

**DETERMINANTS OF COMPLIANCE TO IRON-FOLIC ACID SUPPLEMENTATION  
AMONG PREGNANT WOMEN IN PASTORAL COMMUNITIES OF AFAR REGION:  
THE CASES OF MILLE AND ASSAITA DISTRICTS, AFAR, ETIOPIA-2015**

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**Abstract:**

Iron deficiency is the leading single nutrient deficiency in the world affecting the lives of more than 2 billion particularly in developing countries. Pregnant women are at high risk of iron deficiency due to increased nutrient requirement. WHO recommends supplementation to pregnant women with folic acid for 6 months to reduce the risk of iron deficiency anemia. This study intended to determine the compliance level and identify factors associated with iron folic acid supplementation among pregnant women. A facility based cross sectional study was conducted among pregnant women with 450 samples. Logistic regression was used to identify associated factors. The level of compliance to iron folic acid supplementation was 22.9%. The independent predictors for this were residence, early registration for antenatal care, nutrition counseling and family support. Compliance level to iron-folic acid supplementation is very low as compared to the standards. Nutrition education should focus on the importance of compliance to iron folic acid for the pregnant women.

**Key words: Compliance, Pregnant, Iron-folic acid**

**Introduction**

Iron is a micronutrient that is needed in small amounts for the normal functioning, growth and development of the human body [1]. The recommended dietary allowance for iron among non-pregnant women is 10-18 mg per day; but during pregnancy physiological

demand increases to 27-30 mg per day [1, 2]. Iron deficiency is the leading single nutrient deficiency to cause anaemia 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 [3]. Worldwide data suggest that

normal dietary intake of iron is insufficient to meet daily requirement for a significant proportion of pregnant women [3, 4].

More than half of pregnant women in the world suffer from anemia, which is a major cause of maternal morbidity and mortality [5]. Globally, iron deficiency anemia is associated with 22% of all (115,000) maternal deaths [6]. Prevalence of anemia is 41.8 % among pregnant women, with the highest prevalence rate (61.3%) in Africa and 52.5 % in South East Asia as per WHO [7]. As per EDHS-2011 report, 17% of Ethiopian reproductive age women suffer from anemia and a higher proportion of pregnant women are anemic (22%). 35% of reproductive age women living in Afar region are suffering from anemia which is the second highly prevalent in the country next to Somali region (44%) [6]. During pregnancy, there is an increase of iron need, therefore the likelihood of presenting iron deficiency is high if there is no supplementation during pregnancy [8, 9].

According to the WHO recommendation and Ethiopia's national guidelines for control and prevention of micronutrient deficiencies, all pregnant women should receive and consume a standard dose of 60mg iron + 400 µg folic acid for 6 months: a total of 180 IFA tablets. The recommendations are for pregnant women to begin supplementation during the first month of pregnancy or at the time of their first antenatal visit. [6, 10, 11].

For preventing as well as treating anemia, IFA supplementation is given in many parts of the world [12]. While many developing countries including Ethiopia are now implementing IFA supplementation through routine antenatal care programs, only few countries have reported significant improvement in IFA supplementation and anemia prevention and control [5, 6, 8, 13].

**The low achievement of IFA supplementation may be related with poor**

access to and utilization of prenatal care services, inadequate supply of iron-folic acid tablets, poor counseling, lack of knowledge on anemia, and certain beliefs [5,6]. However, many studies suggested that poor maternal adherence to the regimen is the main reason for the ineffectiveness of iron-folic acid supplementation programs, since adhering to other types of medical regimens is considered to be the major determinant of recovery from disease [5, 6, 8, 14].

Currently, IFA supplementation is the main strategy for anemia control and prevention in Ethiopia [15, 16]. Although, many antenatal care clinics in Ethiopia distribute iron-folic acid supplements to all pregnant women, some studies reported that the effectiveness of these interventions in improving IFA supplementation coverage and reducing maternal anemia remains low and inadequate as compared to global standards [6, 17]. The overall national data suggests that from the all pregnant women supplemented with iron-folic acid tablets only 0.4% of women consumed > 90 IFA tablets during their pregnancy time. In addition, there was no pregnant woman (0%) who took > 90 tablets in Afar region which needs due attention to solve the problem [6, 16, 18].

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., this study will help the concern stake holders. Therefore, this study was taken up

#### **General objective**

To assess the compliance level and identify factors associated with IFA supplementation among pregnant women in pastoral communities of Afar region, Ethiopia.

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### Specific objectives

1. To determine the **compliance level** to iron-folic acid supplementation among the pregnant women
2. To identify the factors associated with **compliance level** to iron-folic acid supplementation among the pregnant women

### Methods and materials

**Study area and period:** The study was conducted in selected health facilities of Zone-1, Afar region, Ethiopia, which is located 625 km from the capital Addis Ababa. Zone-1 is one of the five zones of the region which consists of 16 health facilities. The study was conducted from December /1/2014 to February /1/2015 in two health facilities.

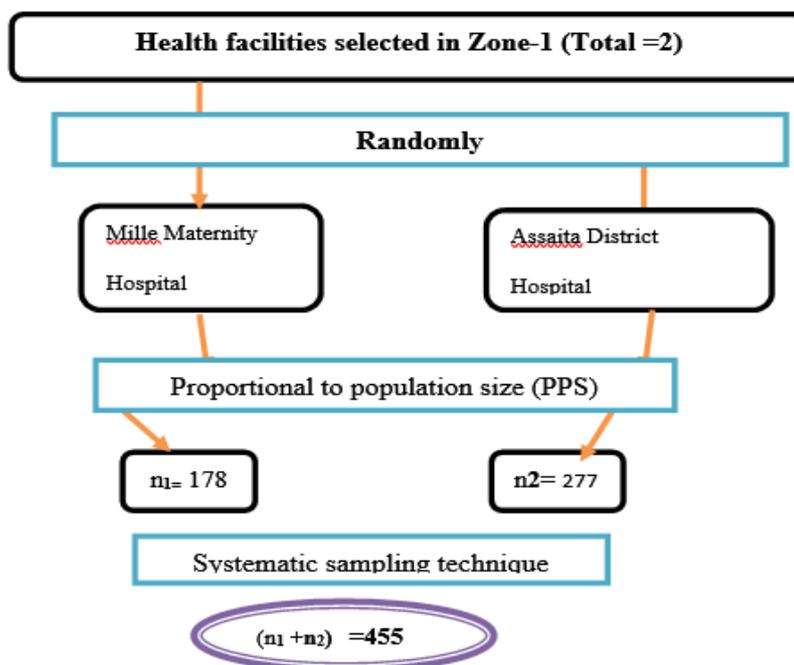
**Study design:** Facility based cross-sectional study.

**Source population:** All pregnant women previously supplemented with IFA tablets.

**Study population:** All pregnant women that were previously supplemented with IFA tablets and who come to each selected health facilities for the second or more visit during the time of data collection.

**Exclusion criteria:** pregnant women who were suffering with mental disorder, who were unable to hear and/or speak).

**Sample size determination:** The sample size was determined by single population proportion formula by assuming an expected compliance level (P) of 16 % in the study area (taken from a study conducted in Tanzania [21]), 95% confidence level, 5 % margin of error (d) and a non-response rate of 10%. Therefore, the total sample size required for this study was **455**.



**Figure-1:** schematic presentation of the sampling procedure for the randomly selected health facilities in Zone-1, Afar region, Ethiopia, 2014/2015.

**Dependent variable:** Compliance level to iron-folic acid supplementation

### 1) Independent variables

**Socio-economic and demographic factors;** Mothers' age, marital status, religion,

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residence, educational status, Husband’s educational status, Mother’s occupational status, Husbands’ occupational status, Family size, Family support

**Obstetric and medical factors;** Gravidity, Parity, Gestational age, Timing of registration, No of visits

**Health service related factors;** Hemoglobin level during the first visit, Nutrition counseling,

**Mother’s knowledge status;** Knowledge about anemia and benefits of taking IFA tablets

#### **Operational definitions**

**Compliance level:** pregnant women ingesting IFA tablets at least 4 times per week in the previous month. This definition is similar with other previous studies [5, 8].

**Multi-gravida:** A woman who is or has been pregnant for at least a second time.

**Multi-para:** A women who has given birth more than one child.

**Primi-gravida:** A woman who is pregnant for the first time.

**Primi-para:** A women who has given birth one child

**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.

#### **Data collection tools and procedures**

Data was collected with structured, pre-tested questionnaire and entered to Epi-info version 3.5.1 and exported to SPSS version 20 for statistical analysis. Descriptive statistics are computed using standard statistical parameters such as frequencies and percentages to present categorical data. Mean and standard deviation was used for normally distributed continuous data. To identify factors associated with adherence to IFA supplement use among pregnant women, bivariate logistic regression was performed for each independent variable with the outcome variable and crude odds ratio was obtained. Significant variables observed in the bivariate analysis were included in to the multivariable logistic regression to determine independent predictors of adherence to IFA supplement use and to control confounding effect. The strength of statistical association was measured by adjusted odds ratios and 95% confidence intervals. All tests were two-sided and  $p < 0.05$  was considered statistically significant.

**Ethical considerations:** Ethical clearance and permissions were obtained from the concerned authorities and confidentiality and was assured to study subjects.

#### **Results and Discussion**

The response rate was 98.4% out of 450 total samples. The mean ages ( $\pm$ SD) of the study subjects was  $25.29 \pm 5.44$

**Table -1:** Socio-demographic characteristics of the study subjects, zone-1, Afar, Ethiopia, 2015 (n=450)

Variables	N	%
<b>Health facility</b>		
Assaita district hospital	274	61.3
Mille maternity hospital	176	38.7
<b>Age</b>		
<20	134	29.8
20-24	72	16.0
25-29	135	30.0
30-35	92	20.4

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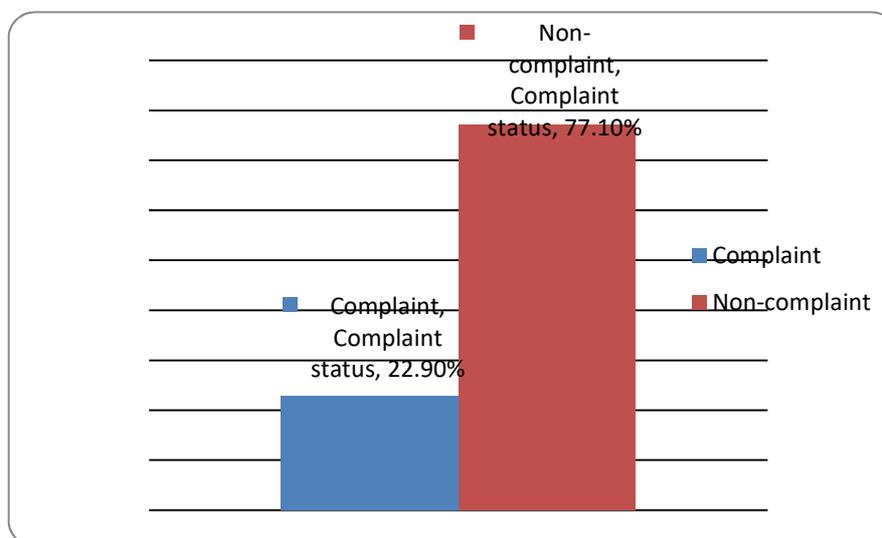
>36	17	3.8
<b>Religion</b>		
Muslim	362	80.4
Orthodox	78	17.3
Others	10	2.3
<b>Marital status</b>		
Married	436	96.9
Others	14	3.1
<b>Ethnicity</b>		
Afar	263	58.4
Amhara	161	35.8
Tigray	10	2.2
Oromo	13	2.9
Others	3	0.7
<b>Educational status</b>		
No formal education	273	60.7
Primary	69	15.3
secondary	55	12.2
Above secondary	53	11.8
<b>Residence</b>		
urban	291	64.7
rural	159	35.3
<b>Occupational status</b>		
House wife	311	69.1
Government t employee	78	17.3
Merchant	52	11.6
Others	9	2.0
<b>Husband's education</b>		
No formal education	231	51.3
Primary	47	10.4
secondary	50	11.1
Above secondary	122	27.1
<b>Husband's Occupation</b>		
Pastoralist	108	24.0
Government employee	136	30.2
Merchant	134	29.8
Ngo	45	10.0
Others	27	6.0
<b>Family size</b>		
1-3	195	43.3
4-6	208	46.2

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>6	47	10.4
<b>Gravidity</b>		
Primigravida	105	23.3
Multigravida	345	76.7
<b>Parity</b>		
Nulliparous	117	26.0
Primiparous	133	29.6
Multiparous	200	44.4
<b>Trimester</b>		
Second	93	20.7
Third	357	79.3
<b>Registration time for ANC</b>		
<=16 (early)	236	52.4
>16 (Late)	214	47.6
<b>No of visits</b>		
<4	376	83.6
>=4	74	16.4
<b>Any disease other than anemia</b>		
yes	45	10.0
no	405	90.0
<b>Previous anemia</b>		
Yes	237	52.7
No	213	47.3
<b>Nutrition counseling</b>		
Yes	229	50.9
No	221	49.1
<b>Knowledge about anemia</b>		
yes	108	24.0
no	342	76.0
<b>Knowledge about benefit of iron supplementation</b>		
yes	78	17.3
no	372	82.7
<b>Family support</b>		
yes	152	33.8
no	298	66.2

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**Figure – 2:** Compliance level to IFA supplementation among pregnant women in zone-1 Afar, Ethiopia, December, 2015



**Factors Associated with compliance to IFA Supplementation**

The comparison between the profiles of the pregnant women who were compliance to IFA supplementation and who did not from bivariate logistic regression analysis, revealed that type of health facility, mother’s education, residence, mother’s occupation, gravidity, parity, registration Time for ANC , number of ANC visits, any disease other than anemia, previous anemia, nutrition counseling, knowledge about anemia and benefits of IFA tablets and family support for

taking tablets were factors associated with compliance to IFA supplementation (**Table-2**).

Multivariable logistic regression analysis after adjusting for each other revealed that variables that were independent predictors for maternal compliance to IFA supplementation were maternal residence, early registration for ANC, nutrition counseling and family support, urban residence could affect positively for IFA tablets intake.

**Table-2:** Factors associated with compliance to IFA supplementation among pregnant women by selected variables, in zone-1, Afar, Ethiopia, Dec, 2015(n=450)

Variables	Adherence to IFA supplementation			
	Yes (%)	No (%)	COR (95%CI)	AOR(95%CI)
<b>Health facility</b>				
Assaita	57 (20.7)	219 (79.3)	<b>1</b>	<b>1</b>
Mille	46 (26.4)	128 (73.6)	1.381 (0.884-2.156)	1.284(0.740-2.230)
<b>Mother’s education</b>				
Uneducated	53 (19.4)	220(80.6)	1	1
Educated	50(28.2)	127(71.8)	1.634 (1.048-2.547)	0.914(0.482-1.733)

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<b>Residence</b>				
Urban	81(27.8)	210(72.2)	2.402(1.431-4.032)	<b>2.167(1.208-3.886)</b>
Rural	22(13.8)	137(86.2)	1	<b>1</b>
<b>Mother’s occupation</b>				
Housewife	66(21.2)	245(78.8)	0.743(0.467-1.181)	1.526(0.825-2.822)
Working	37(26.6)	102(73.4)	1	
<b>Husband’s education</b>				
Uneducated	37(16.0)	194(84.0)	1	1.169(0.598-2.285)
Educated	66(30.1)	153(69.9)	2.262(1.435-3.565)	
<b>Gravidity</b>				
Primigravida	33(31.4)	72(68.6)	1.801 (1.105-2.935)	
Multigravida	70(20.3)	275(79.7)	1	1.207 (0.292-4.991)
<b>Parity</b>				
Nulliparous	37(31.6)	80(68.4)	2.341(1.364-4.015)	1.904(0.462-7.839)
Primiparous	33(24.8)	100(75.2)	1.670(0.971-2.873)	1.205(0.640- 2.267)
Multiparous	33(16.5)	167(83.5)	1	1
<b>Registration Time</b>				
<16 weeks	68(28.8)	168(71.2)	1.422(0.824-2.454)	<b>2.070(1.308-3.275)</b>
>16 weeks	35(16.4)	179(83.6)	1	
<b>No of visits</b>				
<4	78(20.7)	298(79.3)	1	
>4	25(33.8)	49 (66.2)	1.949(1.133-3.353)	1.177(0.618-2.242)
<b>Any disease other than anemia</b>				
Yes	4(8.9)	41(91.1)	0.302(0.105-0.863)	0.309(0.098-0.977)
No	99(24.4)	306(75.6)		
<b>Nutrition counseling</b>				
Yes	75(32.8)	154(67.2)	3.357(2.071-5.441)	<b>1.83(1.265-3.767)</b>
No	28(12.7)	193(87.3)	1	<b>1</b>
<b>Knowledge about anemia</b>				
Yes	31(28.7)	77(71.3)	1.510(0.924-2.468)	0.931(0.508-1.704)
No	72(21.1)	270(78.9)	1	
<b>Knowledge about benefit iron supplementation</b>				
Yes	28(35.9)	50(64.1)	2.218(1.309-3.758)	1.535(.757-3.112)
No	75(20.2)	297(79.8)	1	
<b>Family support</b>				
Yes	59(38.8)	93(61.2)	3.662(2.319-5.784)	<b>2.967(1.664-5.289)</b>
No	44(14.8)	254(85.2)	1	<b>1</b>

Maternal adherence with iron-folic acid supplementation plays a major role in the

prevention and treatment of iron deficiency anemia [7, 24]. In this study, the compliance

level of the pregnant women in the community was 22.9% which is consistent with the other studies conducted in Lucknow India, Kenya and Nigeria in which it was in the range of 25%-38% [23, 28, 29]. And this might be due to similarity in their socio-economic status as they are all developing countries.

But it is higher than that of a study conducted in Tanzania which was 17.2% [19]. This could partly be explained by their differences in geographical location of the study. And it is lower than that of a study conducted in Philippines, Cambodia, Senegal in which it was in the range of 47% -85% [20,27,30] and this could be explained by the difference in geographic location and study design.

Urban resident's compliance was about 2.1 times higher than rural to IFA supplementation (AOR=2.167, 95%CI=1.208-3.886) and the reason could be the urban pregnant women might have better exposure to information than rural. The result of this study is consistent with other studies conducted in Malaysia (p=0.008, 34.5% Vs 54.5), Kiambu, Kenya, ( $X^2=14.3$ , p = 0.001) and Tanzania (p< 0.001, AOR=10.81, 74.9% Vs 21.2% (8.72-13.39) [19, 26, 28].

Pregnant women who were early registered for ANC service were about 2 times higher compliant to IFA supplementation as compared to lately registered (AOR= 2.070, 95% CI= 1.308 -3.275). This might be due to the reason that early registered will get more interaction and counseling with health workers. Similar results were reported by other studies conducted in Lucknow, India (AOR = 1.745, 95% CI=1.122-2.714) and southern Nepal (AOR= 1.03, 95% CI = 1.01-1.04) [13, 23].

Pregnant women who get nutritional counseling were about 1.8 times higher to be compliant to IFA supplementation as compared to who did not get nutritional counseling (AOR=1.83, 95%CI=1.65-

3.767). This might be due to the reason that nutritional counseling can result in better compliant to the supplementation. This result is similar with other studies conducted in Egypt (t= 2.069, p-value = 0.040), Northern Tanzania (AOR = 1.13, 95% CI = 0.97-1.33) and Philippines (p=0.001, AOR =0.683, 95%CI =0.315-0.532) [17, 19, 27].

Pregnant women who had family support were about 2.9 times better compliant to IFA supplementation as compared to who did not have family support (AOR=2.967, 95%CI=1.664-5.289). This result is consistent with other studies conducted in Tanzania (AOR=1.25 95%CI=1.08-1.43), Lucknow, India (AOR= 1.836, 95% CI = 1.020-3.305) and Nepal (p=0.001, AOR=1.03, 95%CI= 1.02=1.04) [13, 19, 23].

#### **Limitation of the Study**

Information on complaint level of the pregnant women was from self-report of IFA intake. Therefore, there is possibility of reporting pregnant women who did not actually ingest the tablets. Pill count method may predict adherence level in future studies.

#### **Conclusion**

Compliance level with IFA supplementation among pregnant women attending antenatal care was found to be low. Urban residents, early registration for antenatal care, nutritional counseling and family support to take the tablets were statistically significant independent positive predictors for maternal adherence to IFA supplementation. Comprehensive nutrition education and health promotion programs should focus on the importance of adherence to IFA tablets to improve adherence to the pregnant women. Health workers should be aware of factors affecting adherence to the pregnant women and try to improve their adherence to iron-folic acid tablets both for urban and rural pregnant women.

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