Adherence to Iron-folic Acid Supplementation and Associated Factors Among Pregnant Women in Borena Woreda, South Wollo, Ethiopia

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Abstract: *Background*: Iron deficiency is the leading and single nutrient deficiency in the world affecting over 30% of the world's population particularly in developing countries. Pregnant women are at high risk of iron deficiency due to increased nutrient requirements during pregnancy. In Ethiopia, only 0.4% of pregnant women take Iron supplements more than 90 days of the recommended 180 days. The factors for this low adherence are not clearly known. *Objective*: To assess the level of adherence and factors associated with iron-folic acid supplementation among pregnant women attending antenatal service of selected health facilities in Borena South Wollo, Amhara region, Ethiopia. *Methodology*: Institution-based cross-sectional study design was used to conduct the study. About 340 pregnant women attended health centers in Borena, South Wollo, Amhara region, Ethiopia was included in the study by using a systematic random sampling technique. Data were entered into Epi info version-7 and exported to SPSS version 25 for analysis. Logistic regression was employed to identify the predictor variables. Statistical significance was considered at P<0.05 with an adjusted odds ratio calculated at 95% CI. *Result*: The overall adherence to iron folate supplement was 45.6%. Husbands educational level [AOR=1.95; 95% CI: 1.07-3.57], history of abortion [AOR=0.162; 95% CI: 0.050-0.53], having diseases diagnosed other than anemia [AOR=0.476; 95% CI: 0.284-0.798], taking of IFA in months [AOR=2.81; 95% CI: 1.365-5.786] and encouragement to take IFA [AOR=0.125; 95% CI: 0.037-0.418] were significantly associated with adherence to iron folate acid supplementation. *Conclusion*: Adherence to IFA supplement utilization was low in the study area. Provision of health education to pregnant mothers and the community on anemia and the importance of IFA during pregnancy through adequate counseling, community education, and media would increase adherence.

Keywords: Adherence, Iron/Folic Acid, Pregnant Women, Borena, Ethiopia

1. Introduction

Iron is a micronutrient required in small amounts for all tissues of the body for basic cellular functions, growth and is critically important in muscle, brain, red blood cells and development of the human body [1, 2]. Daily oral iron and folic acid supplementation is recommended as part of the antenatal care to reduce the risk of low birth weight, maternal anemia and iron deficiency [3, 4]. The recommended dietary allowance for iron among non-pregnant women is 10-18 mg per day; but during pregnancy since the pregnant mothers' physiologic demand for iron increases (example: for fetus), the recommended dietary allowance rises to 27-30 mg per day [5]. Its deficiency at conception and in early pregnancy is associated with increased risk of neural tube defects and other adverse pregnancy outcomes such as preeclampsia, malformations such as spontaneous abortion, fetal death, fetal growth restriction and preterm delivery [6, 7]. Pregnant women are particularly at high risk of iron due to increased nutrient requirement during pregnancy [8–10].

Iron deficiency is the leading single nutrient deficiency to cause anemia in the world affecting the lives of more than 2 billion people, accounting to over 30% of the world's population particularly in developing countries [9, 10]. Globally, iron deficiency anemia is associated with 22% of all maternal deaths [6, 7], which extend as many as 50% of maternal deaths worldwide [11]. About 41.8% almost half of all pregnant women and 30.2% non-pregnant women are anemic with the highest proportion affected in developing countries. The prevalence of anemia among pregnant women in developed country is 18% in average, which is significantly lower than the average 56% in developing countries [12].

According to the WHO and Ethiopian ministry of Health guideline to control and prevent of micronutrient deficiencies, the recommended dose is 60mg/day for 90 days for iron and 400µg of folic acid daily [11]. According to the EDHS of 2011, nationally only 0.4% of the pregnant women take Iron supplements more than 90 days of the recommended 180 days. In Amhara region 80.6% of pregnant women do not take any iron tablets or syrup during pregnancy, while 17.1% take for less than 60 days, 0.3% takes for 60-89 days and only 0.4% take for 90 days or more [13]. However, according to the 2019 EMDHS, the percentage of women taking iron supplements for 90 days or more increased from 5% in 2016 to 11% in 2019 but remains at a substandard level. The percentage of women who did not take any iron supplements decreased from 58% to 40% over the same period The percentage of women taking iron supplements for 90 days or more 15.4% in Amhara region, which is highest in Dire Dawa (22%) and Addis Ababa (19%) and lowest in Somali (2%) and SNNPR (4%) [8]. Due to this and other factors, 16.6% of reproductive age women living in Amhara region are suffering from anemia [13]. During pregnancy there is an increase of iron need, therefore the likelihood of presenting iron deficiency is high if there is not supplementation during the pregnancy [14, 15].

This indicates that identification of the factors associated with adherence to IFA supplementation is an important step to improve the IFA tablets use among the pregnant women. However, there was no previous study that has been conducted in the study area with this purpose. Therefore, the aim of this study is to assess the level of adherence and identify factors associated prenatal IFA supplementation among pregnant women who attend antenatal care in public health centers at Borena Woreda, South Wollo, in Ethiopia.

2. Methodology

2.1. Study Design and Settings

An institution-based cross sectional study design was used to conduct the study. The study was conducted in Borena Woreda, South Wollo, Amhara region, Ethiopia. It was located at 581 km from the capital city of Addis Ababa. The current total population of Borena Woreda was reported as 185,399 population (Men: 91,877 (49.56%) and women:

93,522 (50.44%)). It has 7 health facilities [16, 17]. All are providing regular ANC checkup. The study was conducted from January 1-30, 2020.

2.2. Population and Eligibility Criteria

All pregnant women who were attending ANC clinics during current pregnancy in Borena Woreda, South Wollo, Amhara region, Ethiopia were source population. All pregnant women who taking IFA tablets in the previous ANC visits during current pregnancy in all health centers during the time of data collection were study population. Pregnant women who was on ANC follow up and come at least for second visit to ANC clinics of the selected health centers in the time of data collection were included in the study. However, pregnant women who were seriously ill at the time of data collection were excluded.

2.3. Sample Size and Sampling System

The required sample size for the study was calculated by using single population proportion formula with the following assumptions: 95% confidence level, 4% margin of error and 28.9% proportion of adherence to IFA supplementation among urban and rural pregnant women in north western zone of Tigray [6]. Accordingly, the calculated sample size was 316, considering 10% for non-response rate the total sample size for this study was 348.

All seven public health centers in the woreda included in the study. Accordingly the study was designed to perform for one month's period. About 814 women attended second and above ANC to visit in all health center. So, sample size of 348 pregnant women was allocated proportionally to each of ANC clinics in all health center. Then, the study participants were selected by using systematic random sampling technique. The first pregnant woman included in the sample was chosen randomly by blindly picking one of two pieces of paper coded for the first two visitors. After that, every 2nd pregnant woman who came for antenatal care visit were interviewed until the desired sample size was fulfill in each health center.

2.4. Variables

Independent variable: Adherence to iron-folic acid supplementation.

Dependent variables: Socio-economic and demographic factors (Mothers' age, marital status, residence, educational status, Husband's educational status, Mother's occupational status, Husbands' occupational status, Family size, Family monthly income, Family support), Personal/behavioral factors (Frustration, forgetfulness, not knowing importance, fear of having a big baby, IFA supplements given insufficient, taking other supplements and treatments, health problems other than anemia, IFA tablet-related issues (side-effects, taste, size, color, coating etc.), Health service related factors (Hemoglobin level during the first and current visit, Anemia status), Obstetric and medical factors (Gravidity, Parity, Gestational age, Timing of registration, No of visits),

Mother's Knowledge about anemia and benefits of taking IFA tablets, Social factors (Family encouragement for ANC service & IFA intake).

2.5. Operational Definition

Adherence: is the extent to which patients take medications as prescribed by their health care providers [18].

Adherent to IFAS: defined as women reporting that they consumed the recommended number of supplements in the previous week (versus less than the recommended number). "High-adherence" is defined as reporting the consumption of ≥ 75% of the recommended number of supplements (versus<75%), and "non-adherence" is defined as reporting no supplements consumed in the previous week (versus any supplement consumption) [19]. And pregnant mothers who took at least 70% of the expected dose of the iron-folate tablets in the previous week before the study, which is equivalent to consuming at least five tablets per week, were considered as compliant with iron-folate supplement. The respondents who consumed less than five IFA tablets were considered as noncompliant [20].

Knowledge to anemia: Respondents who were aware of anemia and know at least one of questions asked its major causes, symptoms, consequences, risk group and method of prevention during pregnancy were considered to have good knowledge [20].

Knowledge to benefits of Iron/folic acid: Participants who answered correctly to 75% of the above questions were considered to have good knowledge of iron supplementation in pregnancy, whereas those who answered correctly to two or less were said to have poor knowledge [21].

Anemia: Anemia among pregnant women will be defined as hemoglobin concentration<110 g/L.

Iron deficiency: A state of insufficient iron store to maintain normal physiological functions of tissues.

Antenatal services -pregnancy check-up by health personnel, provision of iron/folic acid.

Supplementation: Provision of specified dose of nutrient preparation which may be in the form of tablet, capsule, oil solution or modified food for either treating an identified deficiency or prevention of the occurrence of such a deficiency in an individual.

2.6. Data Collection Tools and Quality Control

Questionnaire was adapted from other literatures. An interviewer administered structured questionnaire was employed to eligible participants. The questionnaire was first prepared in English and then it was translated to Amharic as the study subjects speak Amharic then back to English to check consistence. Three female nurses and one Health officer was recruited for data collection and supervision. The questionnaire was first pre-tested in 5% of sampled population in public health institutions which will not be included in the study. To ensure data quality, adequate training and orientation was given to data collectors and supervisors. The completeness and appropriateness of the collected data was checked by supervisors every day and corrected according to the identified problems. In addition to this, the investigator was monitoring and evaluating the overall quality of data collection process. The questionnaire was pre-tested and modified based on the findings related with clarity, wordings, logical sequence, skip patterns of the questions and resources needed.

2.7. Data Management and Analysis

The data was entered into EPI-info version 7 and then exported to SPSS version 23 for data management and analysis. Descriptive statistics of percentages mean was carried. In addition, bivariate analysis was used to identify significant variables and then variables with $p<0.2$ was included in to multiple logistic regressions to determine association between independent and dependent variables. Odds ratio with 95% confidence intervals and significance level at $P<0.05$ was used to assess the association between factors and level of infertility. The output of analysis is displayed by statistical tables and figures.

2.8. Ethics Approval and Consent to Participate

The study was conducted after getting ethical clearance from Bahirdar University, College of institutions of technology, Institutional Review Committee (IRC). Support letter was obtained from Amhara Health Bureau and Woreda health office. Informed consent was secured from study participants in their own language; after explaining the purpose of the study, potential risks and benefits of the study as well as the right to withdraw from the study at any time. The participants was also be assured about the confidentiality of the data. To keep confidentiality, the interview was conducted in private as well as their name and other identification aspects are not going to be recorded on the interview sheet and coding was used during data collection and analysis. For those pregnant women who cannot read and write, literate person witness was invited and explained to the pregnant women about the study and then both was sign for the consent.

3. Result

3.1. Socio Demographic Characteristics of Respondents

A total of 340 respondents were participated with a response rate of 97.7%. The mean age of respondents were 27.11 (±5.78 SD) years. Almost nine in ten (87.9%) were rural residents and almost all (99.4%) were currently married. About 69.1% mothers were housewives and 62.1% pregnant women were no education. Around half of the households (49.7%) had less than 3 family size and majority 69.1% and 53.8% of pregnant women and her husband were illiterates respectively. The occupational of pregnant women and her husband were 62.1% house wives and 71.2% farmer respectively and about 71.8% of the mothers had greater than 1000birr family monthly income (Table 1).

Table 1. Socio-demographic and economic characteristics of pregnant women attending antenatal care at Borena woreda health center, 2020. (n=340).

Variable	Frequency	Percent
Age of mothers		
15-19 years	26	7.6
20-34 years	264	77.6
35-49 years	50	14.7
Marital status		
Currently married	338	99.4
Currently married/not	2	0.6
Religion		
Orthodox	169	49.7
Muslim	167	49.1
Others*	4	1.2
Residence		
Rural	299	87.9
Urban	41	12.1
Family size		
1-3	169	49.7
4-7	159	46.8
8 and above	12	3.5
Mothers educational status		
No education	235	69.1
Primarily	66	19.4
Secondary	18	5.3
Secondary and above	21	6.2
Mothers occupational status		
House wife	211	62.1
Farmer	87	25.6
Others**	42	12.4
Husband educational status		
No education	183	53.8
Primarily	78	22.9
Secondary	38	11.2
Secondary and above	41	12.1
Husband occupational status		
Farmer	242	71.2
Merchant	56	16.5
Others***	42	12.4
Monthly family income		
Low (<=500)	9	2.6
Medium (501-1000)	87	25.6
High (>=1001)	244	71.8

* Catholic and Protestant** Governmental and private employee, merchant, laborer and student *** governmental and private employee, laborer and student.

3.2. Mother's Knowledge on Anemia and Benefits of IFA Tablets

Regarding mother's knowledge of anemia and IFA, more than six out ten (64.4%) and above nine out of ten of the mothers (93.5%) had good knowledge respectively (Figure 1).
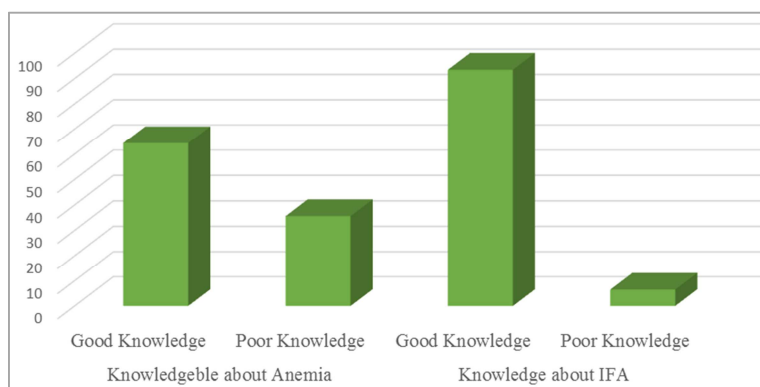
Figure 1. Mother's knowledge status on anemia and benefits of IFA tablets pregnant women attending antenatal care at Borena woreda health center, 2020 (n=340).

3.3. Obstetric and Medical History study Participants

About 73.8% of mothers were multigravida and more than half of the respondents (51.2%) were multiparous. Around 5.9% and 2.5% pregnant mothers during the past time had history of abortion and still birth respectively. From a total 53.8% respondents were in their first and second trimester in gestational age. Above six out of ten of the respondents (65%) were registered for ANC before 12 weeks of gestation and only (8.8%) mothers follow the recommended ANC visit (≥4 visits) (Table 2).

Table 2. Obstetric and medical history of pregnant women attending antenatal care at Borena woreda health centers, 2020. (n=340).

Variable	Frequency	percent
Gravidity (number of pregnancy)		
prim gravida (one times)	89	26.2
Multigravida (more than two times)	251	73.8
Parity (number of births)		
Nulliparous (No children)	90	26.5
Primparous (One children)	76	22.4
multiparous (more than one children)	174	51.2
History of Abortion		
Yes	20	5.9
No	320	94.1
History of still birth		
Yes	10	2.9
No	330	97.1
ANC visit		
<4 visits	310	91.2
>=4visits	30	8.8
Currently Gestational age of mothers		
Frist trimester	11	3.2
Second trimester	179	52.6
Third trimester	150	44.1
GA when first register for ANC		
First trimester	211	65
Second trimester	118	34.7
Third trimester	1	0.3
Disease diagnosed other than anemia		
Yes	217	63.8
No	123	36.2

Table 3. Health related characteristics of pregnant women attending antenatal care at Borena woreda health center, 2020 (n=340).

Variable	Frequency	Percent
GA months when Hgb was first recorded (Total=127)		
First trimester	87	68.5
Second trimester	39	30.7
third trimester	1	0.78
Previous Hgb level and anemia status (total=127)		
Anemic	10	7.9
Not anemic	117	92.1
Current Hgb level and anemia status (total=145)		
Anemic	5	3.4
Not anemic	140	96.6
Information on IFA		
Yes	320	94.1
No	20	5.9
Obtain adequate IFA		
Yes	331	97.4
No	9	3.6

3.4. Health Related Characteristics

Majority of the respondents (68.5%) were in their first trimester of gestational age when their Hgb level was first recorded on ANC register. Based on the previous and current Hgb level (7.9%) and (3.4%) were anemic respectively. Only 94.1% mothers had given information on iron folate supplement use during the nutrition counseling session. Almost all (97.4%) respondents obtained adequate IFA tablets during their ANC visit (table 3).

3.5. Self-reported Adherence Status

About 45.6% of study participants were adhered to IFA supplementation, while the remaining 54.4% was not adhered to the recommended level.
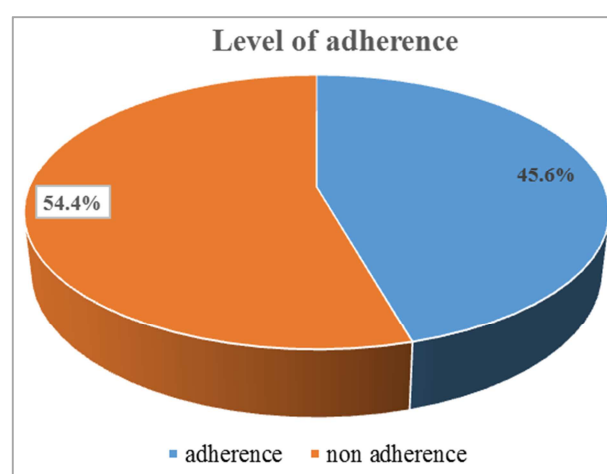
Figure 2. Adherence level of pregnant women to IFA supplement use attending antenatal care at Borena woreda health center, 2020.

3.6. Reasons for Not Adhering to IFA Supplement Daily

Among the major reasons for skipping or not taking IFA supplement daily were forgetfulness to take daily (37.8%), frustration of having to take many tablets (14.6%), due to side effects (14.0%), (table 4).
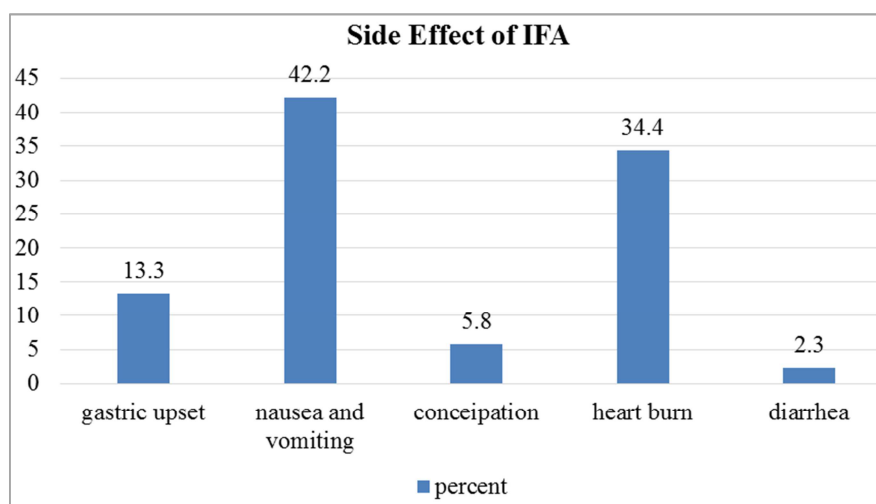
Table 4. Reasons for not adhering to IFA dose among pregnant women to IFA supplement use attending antenatal care at Borena woreda health centers, 2020.

Reasons for skipping IFA dose	Responses	
	frequency	Percent
Frustration of having to take many tablets	68	14.6%
Forgetfulness to take the tablets	176	37.8%
Not knowing importance of taking all the tablets	48	10.3%
Fear of having a big baby	18	3.9%
Tablet-related issues (taste, size, color, coating etc.)	46	9.9%
Due to side effects	65	14.0%
IFA tablets supplements given insufficient	2	0.4%
Taking other supplements and treatments	4	0.9%
Health problems during pregnancy other than anemia	1	0.2%
It is enough for me	37	8.0%
Total	465	100%

3.7. Common Side Effect of IFA Reported

More than half (51.8%) of the respondents during taking IFA reported that presence of side effects and the major specific intake side effects reported were nausea and vomiting (42.2%), heart burn (34.4%), gastric upset (13.3%) and constipation (5.8%) (Figure 3).

Figure 3. *Common side effects of IFA dose responded among pregnant women to IFA supplement use attending antenatal care at Borena woreda health centers, 2020.*

Table 5. *Factor associated with IFA adherence among pregnant mothers attending ANC in Borena woreda health center, 2020.*

Variables	IFA supplement		COR (95% CI)	AOR (95% CI)
	Adhered	Non adhered		
Husband education				
No education	73 (47.1%)	110 (59.5%)	1	1
Primarily	45 (29.0%)	33 (17.8%)	0.49 (0.28-0.83) *	1.95 (1.066-3.570) **
Secondary	10 (6.5%)	28 (15.1%)	1.858 (0.852-4.055)	0.640 (0.266-1.536)
Secondary and above	27 (17.4%)	14 (7.6%)	0.34 (0.169-0.70) *	2.148 (0.984-4.685)
History of abortion				
Yes	15 (9.7%)	5 (2.7%)	0.26 (0.092-0.731)*	0.162 (0.050-0.53) **
No	140 (90.3%)	180 (97.3%)	1	1
Disease diagnosed other than anaemia				
Yes	108 (69.7%)	109 (58.9%)	0.62 (0.398-0.98) *	0.48 (0.284-0.798) **
No	47 (30.3%)	76 (41.1%)	1	1
How many months taking IFA				
One months	21 (13.5%)	50 (27%)	1	1
Two months	52 (33.5%)	53 (28.6%)	0.43 (0.226-0.81) *	2.81 (1.365-5.786)**
Three and above months	82 (52.9%)	82 (44.3%)	0.42 (0.232-0.76) *	1.907 (0.961-3.784)
Encouragement to use IFA				
Yes	151 (97.4%)	157 (84.9%)	0.15 (0.05-0.434) *	0.117 (0.036-0.39) **
No	4 (2.6%)	28 (15.1%)	1	1

*P value<0.05, **p value<0.01, CI: Confidence Interval, COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio.

3.8. Factors Associated with Adherence to IFAS Among Pregnant Women

To identify factors associated with adherence to IFAS among women attending antenatal care at Borena woreda health centers, first bivariate regression analysis was performed. At this level, variable with p value < 0.2 were included for multiple logistic regression analysis to assess their independent effect on dependent variable after controlling confounding effects. Accordingly, the results of multiple regression analysis show that covariates such as; husbands education level, History of abortion, Disease diagnosed other than anemia, how long taking IFA and obtaining encouragement to use IFAS were significantly associated with adherence to IFAS (See Table 5).

4. Discussion

Pregnant women are among the most vulnerable groups of iron deficiency anemia. Iron and folic acid supplementation is among the feasible ways to prevent anemia during pregnancy. The finding of this study found that 45.6% of pregnant women were adhered to Iron and folic acid supplementation (took ≥5 tablets per week in the previous one month preceding the survey) which is consistence with the study done in Egypt, Cambodia and Malaysia [14, 22, 23]

and pooled prevalence done in Ethiopia [24]. However; it is higher than the study done in Tigray, Ethiopia (37.2%) [6], Mecha Northwest Ethiopia (20.4%) [25], Misha district, South Ethiopia (39.2%) [26]. The possible reason may be increased knowledge of pregnant women about anemia and IFA supplementation (through medical advice and media), the time gap, culture of the people. But this finding was lower than a study done in rural districts of Ethiopia (74.9%) [20], Gulale sub city Addis Ababa [27], Yeka Sub city, Addis Ababa [28], Sidama Ethiopia [29] and study done Rohtak city, in India (80.47%) [30]. The variation may be due difference in inaccessibility of health services, giving low attention for adherence issue due to lack of awareness, educational status of women and geographic locations and life style.

The result of this study showed that, those respondents husband with primarily education were 1.951 times more likely to adhere to IFA supplement use as compared to those with no educated husband. The possible reason is that educated husband have better knowledge about anemia and Iron and folic acid supplementation, support wives to take IFA and give better emphasis for adherence to IFAS by anticipating pregnancy outcomes. The finding was supported by studies done in Tanzania and Nepal [31, 32]. But this finding is contradicted by the studies done in Ethiopia [20]. This difference may be due to different in geographic locations, cultures and time of the study. This study also found that having history of abortion during previously pregnancy can affect mothers' to take their daily IFA tablets use. The result show that 5.9% of pregnant mothers during previously pregnancy have history of abortion and among these only 7.9% of mothers were adhere to IFAS. Those Pregnant mothers who had previous history of abortion were less likely to adhere to IFA supplement as compared to those had no history of abortion. This may be due to at health institution, those mothers who have history of abortion counseled and supplemented with Iron and folate this may improve knowledge and practice about anemia and use of IFA.

The study found that disease diagnosed other than anemia can affect mothers adherence to IFA use. Our result show that, of pregnant mothers with disease diagnosed other than anemia only 69.7% of mothers were adhere to IFAS. According to this study, pregnant mothers diagnosed with disease other than anemia were 52.4 more likely adhere to IFA supplement when compared to those who did not diagnosed with disease other than anemia. This may be due to having knowledge about anemia and IFA and fearing of the others diseases. The finding was supported by studies done in Tanzania [31, 33].

The study revealed that Pregnant mothers who were taking IFA for two months 2.810 times more likely to adhere to IFA supplement use as compared to taking IFA for one months. This may be due to the experienced or adapted the side effect and other factors of IFA. The finding is consistent with other studies conducted in Cambodia and Philippines [22, 34]. The study found that obtained any encouragement to take their daily IFA tablets can affect mothers' adherence to IFA use.

According to this study, 90.6% of pregnant mothers did obtained any encouragement to take their daily IFA tablets and among these 97.4% of mothers were adhere to IFAS. The present study showed that mothers who did obtained any encouragement to take their daily IFA tablets were 88.3% less likely to non-adhere to IFA supplement during pregnancy as compared to those who did not obtained any encouragement to take daily tablet. This finding is supported by other studies done in Egypt, Cambodia and Uttar Pradesh [14, 22, 35].

According to this result the main reasons for skipping (non-adherence) to IFA was supplement was forgetfulness to take tablets daily. Our result was lower than results from studies of Malaysia (33.9%), Philippines (78.8%0 and Nepal (39%) [23, 32, 34]. Another reasons was frustration to take many tablets which is lower than the study done in Egypt (54.3%) [14]. Lastly the reasons for skipping IFA was due to side effects then our results was lower than the study done in Philippines (20.2%) and Senegal (17.1%) [34, 36]. This may be due to lower mothers' knowledge about anemia and benefits of IFA tablets, negligence and lower counseling during ANC visits. Our results of reason for skipping difference in Ethiopian studies by magnitude, in Bahirdar the forgetfulness to take the tablets daily (61.5%) frustration of having to take many tablets (48.6%), due to perceived as well as experienced side effects (45.1%) [37], in Mecha forgetfulness (42.1%) [26], in Misha side effects (54.4%) [25]. This difference may be due to ones negligence because of thinking I would get enough from daily dietary intake, knowledge about anemia about IFA, culture of mothers and religious beliefs and working load of mothers.

Among the side effects 51.8% mothers had experienced side effect after taking the supplements and out of this 49% of mother adherent to IFAS. However, most frequently given were nausea and vomiting (42.2%), sensation of heart burn (34.4%) and gastric up set (13.3%). Our results difference with findings from Cambodia (21%), Philippines (24.3%), and Nepal (10%) [22, 32, 34]. This difference may be due to their better feeding habit as tablet intake along with some fruits or tasty and sweet foods may minimize occurrence of side effects. On the other hand the study done in Ethiopia different from our results, eight rural districts (63.3%), Mecha (54.4%), Bahirdar (79%) and Akaki Kality sub city, Addis Ababa (58.4%). This difference may be due to cultural and feeding differences as they may take their tablet along with sweet foods or fruits. This difference may be comes due to their feeding habit as tablet intake along with some fruits or tasty and sweet foods and probably resulted from getting inadequate counseling during medical advice from health care providers may minimize occurrence of side effects.

5. Conclusion

The adherence rate to Iron and folic acid supplementation is low among pregnant women attending ANC. Husbands education, history of abortion, Disease diagnosed other than anemia, taking IFA months and encouragements to taking

IFA were factors associated with adherence to IFA supplement during pregnancy. Forgetfulness to take daily IFA supplement, frustration to take many tablets and presence of side effects were identified as major reasons for skipping a dose and nausea and vomiting and heart burn were the most frequently responded side effects. The community and family members should encourage or support pregnant mother to take iron folic acid supplementation. Health care provider in different level should provide health education to pregnant women on the importance of iron/folic acid throughout pregnancy times, importance of adherence during pregnancy. Health sectors should prepare the in-service education program to all health professionals in regards to anemia, nutrition during pregnancy, supplementation and duration of supplementation during pregnancy and IFA adherence counseling skills to be provided. Future Researchers, should focus on longitudinal quantitative using advanced measures like pills counting and based on hemoglobin level other than self-reported adherence.

Abbreviations

ANC: Antenatal Care, AOR: Adjusted Odd Ratio, CI: Confidence Interval, IFA: Iron Folic Acid, IFAS: Iron Folic Acid Supplementation, EDHS: Ethiopian Demographic and Health Survey, EMDHS: Ethiopian Mini Demographic and Health Survey REC: Research and Ethical Committee, WHO: World Health Organization.

Declarations

Authors Contribution

SH: Hypothesized and developed objective, managed database development & analysis and revised the manuscript. ZAA: Assisted in developing objective and data analysis, and primarily wrote the manuscript.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

Consent for Publication

Not Applicable.

Competing Interest

The authors declare that they have no competing interests.

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