

# IFA utilization and factors associated with IFA utilization among pregnant women attending ANC at government health facilities and family guidance clinic in Hawassa city, South Ethiopia

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## Research Article

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# Abstract

**Background:** Iron deficiency is the most common nutritional disorder in the world, and most prevalent in women of reproductive age. Iron supplementation is a common strategy currently used to control iron deficiency, and iron deficiency anemia in developing countries. However, it is not clear whether women actually ingest the supplements.

**Objectives:** To assess IFA utilization and factors associated with IFA utilization among pregnant women attending ANC at government health facilities and family guidance clinic in Hawassa city, South Ethiopia.

**Methods:** Facility based cross-sectional survey was conducted in March /2015. Sample size is determined by using single and double population proportion. Consecutive sampling technique was used to select study units. Data was collected by trained unemployed diploma nurses using a pretested structured questionnaire. It was cleaned and checked for completeness and then entered in to Epi-info 3.2.2 and exported to SPSS 16.o software for analysis. Predictors were found out using bivariate and multivariate logistic regression.

**RESULTS:**A total of 412 pregnant women who came to attend ANC at least for the second time were interviewed in seven health facilities. Our study showed that 333 (81%, 95% CI: 77.2 -84.8) pregnant women reported taking IFA supplement and compliance was 37.7% (95%CI: 32.5-42.9). In multivariable analysis, side effects and low acceptance of the supplement were significantly associated with high compliance to IFA supplementation ( $P < 0.05$ ).

**Conclusion:** There was a better level of compliance towards IFA supplementation compared to other national data. Pregnant women should be counseled regarding how to manage the side effects of IFA supplement during ANC. Further research has to be done on the acceptability of the supplements.

## Background

Iron deficiency (ID) is a state of insufficient iron to maintain normal physiological functions of tissues and leads to anemia [1]. It is the most common nutritional disorder in the world, affecting approximately 25% of the world's population which is severe in young children and women of reproductive age. It plays an important role in socio-economic development of nations. Global estimates show that 42% of women are anemic. In addition folate is an essential micronutrient in the human body. All pregnant women in areas of high prevalence of malnutrition should routinely receive iron with folic acid (IFA) supplements, together with appropriate dietary advice to prevent anemia [2-5].

According to EDHS 2011, the total fertility rate of Ethiopia was 4.8 children per woman, and the prevalence of low birth weight was 11% [5]. Beside, maternal mortality rate and infant mortality rate were high (114/100,000 and 59/1000, respectively) [5].

For women, the consequences of anemia are reduced level of productivity, impaired immune function, reproductive failure (miscarriage, still births, prematurity, low birth weight, per-natal mortality), and maternal death during childbirth [6].

Antenatal care programs distribute iron supplements to pregnant women. However, the effectiveness of these interventions on reducing maternal anemia has been inadequate [7]. In Ethiopia, < 1% took iron supplements for the recommended period (90 days or more) during their last pregnancy [5]. Many nutrition experts believe that one of the main reasons national iron supplementation programs failures is women's noncompliance with taking iron supplements daily because of side effects that sometimes occur when taking iron.

Recent reviews on the topic suggests that there are a number of reasons for ineffective programs including sporadic or inadequate supply, poor quality tablets, problems with delivery and distribution systems, poorly trained and uncommitted health providers, ineffective communication materials to promote behavior change, lack of access to or use of prenatal care, and poor monitoring of the problem [7-10].

Iron supplementation is a common strategy currently used to control iron deficiency and iron deficiency anemia in developing countries including Ethiopia[6-8]. Consequently, the National Nutrition Program (NNP) set a key target of increasing the proportion of mothers who get iron supplementation for more than 90 days during pregnancy to 50% by 2015[11].

In SNNP, only 27% of women who gave birth in the five years preceding the survey received antenatal care from a skilled provider for their most recent birth and coverage of iron supplementation was 15% [5]. We did not find information on the effective coverage of the IFA women received or purchased in the study. It is also not clear whether women actually use (ingest) the supplement and the factors associated with compliance in the study area.

Study objective. Thus the purpose of the current study is to assess IFA utilization and factors associated with IFA utilization among pregnant women attending ANC at government health facilities and family guidance clinic in Hawassa city, South Ethiopia.

## Methods

2.1. Study area: The study was conducted in Hawassa city, which is 275 km south of Addis Ababa. Hawassa city is found in Sidama zone, South Ethiopia.

2.2 Study design and period.: Facility based cross-sectional study was conducted on the utilization of IFA supplements and associated factors in March, 2015 in Hawassa city.

2.3. Source population. All pregnant women who are permanent residents for last six months.

2.4. Study population. All pregnant women attending antenatal clinic at Hawassa city government hospitals, health centers and family guidance at time of data collection.

The sample size was determined by the formula used for the unmatched case control study using EPI Info 7. Factors like age >25 years, low socioeconomic status, ANC >4, and cost of tablet were used, and a factor giving the largest sample size was used as the final sample size of the study (age >25 years). Assumptions used to estimate the sample size were the percentage of non-adherents with age >25 years 37.3% [12], a minimum detectable of odds ratio of 1.836, level of precision 5% , a power of 80%, with one-to-one ratio among cases and controls, considering 10% non-response rate and design effect of 1. The final sample size became 412.

2.5. Data collection procedure. Data was collected by using face-to-face interviews with pre-tested structured questionnaires initially prepared in English and translated to Amharic, and translated back to English by language experts. The independent study variables included were socio-demographic factors, health seeking behavior and utilization of supplementation services, environmental factors, and medical information. The dependent variable was utilization of iron containing supplement. Seven female research assistants who were unemployed and with training in nursing and two supervisors who had a first degree in health and experience in research were recruited. The questionnaire was pretested on 10% of the sample on other than the study area.

2.6. Data processing and analysis. The data analysis is done by using Statistical Package for Social sciences (SPSS) version 16.0 statistical software. Descriptive statistics was carried out to summarize the data. The main dependent variable was the compliance rate. Bivariate analysis was done to elicit factors associated with utilization of iron and folic acid supplementation with odds ratio as the measure of association. Factor having a p-value <0.25 in bivariate analysis were entered in the binary logistic regression model building process. A P-value <0.05 was considered as statistically significant.

## Operational Definition

**Compliance** was defined as the use of supplements for more than eleven days from last in the previous 15 days preceding the interviewed date

## Results

3.1. Socio-demographic Characteristics of Study Participants. A total of 412 pregnant women were interviewed in seven health facilities. The median age of the respondents was 25 years and about three fourths (74.2%) were between 20–29 years. About half of the women (52.1%) were protestant religion followers. Nearly all participants (97.8%) were married. About one-third (34.5 %) of the respondents were secondary school complete and 47.8% identified themselves as housewives. The median number of children ever born was two. Three hundred thirteen (87.4%) of the women responded their household average monthly income was greater than one thousand birr (Table1).

Table1. Socio-demographic characteristics of pregnant women attending ANC at government hospitals, health centers and family guidance health clinic in Hawassa City, South Ethiopia, March, 2015.

Variables	Category	Frequency	percentage
Age (N=411)	15-19 years	52	12.6
	20-24 years	138	33.5
	25-29 years	167	40.5
	30-34 years	42	10.2
	35-39 years	12	2.9
	40-44 years	1	0.3
Children ever born (N=404)	0	198	49
	1-2	172	42.6
	3-4	32	7.9
	5+	2	0.5
Marital status (N=412)	Married	403	97.8
	Others*	9	2.2
Educational level (N=412)	No formal education	31	7.5
	primary	138	33.5
	Secondary completed	142	34.5
	Technical and vocational	64	15.5
	College and above	37	9
Monthly income in Et. Birr (N=358)	≤500	5	1.4
	500-1000	40	11.2
	≥1000	313	87.4
Current occupation (N=412)	Housewife	197	47.8
	Self employed	104	25.2
	Government employee	80	19.4
	Student	21	5.1
	Others**	10	2.5
* Single and divorced			
** Privet firm employee, Work in others house, run family business ,work in NGO, Daily laborer			

### 3.2 Factors associated with compliance to iron with folic acid supplementation pregnancy

More than one third (38.43%) of study population took all the supplement before the survey. Among those who did not take the entire dispensed supplement Side effects (14.11%) are the main reason for not taking the supplement followed by forgetfulness (3.3%). (Table 2)

Table.2. Reason for missing one or more doses of iron containing tablets/capsule supplementation among pregnant women attending ANC at government hospitals, health centers, and family guidance clinic in Hawassa City, Ethiopia, March, 2015

<b>Reason for not taking the supplement(multiple response) N=208</b>	<b>Frequency</b>	<b>percentage</b>
<b>Took all of the supplement dispensed before the survey</b>	128	38.43
<b>Side effects</b>	47	14.11
<b>Forgetfulness</b>	11	3.3
<b>I dislike taking drugs</b>	5	1.5
<b>Not knowing the importance</b>	5	1.5
<b>Others</b>	12	3.6

\*Others: Travel lost the supplement, caught other illness, get well from anemia and assumed to have many drugs harm the foetus.

Out of the candidate variables on bivariate analysis having p-value <0.25, only explaining the poor quality of supplement and side effects showed statistical significance on multivariate analysis (Table 3).

Table 3. Factors associated with utilization of IFA supplementation among pregnant women attending ANC at government hospitals, health centers, and family guidance clinic in Hawassa City, South Ethiopia, March, 2015.

Variables	Low Compliance (N=115)	High compliance (N=115)	Crude OR (95%CI)	Adjusted OR (95%CI)
<b>Number of ANC visit</b>				
Second	56(47.5%)	54 (27.7%)	2.95(1.63-5.31)	-
Third	37(31.4%)	70(35.9%)	1.50(0.82-2.75)	-
Fourth and above	25(21.2%)	71(36.4%)	1	
<b>Trimester</b>				
First	1(0.9%)	3(1.6%)	0.71(0.07-6.90)	-
Second	44(38.3%)	40(20.9%)	2.33(1.39-3.89)	-
Third	70 (60.9%)	148(77.5%)	1	
<b>Ever heard of anemia</b>				
Yes	96(81.4%)	181(92.8%)	0.34(0.17-0.69)	-
No	22(18.6%)	14(7.2%)	1	
<b>Comprehensive Knowledge</b>				
Yes	38(32.8%)	99(52.1%)	0.45(0.28-0.72)	-
No	78(67.2%)	91(47.9%)	1	
<b>Source</b>				
Government facility (free)	102(86.4%)	154(80.6%)	1.53 (0.81-2.90)	-
Other source	16(13.6%)	37(19.4%)	1	
<b>Side effect</b>				
Yes	20(16.9%)	63(32.6%)	0.42 (0.24 -0.74)	0.35(0.18-0.68)**
No	98(83.1%)	130(67.4%)		
<b>Run out of supplement</b>				
Yes	50(42.7%)	107(55.2%)	0.61(0.38-0.96)	
No	67(57.3%)	87(44.8%)	1	
Stop due to poor quality				0.42 (0.24-0.72)

Yes	13(11.4%)	34(18.7%)	0.56(0.28-1.11)
No	101(88.6%)	148(81.3%)	

## Discussion

WHO recommends all pregnant women in areas of anemia prevalence < 40% should routinely receive iron and folic acid supplements, which means ideally taking 180 tablets before delivery[7]. However, our study showed that more than four-fifth (81%) of pregnant women took Iron containing supplement during the current pregnancy and the compliance was 37.7% (95%CI: 32.5-42.9). Socio-demographic characteristics were not good predictors of compliance, and our findings confirmed this statement [10]. Age of the woman, current marital status, and birth order and income variables did not have a significant effect on high compliance with IFA supplementation. Side effects and low acceptance of the supplement were important predictors of compliance with IFA supplementation (table 3).

This effective coverage (81%) of the IFA supplementation is high compared to the coverage of mini EDHS 2014 of urban consumption of iron tablets(41%)[15]. This difference may be due to the respondents were from health facility only and the study was carried out in the capital of south nations and the nationality of people region. In addition to that, the longer reference period used in the EDHS might have made it less sensitive to the very recent national level. However, WHO recommends that every pregnant woman has to receive standard doses of iron and folic acid supplements [2, 7].

Ideally, women should receive iron-containing supplements no later than the first trimester of pregnancy as recommended by World Health Organization [2, 7]. However, we found that the supplementation initiation was late ( $4.2 \pm 1.3$  months) on average during the fourth month of pregnancy but it is earlier than the study done in eight rural districts of Ethiopia  $5.6 (\pm 1.7)$  and this might be due to early first ANC visit [14]. Early initiation and the total number of supplements consumed during pregnancy have a significant impact on child mortality [2].

According to our study, 37.7 % of women have high compliance. This finding is lower than the compliance of 74.9% reported in Ethiopia, 69% in Senegal, and 58.1% in South India [14, 16, 17]. This might be due to the low compliance of prescribers with the national micronutrient guideline. In addition, various studies use different definitions of compliance with IFA supplementation; hence, comparison among them is not a worthy.

Forget fullness is mentioned by 3.3% of women as a reason for missing one or more doses of iron containing tablets/capsules. It was found to be 78.8% in another study of compliance with IFA in

Philippines [18] and 48.8% in a South Indian [2], which is lower in this study might better self-care. Further, it can be prevented by supportive attitude of family members and compliance can be improved by developing an appropriate message and improving communication [19].

Among the enabling factors, side effects and acceptability of iron and folic acid supplement was found to be significantly associated. Side-effect is frequently considered as a major obstacle to compliance [14, 16, 22]. In our study, it observed that 80.9 % of women with low compliance reported side effect as the reason for low compliance. However, in Burma, only 3% of women stated that side effects were the reason they stopped taking iron supplements, while 30% of women in Thailand complained of side effects while taking iron tablets. Studies conducted in Philippines [19] and Vietnam [20] also concluded likewise. This might be due to the majority of women were not informed about the potential side effects of iron and folic acid supplements and how to minimize them in advance. The study also showed that 14.41% women not took the supplement due to poor quality of iron and folic acid tablets. This finding is supported by a study done in India [2].

## Conclusion

Effective coverage and compliance with IFA supplementation among pregnant women attending ANC at government hospitals, health centers, and family guidance clinic in Hawassa City was relatively high. Compliance is significantly associated with side effects and low acceptance of the supplement due to poor quality.

## Declarations

### **Ethics approval and consent to participate**

Ethical clearance was obtained from School of Public Health and Medical Sciences Research and Ethics committee of Wolaita Sodo University. Formal letter of permission was obtained from Hawassa City administration health desk for each health facility. Respective health centers officially allowed carrying out the interviews. Finally, verbal consent was secured from each participant before the interview explaining the objectives of the study. Confidentiality was assured by indicating that they are not requested to write their name on the questionnaire and by assuring that their responses will not in any way be linked to them. In addition, they were told that they have the right not to participate and withdraw from the study in between.

### **Consent for publication: Not applicable**

**Competing interests:** The authors declared no conflict of interest

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**Authors' contributions:** FM carried out IFA utilization and factors associated with IFA utilization among pregnant women attending ANC at government health facilities and family guidance clinic in Hawassa city study by acquisition of funding, collection of data, general supervision of the research and made substantial contributions to conception and design, acquisition of data, analysis and interpretation of data, involved in drafting the manuscript and revising it critically for important intellectual content, and gave final approval of the version to be published. LK made substantial contributions to conception and design, acquisition of data involved in drafting the manuscript, revising it critically for important intellectual content. AW made substantial contributions to the conception and design, analysis, and interpretation of data involved in drafting the manuscript or revising it critically for important intellectual content, and gave final approval of the version to be published.

**Availability of data and materials:** the spreadsheet data supporting the findings of this is available at the hands of the corresponding author which can be delivered to the journal based on request at any time.

**Consent for publication:** We agree to the terms and policies of the editorial office of the journal.

## **Abbreviations**

<b>ANC</b>	Anti Natal Care
<b>CI</b>	Confidence Interval
<b>CSA</b>	Central Statistical Agency
<b>DHS</b>	Demographic and Health Survey
<b>EDHS</b>	Ethiopian Demographic and Health Survey
<b>FMoH</b>	Federal Ministry of Health
<b>ID</b>	Iron deficiency
<b>IFA</b>	Iron with Folic acid
<b>SNNPRS</b>	Southern Nations Nationalities and Peoples Region State
<b>WHO</b>	World Health Organization

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