also evaluated. The specificity of recall based self-response was higher among age group above 35years (41.7%) and lower among 30-34years (30.8%). This indicating the method does not adequately measuring non adherent mothers. The highest specificity was observed among mother whose Wealth Index was in the thrid quartile (48.6%) as compared to the rest quantiles.

The different results from comparison of self-report and pill count measures in terms of mean adherence self-reports higher than pill counts. When adherence was defined in two categories of <=65% and >=65% of supplements taken as prescribed, we found that the self-response measure still had a higher Specificity, and a positive predictive value than pill count measure. Self-reports are most commonly used to assess adherence and most often are the only feasible approach in community supplementation

Despite the limitations in our study, the pill count measurement are a more objective adherence measure may reduce the overestimation by self-reported data used in most study of supplementation. This study also determined the prevalence of compliance with IFA supplementation among pregnant women through pill count by direct observation of the pill. It is cost effective and applicable in low and middle income countries to assess compliance.

7. STRENGTH AND LIMITATION

7.1 Srtength

The strength of this study is used prospective data and conduct direct observation of pills remained in the pill container to assess adherence of supplement consumption as per recommendation.

Conduct validation study to assess how self report method is valid in estiomating adherence to iron folic acid supplementation among pregnant women attending ANC service.

7.2 Limitation

The major limitation of this study was we couldn't recruit samples in to the study in the intended time period because of lack of supply in almost half of study facilities. Sample sizes of 375 pregnant women for the study achieve 72% power to detect the difference in estimation between the two methods. This might be inadequate. There may be learning effect and information bias in the subsequent months in pill count method. Since mothers are interviewed to assess adherence measurement by self- report we couldn't fully minimize recall and social desirability bias. Lack of including methods which is considerd to be gold standard like MEMS (Medication Event Monitoring System), Biomarkers and stool exam that could measures level of adherence

8. CONCLUSIONS AND RECOMMNDATION

8.1 Conclusion

Conclusion

Self report adherence assessment of IFA supplementation continues to be problematic and difficult in determining how pregnant women are using their supplement as recommendation.
Self-report adherence measurement had poor validity in measuring those pregnanat women who were not correctly follow their prescription as recommended compared to pill count.
There is a statistically significant difference in estimation of adherence between the self report and pill count methods

8.2 Recommendation

Programmers

FMoH better consider alternative method for adherence measurement along with self report for assessing adherence status.

Should consider valid measurement for program planning, monitoring progress, and evaluating programc

Researcher

Studies including Use of EMD, Biomarkers and stool exam

When selecting specific methods for adherence analysis

- ✓ Validity of the methods, Purpose of the study, Accuracy requirements and Available resources should be considered

Health professional

Enhance mother knowledge on IFA Supplementation and nutrition during pregnancy

Look for the strategy to improve adherence status of the mother

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APPENDICES

Annex 1: Questionnaire

Questionnaires ID number _____

Sub city _____ district_____ kebele _____

House number_____ Phone Number_____

Name of the interviewer _____

Date of the interview_____

Time started_____ Time finished_____

Part 1: Background Information

Instruction: Ask the following questions carefully and circle the response

No	Question	Coding categories	skip
101	In what month and year were you born?	☐☐ ☐☐ ☐☐☐☐ DD MM YY I don't know ……. 88	
102	How old are you now? in completed year (COMPARE AND CORRECT 101 IF INCONSISTENT)	☐☐ Years old	
103	What is your Marital status?	Married……1 Living Together…….....2 Divorced…….....3 Widow…….....4 Separated……..5 Single …….. 6 No response ……. 99	
104	What is your religion?	Orthodox……1 Catholic……...2 Protestant…….3 Muslim…….4 Have no religion ……..6 Other (specify)_____ 7 No response……..... 99	

105	Have you ever attended school?	No……...0 Yes……..1	If 0 skip to 107
106	What is the highest level of school you attended? Hint:- Read and write – informal education Prima (1-8grades), Secondary (9-10), Higher (college and above) Technical(10+ or Level)	Can't read and write …….....1 Read and write…….2 Primary(grade 1-8)…….....3 Secondary (grade 9-12)…….....4 Technical/vocational……...5 Higher Education ……..…….6 I Don't know ……88 No response ……. 99	
107	To which ethnic group do you belong?	Oromo……1 Amhara ……...2 Gurage ……3 Tigray……..4 Other (specify) _____ 5 No response …… 99	
108	What is your occupation?	Government employee……..1 Private organization…….....2 Merchant…….....3 Daily laborer…….4 Student…… ……5 House wife……....6 Other (specify)_____ 7 No response……. 99	
109	What is the size of your family? (total number of individuals living in the house with you, member of your family)	_____	
110	What is your Husband/partner educational Status? Read and write – informal education	Can't read and write…… 1 Read and write …..……. 2 Primary school (grade 1-8)…….. 3	

	Prima (1-8grades), Secondary (9-10), Higher (college and above) Technical(10+ or Level)	Secondary school (grade 9-12)…… 4 Vocational or technical school……. 5 College graduate or above…… 6 Husband is not alive…… 7 I don't know…… 88 No response ……..99	
111	What is your Husband/partner occupation?	Government employee……1 private organization……..2 Merchant…….. 3 Daily laborer…… 4 Farmer…….....5 Unemployed…… 6 Other (specify)_____7 I don't know……..88 No response…….. 99	If Q. 103 ans. is no. 4 skip to 201

Part 2. Household socio-economic status (Wealth Index)

The next questions ask about your household assets, services and housing conditions			
No	**Questions**	**Response**	**Skip**
1. Household assets & services – In answering the questions below please think of assets & services available in your household			
201	Television	No…...0 Yes...…… 1	
202	Computer (Lap Top/ Desk top)	No…...0 Yes...…… 1	
203	Mobile Telephone	No…...0 Yes...…… 1	
204	Non-mobile/fixed telephone	No…...0 Yes...…… 1	
205	Electric stove	No…...0 Yes...…… 1	
206	Refrigerator	No…...0 Yes...…… 1	
207	Laundry Machine	No…...0 Yes...…… 1	
208	Sofa	No…...0 Yes...…… 1	

209	Bicycle/motorcycle	No…..……...0 Yes...…… 1	
210	Car	No…..……...0 Yes...…… 1	
2. Housing Condition – please answer the following questions thinking about the housing condition of your household			
211	Home ownership	Private……. 1 Government……. 2 Rent……. 3 Other (specify) _____ 4	
212	Number of rooms in the house?	_____	
213	What is the main construction material used for the roof? CIRCLE ALL THAT APPLY	Plastic roof …….....1 Asbestos …….....2 Wood……...…….3 Corrugated iron ……...4 Tiles……...……...5 Concrete ……..6 Other (specify)_____ 7 I don't know …… 88 No response……. 99	
214	What is the main construction material used for the floor? CIRCLE ALL THAT APPLY	Made of soil……... 1 Parquet/polished wood …..…….....2 Cement…….…….. 3 Ceramic tiles…….. 4 Carpet……..……... 5 Other (specify) _____ 6 I don't know……88 No response…….99	
215	What is the main construction material used for the wall? CIRCLE ALL THAT APPLY	No wall ……. 1 Wood with mad ……. 2 Carton/cheep wood ……... 3 Stone and cement …….. 4 Blocket ……... 5	

		Others (specify) …….. 6 I don't know …… 7	
216	What is the main source of drinking water for member of your households?	<u>Piped water/supply water</u> Piped inside dwelling .....1 Piped to yard/plot .....2 Public tap .....3 Packed /Bottled water……..4 Other (specific)_____ 5	
217	What kind of toilet facility do members of your household usually use?	<u>Flush toilet</u> Flush to septic tank.....1 Flush to Pit latrine .....2 Flush to somewhere else……3 <u>Pit latrine</u> Traditional pit toilet.....4 Pit latrine with slab.....5 Pit latrine without slab.....6 Ventilated improved pit latrine….7 Common Latrine ……..8 No facility/field……..……....9 Other (specify) _____10 I don't know……...88 No response……... 99	
218	What type of fuel does your household mainly use for cooking?	Electricity……1 Natural gas …….2 Solar……3 Kerosene…….4 Biogas…….5 Charcoal…….....6 Wood…….....7 Other (specify_____ 8	

Part 3. Knowledge assessment of the mother about Anemia and Iron folic Acid Supplementation

Instruction 1: Ask the following knowledge questions carefully and circle the response			
No	**Question**	**Response**	**Skip**
301	Have you heard about the term anemia?	No…..……. 0 Yes..……..... 1	If 0 skip to 308
302	What are the signs and symptoms of anemia? (interviewer encircle all what is being responded)	Weakness.....1 Headache.....2 Vertigo……...3 Pale eyes……..... 4 Tinnitus……..5 Irritability…….....6 Blurring of vision……...7 Impaired physical performance..... 8 Other (Specify) _____ 9 I Don't Know …….…….....88 No response……...99	
303	What are the causes of anemia? (interviewer encircle all what is being responded)	Loss of excess blood.....1 Parasitic infections……..……..… 2 Malaria……..… 3 Menstruation…….....4 Deficiency of Iron rich foods…..……..5 Deficiency of vitamins in food ……....6 During Pregnancy period…….7 Other (Specify)_____8 I Don't Know……. 88 No response……99	
304	Do you think that anemia has a problem on pregnancy?	Yes …….... 1 No ……2	If no skip to 306
305	If yes, what is that problem?	Repeated infection ……1 Low birth weight……...2 Intera uterine growth retardation ……..3	

	(interviewer encircle all what is being responded)	Death of baby……4 Death of mother…….5 I Don't Know……88 No response ……..99	
306	Which food items are good to prevent anemia? (interviewer encircle all what is being responded)	Green leafy vegetables……..…… 1 Meat, Fish…….....2 Egg……..3 Fruits…….…… 4 Beans, peas ……5 Bread …… 6 Chicken/poultry… ……..7 Other(Specify)_____ 8 I Don't now……88 No response……...99	
307	Can Anemia during pregnancy be preventable?	No…….. 0 Yes……. 1 I don't know ……. 88	If 0 /88 skip to 309
308	How anemia can be prevented? (More than one answer possible)	Using Balanced diet……..1 Using Medication……..2 Using IFA Supplementation……..3 Fortification of food……...4 Other (specific)_____ 5 I don't know ……..88 No response ……..99	

Knowledge assessment of the mother about Iron folic Acid Supplementation

Instruction 2: Ask the following questions carefully and circle the response

309	Do you know anything about Iron folic acid supplementation?	No…… 0 Yes……1	If 0 skip to 401
310	Is iron folic acid supplementation important during pregnancy?	No……0 Yes……1 I don't know……..88	If 0 skip to 312

311	What is the benefits of Iron folic acid supplementation during pregnancy? (more than one answer is possible)	Increases blood volume……..1 Increase weight of fetus/baby ……...2 Prevent deficiency during pregnancy…..3 Prevent anemia……4 Prevent Birth complication…….5 Other (specific)_____ 6 I don't know ……..88 No response……99	
312	Where did you get information about importance of Iron supplementation? (more than one answer is possible)	Health Extension workers……..1 Health professionals ……..2 Family ……3 Friends ……...4 Neighborhood…….5 Public Media/Radio, Television.……6 Other (specify) _____ 7	
313	Before this pregnancy, did you receive any Iron supplement?	No……...0 Yes……..1	If 0 skip to 401
314	Why did you took iron supplements before the time of this pregnancy?	Got pregnant……...1 Became Sick……...2 For supplementation ……..3 Other (specific)_____4 I Don't now……88 No response ……99	

Part 4. Questionnaire about present and past Obstetric History

Present Obstetric History

Instruction: Ask the following questions carefully about current pregnancy and circle the response

Now I would like to ask you about your previous pregnancies please respond to the following questions.			
No	Question	Response	skip
401	At the time you became pregnant with the index delivery, did you plan to get pregnant, did you want to wait until later, OR did you NOT WANT to have more?	Planned ……..1 Later……2 Not want more children……..3	
402	How many months/weeks pregnant are you? when you first visit antenatal care for this pregnancy? (prompt with date of last menstrual period)	months ……. ☐☐ or weeks ……..... ☐☐ I Don't now…… 88	
403	Whom do you saw? during your ante-natal care visit (PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL)	Medical Doctor …….....1 Nurse……. 2 Midwife Nurse ……. 3 Health officer ……... 4 Health extension worker…….5 Other (specify)_____6	
404	How many times did you receive antenatal care during this pregnancy?	Number of times …….. ☐☐ I Don't Now …….88	
405	How many minutes it takes you to reach health facility for getting ANC service?	15 – 30 minutes ……1 30 – 60 minutes ……2 ≥60 minutes ……..3 I don't know ……88	

406	During your Antenatal care visit(s) did you told about the signs of pregnancy complications?	Yes . . . . . 1 No 0	If 0 skip to 408
407	Which signs of pregnancy complications were you told about? (interviewer encircle all what is being responded)	Vaginal bleeding. . . . . 1 Severe headache . . . . . 2 Blurred vision. . . . . 3 Vertigo …… 4 Fever . . . . . 5 Abdominal pain. . . . . 6 Convulsion . . . . . 7 Weakness …… 8 Other (specify) _____9	
408	During this pregnancy, did you given information/counselling about Nutrition?	Yes……..... 1 No…….. 0	
Past obstetric history **Instruction**: Ask the following questions carefully about all the pregnancies the mother have had during her life time and circle the response (**skip if it is first pregnancy**)			
Now I would like to ask you about your previous pregnancies please respond to the following questions.			
409	During your life how many times have you been pregnant? (including those that did not end with a live births)	[_____] times Don't Know…….88	
410	During your life how many times have you given birth? (woman's past delivery, regardless of status of infant at the time of delivery)	[_____] times Don't Know…….88	
411	Have you ever had abortion/pregnancy terminated before 28 weeks of gestation?	Yes ……1 No …… 0 Don't Know……..88	If **0** skip to 413

412	If yes, how many times have you had abortion/pregnancy terminated before 28 weeks of gestation?	[_____] times Don't Know……88	
413	How many living sons and daughters do you have who was born alive?	_____	
414	Did you visit health facility for antenatal care during your previous pregnancy?	Yes . . . . . 1 No . . . . . 0 Don't know 88	If 0 skip to 501
415	Where did you receive Antenatal care during your previous pregnancy? (Anywhere else)	Government hospital …… 1 Government health center……..2 Government health post ……3 Private hospital …….4 Private clinic …….5 Other(specify) _____6	
416	How many times did you receive antenatal care?	Number of times …….. ☐☐ I Don't Now ……88	

Part - 5 Questionnaire to assess current use of Iron Folic Acid Supplementation

Instruction: Ask the following question carefully and circle the response

No	**Question**	**Response**	**skip**
501	During this pregnancy, were you given any tablets? (For example, show her IFA tablets)	No……..... 0 Yes……. 1	If 0 skip to 509
502	If yes, Where did you get these tablets?	Government Health center……1 Government Hospital…….2 Private clinic……..3 Drug shop/ pharmacy……4 Other (specific)_____ 5	
503	Have you paid for those tablet? (cost of the tablets)	No ……...……..0 Yes …….. ……..1	

		Other (specific) _____2	
504	Did you take the pill daily?	No…… 0 Yes……..... 1	If 0 skip 506
505	If yes, what helps you to take your pill daily?	I Understand it's health benefit….....1 Family (Husband, Mother) support..…….2 Information from health professional…...3 Fear of illness…….....4 I feel health when I take the tablet …….5 Other (specific)_____ 6	
506	If No, Why you fail to take your pill every day? (interviewer encircle all what is being responded)	I Forgot ……..…….1 Problem with taking the tablets ...…….2 Fear of taking to many pills……3 No Drug/supplement ……4 Not important ……....5 Other (specific)_____ 6 No response …… 99	
507	Did you experience any problem when you take the tablets?	Yes……..1 No……....0 Don't Remember……..... 88	If No skip to Q. 510
508	What were the problem you experienced? (interviewer encircle all what is being responded)	Constipation ……...1 Stomach pains…….....2 Nausea…….3 Vomiting ……4 Dark Stool……...5 Metallic taste ……6 Other (Specify)_____7	
509	If yes, was you continue taking the tablets throughout this pregnancy?	Yes . . . . 1 No . . . . 0 Don't know . . . . . ……... 99	
510	During this pregnancy, were you given information/counselling about IFAS?	Yes……..1 No……0	If 0 skip to 512

511	If yes, what type of information were you given?	Benefit of taking IFA tablets……1 Problem of not taking IFA tablets ……...2 Minor problems with taking the tablets and its management……... 3 Tablet should be taken daily until all the prescribed pills are completed……. 4 Timely refill of the tablets ……..….5 Other(specific)_____6	
512	By Whom did you have counselled? (PROBE TO IDENTIFY EACH TYPE OF PERSON AND RECORD ALL)	Doctor …….…… 1 Nurse……... 2 Midwife …….. 3 Health Extension Worker…… 4 Pharmacist……... 5 Other (specific) _____ 6 I don't know ……..88 No response ……...99	
513	During the last three months of pregnancy, for how many days did you take the tablet?	Number of Days [_____] I Don't now……88 No response…….99	
Interviewer Observation **Instruction:** Ask the mother to give you previously prescribed IFA bottle or strip and check for the remaining / unused / pills and record the number			
514	Check the bottle or strip for the remaining pills	[_____] pills are remained	
515	Record the date of the IFA tablets were prescribed (check client card and write in the box provided)	☐☐ DD ☐☐ MM ☐☐☐☐ YY	
516	Record date of counting the pills (write in the box)	☐☐ DD ☐☐ MM ☐☐☐☐ YY	

517	How many tablets /pills were the mother prescribed? (check client card and write in the box provided)	[ ][ ][ ] Pills	

Part Six – Questions to the health facilities

Instruction: Ask the following Questions carefully and encircle the response properly

No	Question	Response	Skip
601	Is there any time in which IFA supply were not available in the last six months?	Yes ……..1 No ……...0	If no skip to 603
602	If yes, what is the cause of unavailability?	Stock out ……. …….…….1 Becomes expired ……2 Lack of appropriate and timely sending report and request form (RRF)……3 No enough supply from PFSA ……..4 Other(specific)_____5	
603	For how long it had been not available in the health facility?	[_____] month/s or [_____] week/s	
604	Does the mothers discontinue taking the tablet when the supply is not available?	Yes ……1 No …… 0	
605	If No, how they was sustain taking the Iron tablet?	We provide them ones for three month .1 We advise them to buy from outside ….2 They shall wait until iron recruited ……3 Other (specify) …….. 4	If 2 go to 606
606	If they are instructed to buy from outside, how can you recognize whether they are utilize it or not?	_____	
607	How did you prescribe?	Monthly ……1 Every three month ……2 According to WHO guideline …….. 3	

	Hint: WHO guideline for IFA supp. (50+50+60+25 = 185 tablets) throughout the pregnancy	Based on Hemoglobin number …… 4 Other (specific) _____5	
608	How many IFAS tablets is given for pregnant women during the full course of pregnancy?	30 tablets……1 60 tablets …….. 2 90 tablets …….. 3 150 tablets…… 4 180 tablets …… 5	
609	Did anyone who trained on maternal and child nutrition?	Yes ……1 No …… 0	

Annex 2: Participant information sheet (English version)

Good morning/ afternoon.

My name is _____ and I am here on behalf of Feleke Milkiyas, student of Addis Ababa University School of public health. He is conducting a research on ―Assessment of prevalence of adherence to IFA supplementation by pill count among antenatal care attending pregnant women in Addis Ababa, Ethiopia 2018/2019. He received permission from Addis Ababa University, Addis Ababa city administration, Health bureau and the respective sub city Health offices to conduct this study. You are selected to participate in this study because you are currently attending in one of the selected Health centers for the study purpose. Your participation is purely based on your wasingness & you have the right to choose not to take part in this study. If you choose to take part, you also have the right to stop at any time. If you are wasing to participate or refuse or decide to withdraw later, you was not be subjected to any harm.

If you agree to participate in the study, you was be interviewed about your background information, Socio economic status, your knowledge about anemia and Iron folic acid supplementation. he study period stays for three months. The interview was conducted on monthly bases for consecutive three months. The first interview with you was take about 20 minutes at health center. The other subsequent interviews was take only about 10 minutes at your home.

Any information that you provide was be kept confidential, names was not be written or specified and all the questionnaires was coded for anonymity. No one was have access to the non-coded data except the principal investigator. Only the principal investigator was know the details and he was discard it after completing analysis. The data was not be used for purposes other than the study. Your wasingness and active participation is very important for the success of this study.

Contact details of principal investigator and the person to whom to contact at any time for further explanation:

Name of principal investigator: **Feleke Milkiyas**

Cell phone No – 0917817790

E-mail: felekemilkiyas@gmail.com

Annex 3: Informed consent

Based on the understanding of the information I gave you, are you wasing to participate in this study? A. Yes B. No

1. If yes, continue the interview. 2. If no, skip to the next participant by writing reasons for His/her refusal.

Informed consent Certified by: _____

Respondent's signature_____ Date _____

Interviewer: Name_____ Signature_____

Questionnaires ID number _____

Date of interview _____ Time started _____ Time completed _____

Result of interview:

1. Completed

2. Partially completed

3. Refused

Checked by: Supervisor: Name _____ Signature_____

Annex 4: Amharic version of information sheet

አዲስ አበባ ዩኒቨርሲቲ ጤና ሣይንስ ፊኩልቲ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል የተጠያቂዎች/ መላሾች የመረጃ ቅፅ

ጤና ይስጥልን እንደምን ነዎት

_____ እባላለሁ፡፡ የመጣሁት በአዲስ አበባ ዩኒቨርሲቲ ጤና ሳይንስ ኮላጅ የህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል የሁለተኛ ዲግሪ ለማግኘት በተማሪ ፈለቀ ሚልክያስ የሚደረግ የምርምር ጥናትን ወክዬ ነው፡፡ ጥናቱ በእርግዝና ወቅት የሚሰጥ ተጨማሪ አይረን (ብረት ማዕድን) እና ፎሊክ አሲድ እንክብል አወሳሰድ መጠን በክንን ቆጠራ ለማወቅ ይረዳ ዘንድ በአዲስ አበባ በሚገኙ የመንግስት ጤና ጣቢያዎች ላይ የእርግዝና ክትትል በሚያዬርጉ እናቶች ላይ የሚደረግ ሲሆን ለዝህም ከአዲስ አበባ ዩኒቨርሲቲ ፣ ከአዱስ አበባ ጤና ቢሮ እና ከተመረጡት ጤና ጣቢያዎች ፍቃድ አግኝቶአል፡፡

በዚህ ጥናት ላይ የሚሳተፉ እናቶች በእጣ ከተመረጡት ጤና ጣቢያዎች መካከል በአንዱ ውስጥ ክትትል የምያድርጉ ሲሆኑ እርስዎም እድል ደርስዎት አንድ ለመሆን በቅተዋል፡፡ በዚህ ጥናት ላይ መሣተፍ በእርስዎ ሙሉ ፍቃደኝነት ላይ የተመሰረተ ነው፡፡ በመሆኑም የእርስዎ ተሣትፎ ለዚህ ጥናት ከፍተኛ አስተዋፅዎ ስለሚያደርግ መልካም ፍቃድዎ ሆኖ በጥናቱ እንደሚሳተፉ ተስፋ አደርጋለሁ፡፡ ነገር ግን ጥናቱ ላይ ባለመሳተፍዎ ወይም ጥናቱን በማቋረጥዎ ምክንያት የሚደርስብዎ አንዳችም ችግር /ጉዳት አይኖርም፡፡

በጥናቱ ለመሳተፍ ከተስማሙ የተወሰኑ ጥያቄዎችን ስለ አጠቃላይ ግላዊ ፤ ማህበረሠባዊና ምጣኔያዊ መረጃዎች ፣ ስለ ደም ማነስ እና ተጨማሪ አይረን (የብረት ማዕድን) እና ፎሊክ አሲድ በተመለከተ ያለዎትን እዉቀት የሚመዝኑ ጥያቄዎችን እጠይቅዎታለሁ፡፡ የጥናቱ ጊዜ ለሶስት ተከታታይ ወራት የሚቆይ ስሆን የመጀመሪያዉ መጠይቅ ለ 20 ደቂቃ ስቆይ ተከታዩ መጠይቅ በየወሩ ለ ١٥ ደቂቃ የሚቆይ ይሆናል፡፡

በመጨረሻም ከዚህ ጥናት የተሰበሰበው መረጃ ሙሉ ሚስጥራዊነቱ የተጠበቀ ይሆናል፡፡ ስምዎትም እንደማይጠቀስና ለማንም አካል ተላልፎ እንደማይሰጥ፤ እንዲሁም ከጥናት ቡድኑ ውጪ ማንም የተሰበሰበውን መረጃ ማግኘት አይችልም፡፡ መረጃው ለጥናቱ ዓላማ ብቻ እንደሚዉል ልናረጋግጥልዎ እንወዳለን፡፡

ለተጨማሪ ማብራሪያ

የዋና አጥኚውን አድራሻ ይጠቀሙ

ስም፡ ፈለቀ ሚልክያስ

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Annex 5: Amharic version of informed consent

የስምምነት መጠየቂያ/ማረጋገጫ ቅፅ

ከላይ በሰጠዎት መረጃ መሰረት በጥናቱ ላይ ለመሳተፍ ፍቃደኛ ነዎት?

1. አዎ (ቃለ መጠይቁ ይቀጥል)

2. አይደለሁም (ምክኒያቱን ፅፈህ _____ አመስግነህ ወደ ሚቀጥለው ተሳታፊ እለፍ)

ስምምነቱን ያረጋገጠ _____

የተሳታፊው ፊርማ_____ቀን_____

የመረጃ ሰብሳቢዉ ስም_____ፊርማ_____

የተጠያቂው መለያ ቁጥር _____

መጠይቁ የተካሄደበት ቀን ____/_____/_____

የተጀመረበት ሰአት_____ ያለቀበት ሰአት _____

የቃለ መጠይቁ ውጤት

1. ሙሉ በሙሉ የተሞላ

2. በከፊል የተሞላ

3. ምንም ያልተሞላ

በተቆጣጣሪዎች ተረጋግጧል ፤ ስም_____ ፉርማ_____

Annex 6: Amharic version of questionnaire

የመጠይቁ መለያ ቁጥር_____

ክፍለ ከተማ _____ ወረዳ _____ቀበሌ _____

የቤት ቁጥር _____ ስልክ ቁጥር _____

የጠያቂው ስም_____የመጠይቁ ቀን_____/_____/_____

የተጀመረበት ሰዓት_____ያለቀበት ሰዓት_____

ክፍል አንድ ፡- መሰረታዊ መረጃ

መመሪያ፡-የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ

ተ.ቁ	ጥያቄ	መልስ	ወደሚቀጥለው ጥያቄ ይሂዱ
101	መቼ ነዉ የተወለድሽዉ? (ቀን/ወር/ ዓ.ም)	☐☐.☐☐.☐☐☐☐ ቀን / ወር / ዓ.ም	
102	እድሜሽ ስንት ነው? ከ ቁጥር 101 ጋር በማነፃፀር የማይጣጣም ከሆነ/ስህተት ካለው ይታረም	☐☐ ዓመት	
103	የጋብቻሽ ሁኔታ ምንድን ነዉ?	ያገባች ..... 1 አብረዉ የሚኖሩ..... 2 የተፋታች..... 3 የሞተባት..... 4 የተለያየች .....5 ያላገባች.....6 መልስ የለም.....99	
104	ሃይማኖትሽ ምንድን ነው?	ኦርቶዶክስ .....1 ካቶልክ .....2 ፕሮቴስታንት .....3 ሙስልም.....4 ሌላ (ዝርዝር ይግለጹ) _____5 ሀይማኖት የለኝም.....6 መልስ የለም.....99	
105	ትምህርት ተምረሽ ታውቂያለሽ?	አይ ..... 0 አዎ 1	0 ከሆነ ወደ 108 ይሂደ

106	የትምህርት ደረጃሽ ምንድን ነው?	ያልተማረች (ማንበብና መፃፍ የማትችል.....1 ማንበብና መፃፍ የሚችል ... ... 2 የመጀመሪያ ደረጃ (ከ1ኛ - 8ኛ) ... . 3 ሁለተኛ ደረጃ (ከ9ኛ -12ኛ) ... ... 4 ተክኒክና የሙያ ስልጠና..... 5 ከፍተኛ ደረጃ..... 6 አላዉቅም.....88 መልስ የለም.....99	
107	ከየተኛዉ የዘር ግንድ ነሽ?	ኦሮሞ.....1 አማራ.....2 ጉራጌ.....3 ትግሬ.....4 ሌላ (ይግለጹ).....5 መልስ የለም.....99	
108	የስራ አይነት	የመንግስት ሰራተኛ .....1 የግል ድርጅት..... 2 የቤት እመቤት..... 3 ተማሪ ..... 4 ነጋዴ ..... 5 የቀን ሰራተኛ ..... 6 ሌላ (ይገለጽ) ..... 7 መልስ የለም.....99	
109	የበተሰብ መጠን/ብዛት (ከአንች ጋር አንድ ቤት ዉስጥ የምትኖሩ)	_____	
110	የባለቤትሽ የትምህርት ሁኔታ ምንድ ነው?	ያልተማረ (ማንበብና መፃፍ የማይችል).....1 ማንበብና መፃፍ የሚችል .....2 የመጀመሪያ ደረጃ (ከ1ኛ-8ኛ ክፍሌ).....3 ሁለተኛ ደረጃ (ከ9ኛ-12ኛ) .....4 የቴክኒክና ሙያ ትምህርት ያለው .....5 ኮላጅ ያጠናቀቀ ወይም ከዛ በላይ .....6 ባለቤት በህይወት የለም.....7 አላውቅም .....88 መልስ የለም.....99	ጥያቄ ቁጥር 103 መልሱ 4/ 6 ቁጥር ከሆነ ወደ 201 ይሂደ
111	የባለቤትሽ የስራ ሁኔታ ምንድ ነው?	የመንግስት ሰራተኛ 1	

		የግል ድርጅት.....2 ነጋዴ.....3 የቀን ሰራተኛ.....4 ገበሬ.....5 ስራ የሌለዉ/ያልተቀጠረ.....6 ሌላ(ይገለጽ)_____...7 አላዉቅም.....88 መልስ የለም 99	

ክፍል ሁለት፡- የቤተሰብን የሀብት ደረጃ የተመለከቱ ጥያቄዎች

መመሪያ፡- ስለ የሚኖሩበት ቤት ውስጥ ስለሚገኙ ንብረቶችና የቤት አሰራር ሁኔታ የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ፡፡

ነ. **የቤት ንብረት እና አገልግሎቶች** ፡- እባክዎ የሚቀጥሉትን ጥያቄዎች ቤትዎ ውስጥ ስለሚገኙ ንብረቶችና አገልግሎቶች እያሰቡ ይመልሱ			
ተ.ቁ	ጥያቄ	መልስ	ወደሚቀጥለው ጥያቄ ይሂዱ
201	ቴለቪዥን	የለም.....0 አለ.....1	
202	ኮምፑተር (ላፕ ቶፕ/ ዴስክ ቶፕ)	የለም.....0 አለ.....1	
203	ሞባይል/ተንቀሳቃሽ ስልክ	የለም.....0 አለ.....1	
204	የቤት (የመስመር) ስልክ	የለም.....0 አለ.....1	
205	የኤሌክትሪክ ምድጃ (ስቶቭ)	የለም.....0 አለ.....1	
206	ማቀዝቀዣ (ፍሪጅ)	የለም.....0 አለ.....1	
207	የልብስ ማጠቢያ ማሽን	የለም.....0 አለ.....1	
208	ሶፋ	የለም.....0	

		አለ…..…… ነ	
209	ብስክሌት/ሞተር ብስክሌት	የለም…..……0 አለ…..…… ነ	
210	መኪና	የለም…..……0 አለ…..…… ነ	
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313	ከዝህ እርግዝና በፊት ተጨማሪ አይሬን ፎሊክ አሲድ (ብሬት ማዕድን) ወስደዉ ያዉቃሉ?	አይ..... 0 አዎ..... 1	መልሱ 0 ከሆነ ወደ 401 ይዝለሉ
314	ከዝህ እርግዝና ወቅት በፊት ተጨማሪ አይሬን ፎሊክ አሲድ (ብሬት ማዕድን)ለምን ወሰዱ?	በእርግዝና ምክንያት.....1 ህመም ምክንያት.....2 ለተጨማሪ የብሬት ማዕድን.....3 ሌላ (ግለጽ).....4 አላዉቅም.....5 መልሰ የለም..... 6	

ክፍል አራት፡- ከእርግዝና እና ወሊድ ጋር የተያያዙ ጥያቄዎች

የአሁኑ እርግዝና የሚመለከት ጥያቄዎች

መመሪያ፡-የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ፡፡

ተ.ቁ	ጥያቄ	መልስ	ወደ ምቀጥለዉ ጥያቄ ይሂዱ
401	በአሁን ሰአት ስላለው እርግዝና በተመለከተ ለማርገዝ አቅደሽ ነበር ወይንስ ለመቆየት ሀሳብ ነበረሽ ወይም ተጨማሪ ልጅ የመውለድ ሀሳቡ አልነበረሽም	አቅጂ ነበር.....1 ለመቆየት ሀሳብ ነበረኝ .....2 ተጨማሪ ልጅ የመውለድ ሀሳብ አልነበረኝም.....3	መልሱ 0 ከሆነ ቁጥር 506 ን ይዝለሉ
402	በዚህ እርግዝና ወቅት ለመጀመሪያ ጊዜ የቅድመ ወሊድ (ለእርጉዞች ሚደረግ) ምርመራ ሲያገኙ የስንት ወር እርጉዝ ነበሩ?	[____][____] ወራት ወይም [____][____]ሳምንታት አላውቅም 88	
403	አዎ ከሆነ፣ ምርመራውን ያደረገልዎት ማነው?	ዶክተር .....1 ነርስ .....2 አዋላጅ ነርስ .....3 ጤና መኮንን .....4 የጤና ኤክስቴንሽን ሰራተኛ .....5 ሌላ (ይገለጽ).....6	
404	በዝህ እርግዝና ወቅት ለስንት ግዜ ነዉ የእርግዝና ክትትል አገልግሎት የወሰድሽዉ ?	☐ ግዜ አላዉቅም 88	
405	የእርግዝና ክትትል አገልግሎትን ለማግኘት ወደ ጤና አገልግሎት ሰጪ ድርጅት ደርሶ ለመመለስ ምን ያህል ግዜ ይወስድቦታል?	15 – 30 ደቂቃ ..... 1 30 – 60 ደቂቃ ..... 2 60 ደቂቃና ከዛ በላይ ..... 3 አላዉቅም 4	
406	ለቅድመ ወሊድ ምርመራ ህክምና በሚሄዱባቸው (በማናቸውም ጊዜ) በእርግዝና ወቅት ስለሚያጋጥሙ ችግሮች/ምልክቶች ተነግሮዎት/ምክር ተሰጥትዎት ነበር?	አዎ.....1 አልተሰጠኝም .....0 አላውቅም..... 88	መልሱ 0 ከሆነ ወደ ጥያቄ 408 ይዝለሉ
407	ስለየትኞቹ በእርግዝና ወቅት የሚያጋጥሙ ችግሮች/ምልክቶች ነበር የተነገርዎት?	በብልት ደም መፍሰስ. . . . . .1 ከፍተኛ ራስ ምታት. . . . . .2 የማየት ችግር/ ብዥታ. 3	

	(ከአንድ በላይ መልስ ማክበብ ይቻላል)	አዙሪት.....4 ትኩሳት . . . .5 የሆድ ህመም/ቁርጠት. . . . .6 መንቀጥቀጥ/መዝለፍለፍ . . . .7 የድካም ስሜት.....8 ሌላ(ይገለጽ) 9	
408	በዝህ እርግዝና ወቅት፣ በእርግዝና ግዜ ስለምወሰድ የምግብ ስርዓት የምክር አገልግሎት አግኝተዋል?	አይ..... 0 አዎ..... 1	
የቀድሞዉን እርግዝና የሚመለከት ጥያቄዎች የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ፡፡ (እርግዝናዉ የመጀመሪያ ከሆኔ ጥያቄዎቹን ይዝለሉ)			
409	በህይወትሽ ዘመን እስከ አሁን ስንት ግዜ ነዉ የፀነሽዉ ?	[_____] ግዜ አላዉቅም 88	
410	በህይወትሽ ዘመን እስከ አሁን ስንት ግዜ ነዉ የፀነሽዉ ?	[_____] ግዜ አላዉቅም 88	
411	ከዝህ በፍት ከ28 ሳምንታት በፊት የተቋረጠ/ ተጨናገፈ እርግዝና አጋጥሞሽ ያዉቃል?	አይ..... 0 አዎ..... 1	
412	በህይወትሽ እስከ አሁን ለስንተኛ ግዜ ነዉ ከ28 ሳምንታት በፊት የሆነ ፅንስ የተቋረጠብሽ?	[_____] ግዜ አላዉቅም 88	
413	ስንት ልጆች አሉሽ በህይወት የተወለዱ?	[_____]	
414	በቀድሞዉ የእርግዝና ወቅት ከጤና ተቋም የቅድመ ወሊድ (ለእርጉዞች የሚደረግ) ምርመራ አግኝተሽ ነበር?	አይ..... 0 አዎ..... 1 አላዉቅም 88	መልሱ 0 ከሆነ ቁጥር 501 ይዝለሉ
415	በቀድሞዉ የእርግዝና ወቅት የቅድመ ወሊድ (ለእርጉዞች የሚደረግ) ምርመራ ያገኙት የት ነበር?	የመንግስት ሆስፒታል .....1 የመንግስት ጤና ጣብያ .....2 ጤና ኬላ .....3 የግል ሆስፒታል .....4 የግል ክሊኒክ .....5 ሌላ (ግለጽ).....6	
416	በቀድሞዉ እርግዝና ወቅት ለስንት ግዜ ነዉ የእርግዝና ክትትል አገልግሎት የወሰድሽዉ?	[ ] ግዜ አላዉቅም 88	

ክፍል አምስት - በአሁኑ ግዜ ያለዉን የተጨማሪ አይሬን (የብሬት ማዕድን) አወሳሰድን የተመለከተ ጥያቄ

መመሪያ፡-የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ፡፡

ተ.ቁ	ጥያቄ	መልስ	ወደምቀጥለዉ ጥያቄ ይሂዱ
501	በዝህ የእርግዝና ወቅት የምዋጥ መድሃኒት ወስደዋል? (የአይሬን መድሃኒት እንክብሉን በማሳየት የዝህን አይነት ወስደዉ ያዉቃል ብለህ/ሽ ጠይቅ/ቂ)	አይ..... 0 አዎ..... 1	
502	አዎ ከሆኔ መድሃኒቱን ከየት ነበር ያገኙት?	የመንግስት ሆስፒታል .....1 የመንግስት ጤና ጣብያ .....2 የግል ክሊኒክ .....3 መድሃኒት መሸጫ መደብር .....4 ሌላ (ግለጽ).....5	
503	መድሃኒቱን በክፊያ ነበር ያገኙት?	አዎ .....1 አይ .....2 ሌላ (ግለጽ).....3	
504	የአይሬን መድሃኒት እንክብሉን በየቀኑ ይወስዳሉ?	አይ..... 0 አዎ..... 1	0 ከሆነ ወደ 506 ይዝለሉ
505	አዎ ከሆነ፣ በየቀኑ እንድወስዱ ማን ያግዞታለ?	ለጤና ያለዉን ጥቅም ስለተገነዘብኩ.....1 በተሰቦቼ(ባለቤቴ፣ እናቴ).....2 ከጤና ባለ ሙያ ያገኘሁት ምክር .....3 በሽታዉን ስለምፈራ.....4 መድሃኒቱን ስወስድ ጤንነት ስለሚሰማኝ...5 ሌላ (ግለጽ).....6	
506	አይ ከሆኔ፣ በየቀኑ መዉሰድ ያልቻሉት ለምንድን ነዉ?	እረሳለዉ .....1 የጎንዮሽ ችግር ስላስከተለብኝ.....2 ብዙ ክኒኒ መዉሰድ ስለፈራዉ .....3 መድሃኒቱ ስላለቀ .....4 አስፈላጊ ስላልመሰለኝ .....5 ሌላ (ግለጽ).....6 መልስ የለም 99	

507	እስካሁን ድረስ የገጠመዎት የጎንዮሽ ችግር አለ?	አዎ.....1 አልገጠመኝም .....0 አላውቅም..... 88	መልሱ 0 ከሆ ወደ ጥያቄ 510 ይሀዱ
508	አዎ ከሆነ፣ ምን አይነት የጎንዮሽ ችግር ነው የገጠመዎት?	ድርቀት.....1 የሆድ ቁርጠት.....2 ማቅለሽለሽ.....3 ማስታወክ..... 4 የሰገራ መጥቆር.....5 የመነምዘዝ.....6 ሌላ(ይገለፅ).....7	
509	መልሱ አዎ ከሆነ እስከ እርግዝና መጨረሻ ድረስ እንክብሉን ይወስዳሉ?	አዎ.....1 አልወስድም .....0 አላውቅም..... 88	
510	በዝህ እርግእና ወቅት ስለሚሰጥ የተጨማሪ አይሬንና ፎሊክ አስድ (ብሬት ማዕድን) አስፈላጊነት በተመለከተ የምክር አገልግሎት ተሰጥቶታል?	አይ..... 0 አዎ..... 1	መልሱ 0 ከሆነ ቁጥር 511 ይዝለሉ
511	አዎ ከሆነ ምን አይነት የምክር አገልግሎት?	መድሃኒቱ ጥቅም..... 1 መድሃኒቱን ያለመዉሰድ የሚያስከትል ጉዳት.2 መድሃኒቱ ስላለዉ የጎንዮሽ ችግር .....3 መድሃኒቱ እስከሚያልቅ ሳያቋርጡ በየቀኑ መወሰድ አንዳለበት.....4 መድሃኒቱ ስያልቅ መጥቼ መዉሰድ እንዳለብኝ.....5 ሌላ (ግለጽ).....6	
512	አዎ ከሆነ፣በማን ነዉ የምክር አገልግሎቱን ያገኙት?	ዶክተር .....1 ነርስ .....2 አዋላጅ ነርስ .....3 ጤና መኮንን .....4 የጤና ኤክስቴንሽን ሰራተኛ .....5 ሌላ (ይገለጽ).....6 አላዉቅም .....88 መልስ የለም 99	

513	ባለፉት ሦስት የእርግዝናዎ ወራት የተጨማሪ አይሬንና ፎሊክ አሲድ (ብሬት ማዕድን) ክኒኖቹን የዋጡት ለምን ያህል ቀናት ነበር?	[___][___] ቀናት አላዉቅም .....88 መልስ የለም 99	
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514	ብልቃጡ/ስትሪፑ ዉስጥ የቀረዉ ክኒኒ ስንት እንደሆነ ቆጥረህ ጻፍ፡፡	[_____] ክኒኒ	
515	ለእናትዬዋ የተሰጠበትን ቀን ሙላ፡፡ (ከእናትዬዋ ካርድ ላይ በማየት)	☐☐.☐☐.☐☐☐☐ ቀን /ወር / ዓ.ም	
516	ቀሪዉ ክኒኒ የተቆጠረበትን ቀን በተሰጠዉ ሳጥን ዉስጥ ጻፍ፡፡	☐☐.☐☐.☐☐☐☐ ቀን /ወር / ዓ.ም	
517	ምን ያህል ክኒኒ ለእናትዬዋ እንደተሰጣት ጻፍ፡፡ (ከእናትዬዋ ካርድ ጋር አስተያይ)	[_____] ክኒኒ	

ክፍል ስድስት፡- የጤና ተቋሙን የሚመለከት ጥያቄ

መመሪያ፡-የቀረቡትን ጥያቄዎች በመጠየቅ የመለሱትን መልስ በጥንቃቄ በማዳመጥ በመልስ ሳጥን ውስጥ ያሉትን ቁጥሮች ያክብቡ፡፡

ተ.ቁ	ጥያቄ	መልስ	ወደምቀጥለዉ ጥያቄ ይሂዱ
601	ባለፉት ስድስት ወራት የተጨማሪ አይሬንና ፎሊክ አሲድ (ብሬት ማዕድን) መድሃኒት ያልነበረበት ወቅት ነበር?	አዎ ..... 1 አይ 0	
602	አዎ ከሆነ በምን ምክንያት ነዉ ያልነበረዉ?	ከማከማቻ ክፍል ስላለቀ..... 1 መድሃኒቱ ግዜዉ ስላለፈበት.....2 የሪፖርትና የመጠየቅያ ቅጹ በግዜ ተሞልቶ ስላልተላከ .....3 በቂ አቅርቦት ከመድሃኒት አቅርቦትና ፈንዲ ኤጀንሲ ስለሌለ .....4 ሌላ (ግለጽ).....5	
603	የተጨማሪ አይሬንና ፎሊክ አሲድ (ብሬት ማዕድን) መድሃኒት መስጫ መመሪያ አለ	አዎ..... 1 አይ 2	
604	የተጨማሪ አይሬንና ፎሊክ አሲድ (ብሬት ማዕድን) መድሃኒት አወሳሰድ ላይ ስልጠና የወሰደ የጤና ባለ ሙያ አለ	አዎ..... 1 አይ 2	
605	የተጨማሪ አይሬንና ፎሊክ አሲድ (ብሬት ማዕድን) መድሃኒት አሰጣጥ እንደት ነዉ	በየወሩ..... 1 በየሶስት ወሩ ..... 2 በአለም ጤና ጥበቃ መመሪያ መሰረት..... 3 በደም መጠን ላይ ተመርኩዘን ..... 4 ሌላ(ግለጽ).....5	

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