Determinants of Adherence to Iron Folic Acid Supplementation among Pregnant Women Attending Antenatal Clinic in Asella Town, Ethiopia

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ABSTRACT

Introduction: Globally, 41.8% of pregnant women are anemic with the highest proportion affected in developing countries. In Ethiopia, only 0.4% of the pregnant women take iron supplements during pregnancy time.

Objective: The aim of this study was to assess the determinants of adherence to iron and folic acid (IFA) supplements among pregnant women attending antenatal clinic in Asella town.

Materials and Methods: A institution-based descriptive study design with quantitative method was conducted in Asella town from September 2015 to June 2016. A purposive sampling technique was used to select the health institution. The sample size of 317 was selected with systematic random sampling method. The questionnaire was adapted from a Kenyan study by Dingo *et al*. 2013 and data were collected by interview method. Data were cleaned, coded, and entered by EPI-DATA version 3.0 and transported to SPSS version 22 for further analysis. To indicate the strength of association, odds ratios (OR) and 95% confidence intervals (CI) were used.

Result: The study respond rate was 296 (93%), and mothers who completed at least secondary school were more likely to adhere the supplement than those uneducated (adjusted OR [AOR] = 6.501, 95% CI = 1.945–21.728). Women with early antenatal care (ANC) registration were more likely to adhere to the IFA supplement than those with late ANC registration AOR = 4.813, 95% CI = 1.728–13.407. Multigravida mothers were more likely to adhere the supplement AOR = 2.727, 95% CI = 1.170–6.355. In addition, forget fullness, taking many pills, and fear of side effects were major related factors with non-adherence.

Conclusion: Determinants of adherence to IFA were maternal education, gravidity, ANC visit starting time, family monthly income, knowledge about the duration of supplement, and problems faced in the facility were identified. Result recommend that maternal health education by media, health professionals about early Antenatal visits, and Importance of adherence of Iron and Folic acid. Government to arrange adequate supply of Iron/folic acid supplements to the health facilities.

Key words: Adherence, antenatal clinic, determinant, iron and folic acid, pregnant women

INTRODUCTION

Iron deficiency anemia is the most common nutritional disorder affecting two billion people worldwide.[1] Based on evidence from iron supplementation trials, it was estimated that, on average, 50% of anemia globally is caused by iron deficiency.[2] Pregnant women are at, especially, high risk for iron deficiency and anemia due to significantly increased iron requirements during pregnancy. Taking iron supplementation has been a major strategy in low-income and middle-income countries where micronutrient deficiencies are common to reduce iron deficiency anemia in pregnancy.[2,3]

Globally, 41.8%, almost half of all 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. The actual prevalence of anemia in pregnant women in Africa and Asia is estimated to be 57.1% and 48.2%, while that of America and Europe is 24.1% and 25.1%, respectively.[4,5]

Currently, 17% of Ethiopian women with the age of 15–49 were anemic with the highest proportion of pregnant women (22%) than breast feeding (19%) and neither pregnant nor breastfeeding women (15%). Anemia prevalence also varies from urban and rural residence; a higher proportion of women in rural areas are anemic (18%) than those in urban areas (11%).[6]

The 2011 Ethiopia Demographic and Health Surveys (EDHS) revealed that maternal nutritional status is poor in many respects in Ethiopia. Of 17% of anemic women, 13% of them have mild anemia where hemoglobin level ranges

between 10 g/dl and 10.9 g/dl, 3% having moderate anemia where Hgb level ranges between 7 g/dl and 9.9 g/dl, and 1% having severe anemia where Hgb level is <7 g/dl.[7,8]

A Sub-Saharan Africa country including Ethiopia has a national policy to prevent and treat anemia in pregnancy. This includes the provision of ferrous sulfate and folic acid to all pregnant women. The recommended dose in Ethiopia is 300–325 mg of ferrous sulfate and 400 μg of folic acid once a day taken by mouth for 180 days of prenatal period, preferably with a meal. This dosage is usually supplied in a single combined iron and folic acid (IFA) tablet.[9]

MATERIALS AND METHODS

Study Area

The study was conducted in Asella town, Southeast Ethiopia. It is located in the Arsi Zone, Oromia Region, about 175 km from Addis Ababa. Total reproductive age group population in Asella town was 20,714 (22.1%). The religion of population was 67.43% of Orthodox Christians, 22.65% of the population were Muslims, and 8.75% of the population were Protestant.

Asella town comprises governmental (teaching and referral hospital and two health centers), non-governmental (13 medium clinics, one hospital, one specialty MCH center, and one higher clinic), and non-profit non-governmental (FGA and Marie stops). Of these 21 health institutions, eight of them comprise antenatal clinic, of which seven of them only provide a regular antenatal care (ANC) checkup. Institutional-based cross-sectional study design with quantitative method was used and it was conducted from September 2015 to June 2016.

The source population was all pregnant women attending ANC clinics in health institutions in Asella town. The study population was pregnant women attending ANC clinics in selected health institutions and fulfills the inclusion criteria during data collection period.

Inclusion criteria of this study were pregnant women who had at least one ANC visit in health institution and supplemented with IFA tablets for at least 1 month before the date of interview. Exclusion criteria such as pregnant women who come for the first antenatal visit, those who refuse to take the supplement, lack of IFA tablet, those who are unable to hear and/or speak, and those who have mental disorder were excluded from the study.

To determine the sample size, single population proportion formula was used,

$$n = \frac{(Z\,\alpha/2)^2\,p\,(1-p)}{d^2}$$

Where

n = Sample size,

Z α/2 = Significance level at α = 0.05,

P = Established the prevalence from previous studies on the topic of interest (adherence rate) in eight rural districts in Ethiopia (p = 74.9%)[10]

d = 0.05 (margin of error).

Therefore, based on using the above single population proportion formula, the sample size was calculated as follows:

$$n = \frac{(1.96)^2\,0.749(0.251)}{(0.05)^2}$$

n = 288.

With the assumptions of the 95% confidence interval (CI) and 10% non-responsive rate, the total sample size was 317.

All health institutions (private and public) in Asella town were included to make the data representative. The health institution was selected purposively because of those institutions provided ANC [Figure 1].

The total estimated number of pregnant women attending antenatal clinics in each antenatal institution for 1 month was taken, and proportional sample size was calculated for each institution so as to give the total sample size using the following formula.

$$(n_j = \frac{n}{N}N_j)$$

Where

n_j = Sample size of the jth institution

N_j = Total population size of jth institutions

n = Number of respondents to be selected from each institution

N = Total number of pregnant women in selected institution (504).

For Asella referral hospital $n_j = \dfrac{317 * 257}{504} = 162$

For Asella health center $n_j = \dfrac{317 * 127}{504} = 80$

For Halila health center $n_j = \dfrac{317 * 25}{504} = 16$

For Halila health center $n_j = \dfrac{317 * 25}{504} = 16$

For specialist MCH center $n_j = \dfrac{317 * 60}{504} = 38$

For FGA $n_j = \dfrac{317 * 9}{504} = 5$

For Rhoboot hospital $n_j = \dfrac{317 * 26}{504} = 16$

Total: 317 pregnant mothers

Dependent Variable

Determinants of adherence to IFA supplement were taken as dependent variable.

Independent Variables

Sociodemographic

Age, marital status, socioeconomic status, family size, residence, maternal education, and paternal education are considered as sociodemographic variables.

Obstetric Factors

Obstetric factors are as follows: Number of gravida, parity, number of ANC visit, abortion, stillbirth, and ANC follow-up started them.

Women Awareness

Awareness about knowledge of anemia, knowledge about benefits of IFA, and knowledge about duration of the supplementation was taken.

Physical Attributes and Related Factors

Other non adherence factors: Side effect, forget fullness, unpleasant tests, fear of baby weight, and the assumption of too many tab harm infants.

Health-care System

Healthcare facility factors: Problem faced in the facility, shortage of supplement within the facility, health education and collected tablet per visit

Data collection instruments had close- and open-ended questionnaire and its consists of six sections, which includes sociodemographic characteristics, obstetric history, knowledge on anemia and folic acid, adherence to IFA, and health-care system factors. The questionnaire was adapted from a Kenyan study by Dingo et al., 2013.[11] Data were collected by interview method by local language.

Data were entered and analyzed using Epi-data and SPSS version 22 software statistical package. Statistical significance was defined as $P < 0.05$. Odds ratio (OR) was also calculated, and univariate, bivariate, and multivariate analyses were executed using logistic regression.

Ethical clearance was obtained from Addis Ababa University, Department of Nursing and Midwifery Institutional Ethics Committee. Formal permission letter was obtained from the Department of Nursing and Midwifery to Oromia Regional Health Bureau, and then from Oromia Health Bureau to respective hospitals and health centers conduct the study. Finally, informed verbal consent was obtained from respondents after objectives and importance of study explained to the participants. The confidentiality of data of each study subject was maintained and used only for study purpose.

RESULT

A total of 317 pregnant women attended ANC in governmental and private clinic in Asella town, of 317 pregnant women, response rate was 296 (93%). 178 (60.1%) were from Asella town and 118 (39.1%) from the peri-urban area of the town.

The age of the respondents ranges from 15 to 49 years. The mean age of the pregnant women was 27.7 and 27.2 years in rural and urban, respectively. The majority of the respondents from urban and rural were married women (80.3% and 59.3%), respectively, and some of the women in the urban and rural area where single (15.2% and 28.8%), respectively, while 4.5% in urban and 10.2% from rural were divorced.

Majority 47.8% and 22.5% of women from the urban area of the town had secondary and higher education, respectively, while very few 11.9% and 2.5% of women from the rural area had secondary and higher education, respectively. 39% and 2.8% of the respondents are illiterate from rural and urban women, respectively. 44.4% and 10.2% of the husbands of the respondents were literate in the urban and rural area of the town, respectively. Most of the husbands of the rural respondents (11.9%) were illiterate and 1.7% husbands of the respondent in the urban area were illiterate [Table 1].

Table 1: Sociodemographic and economic characteristics of the study population, Asella town

Variable	Urban n=178 (%)	Rural n=118 (%)
Age in years		
15–19	8 (4.7)	6 (5.1)
20–29	119 (66.9)	68 (57.6)
30–39	50 (28.1)	43 (36.4)
40–49	1 (0.6)	1 (0.8)
Marital status		
Single	27 (15.2)	34 (28.8)
Married	143 (80.3)	70 (59.3)
Divorced	8 (4.5)	12 (10.2)
Widowed	0 (0.0)	2 (1.7)
Total number of family size		
Below mean (2.7)	145 (81.5)	67 (56.8)
Above mean (2.7)	33 (18.5)	51 (43.2)
Educational status of mother		
Cannot read and write	5 (2.8)	46 (39)
Can read and write	7 (3.9)	36 (30.5)
Primary (Grade 1–8)	41 (23)	19 (16.1)
Secondary (9–12)	85 (47.8)	14 (11.9)
Above secondary	40 (22.5)	3 (2.5)
Educational status of husband		
Cannot read and write	3 (1.7)	14 (11.9)
Can read and write	5 (2.8)	37 (31.4)
Primary (Grade 1–8)	21 (11.8)	33 (28)
Secondary (9–12)	70 (39.3)	22 (18.6)
Above secondary	79 (44.4)	12 (10.2)
Continued table		
Monthly income		
151–650	9 (5.1)	16 (13.6)
651–1400	15 (8.4)	41 (34.7)
1401–2350	53 (29.8)	22 (18.6)
2351–3550	46 (25.8)	19 (16.1)
3551–5000	36 (20.2)	18 (15.3)
5001–10,000	19 (10.7)	2 (1.7)

A high percentage of the pregnant women interviewed were in their first trimester (35.5%), 33.4% were in their second trimester, and 31.1% were in the third trimester. Of the 296 pregnant women interviewed, 71.6% and 32.8% were multigravida and multiparous, while 28.4% and 67.2% were primigravida and primiparous [Table 2].

Figure 2 shows that the great majority of respondents' pregnant women (76% and 50.7%) were knowledgeable about IFA and anemia, respectively, in giving the correct answer from listed correct and incorrect response to questions asked to type, duration, benefit, and risk of IFA and cause, consequence, prevention of anemia, and most susceptible group of people for anemia. Remaining 49.3% of the respondent had lack of Knowledge on

Table 2: Obstetric status of study respondents in Asella town

Variable	Frequency n=296 (%)
Gravidity	
Primigravida	84 (28.4)
Multigravida	212 (71.6)
Parity	
Primiparous	199 (67.2)
Multiparous	97 (32.8)
Number of ANC visits	
2–3	260 (87.8)
≥4	36 (12.2)
ANC starting time	
First trimester	105 (35.5)
Second trimester	99 (33.4)
Third trimester	92 (31.1)

ANC: Antenatal care

cause of anemia, diet and treatment. Around 24% of the respondents were had lack of knowledge on important of iron and folic acid supplements.

A multivariate analysis involving all associated variables during bivariate logistic regression was performed to identify independent predictors of adherence to IFA supplementation. Consequently, maternal education, gravidity, current trimester, monthly family income, knowledge about the duration of supplementation, and the shortage of supplement in the facility independently showed significant association. The details are summarized in Table 3.

Less educated mothers were less likely to adhere with the supplement. Women who uneducated were more than 86% times less likely to adhere the supplement than those completed at least secondary school ($P = 0.006$, adjusted OR [AOR] = 0.172.95% CI = 0.042–0.706). Primigravida mothers were more than 66% times less likely to adhere IFA supplement than multigravida mothers ($P = 0.009$, AOR = 0.331, 95% CI = 0.144–0.762).

Those mothers who started ANC in the first trimester were more than 3 times more likely to adhere IFA supplementation than those mothers started ANC in the third trimester ($P = 0.01$, AOR = 3.803, 95% CI = 1.520–9.518). On the other hand, mothers whose monthly family income was in the range between 151 and 650 birr were 98% times less likely to adhere the supplement than those mothers whose monthly family income was above 650 birr ($P = 0.000$, AOR = 0.013.95% CI = 0.001–0.20).

Pregnant mothers who did not aware the duration of the supplementation were more than 70% times less likely to adhere the supplement and IFA than those mothers who know the duration of the supplement ($P = 0.005$, AOR =
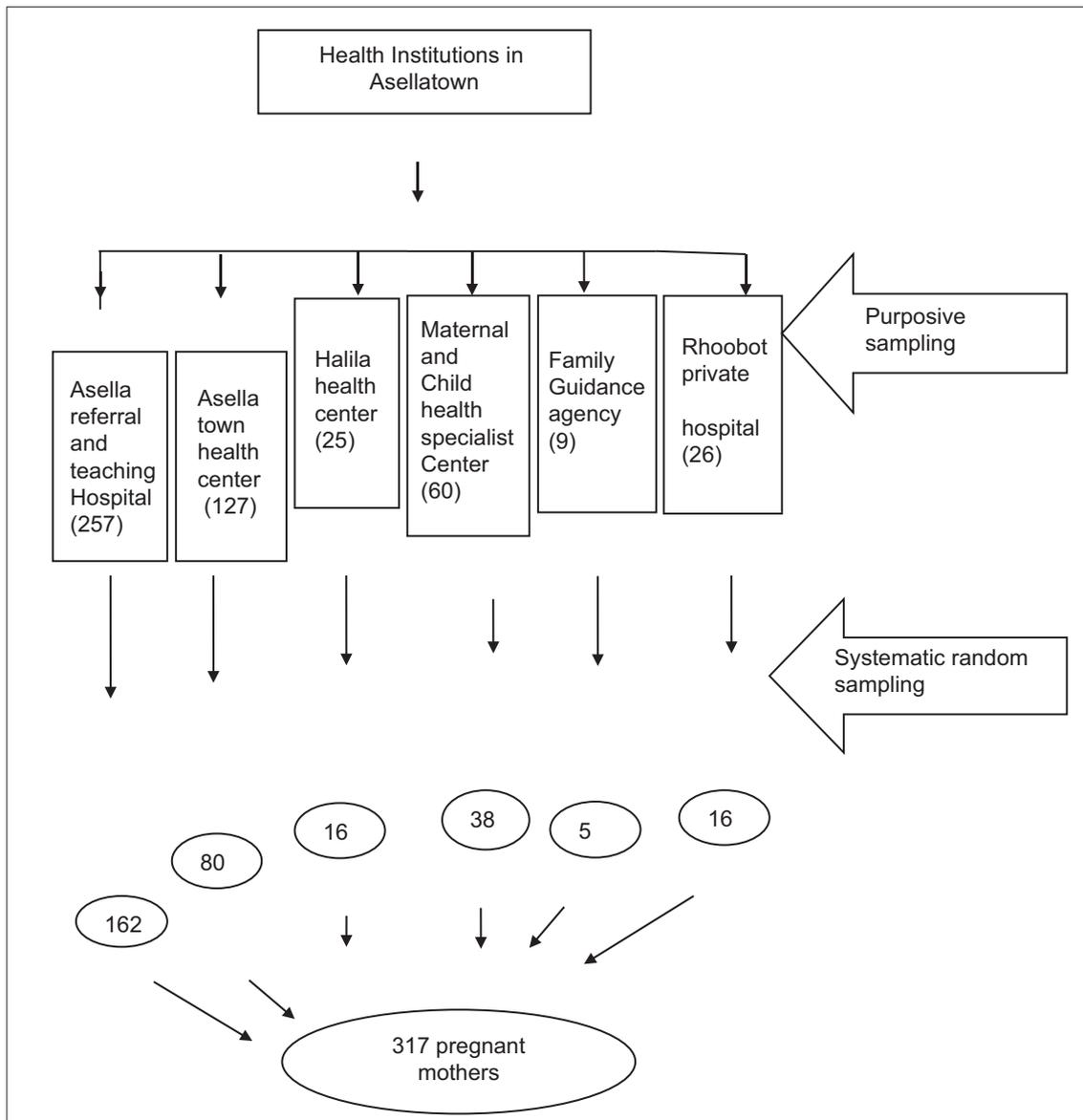
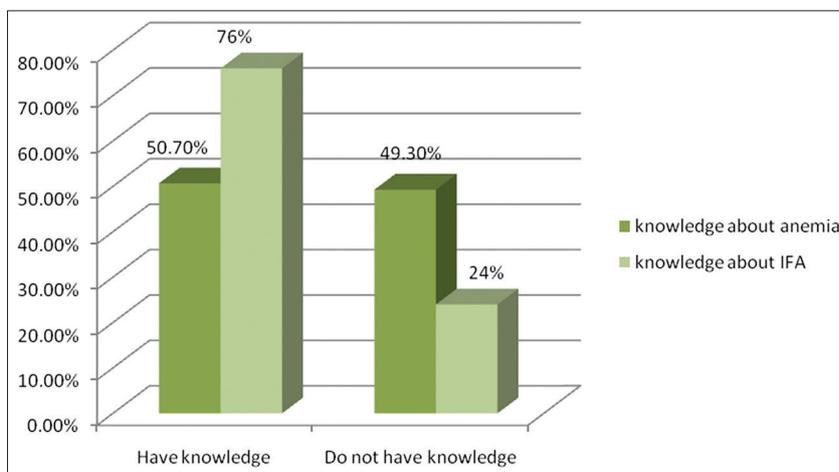**Figure 1:** Schematic presentation of sampling procedure, Asella town, 2016

Figure 2: Respondents knowledge about anemia and iron and folic acid supplementation, Asella town

0.290, 95% CI = 0.122–0.687). Moreover, mothers who faced different problem within the facility were more than 78% times less likely to adhere with the IFA supplement than mothers who did not face any problem within the facility (*P* = 0.000, AOR = 0.214, 95% CI = 0.102–0.448).

Table 3: Factors associated with adherence to IFA supplementation, Asella town

Variable	Adherence to IFA			
	Yes (%)	No (%)	COR (95% CI)	AOR (95% CI)
Maternal education				
Cannot read and write	11 (21.6)	40 (78.4)	0.036 (0.011–0.114)*	0.172 (0.042–0.706)*
Can read and write	12 (27.9)	31 (72.1)	0.05 (0.016–0.160)*	0.304 (0.074–1.245)
Primary	34 (56.7)	26 (43.3)	0.172 (0.059–0.498)*	0.327 (0.091–1.169)
Secondary	82 (82.7	17 (17.2)	0.635 (0.218–1.848)	1.193 (0.343–4.145)
Above 2nd	38 (88.4)	5 (11.6)	1	1
Number of gravida				
Primigravida	38 (44.2)	46 (54.8)	0.434 (0.259–0.726)*	0.331 (0.144–0.762)*
Multigravida	139 (65.6)	73 (34.4)	1	1
ANC starting time				
First trimester	83 (79)	22 (21)	12.004 (6.139–23.485)*	3.803 (1.520–9.518)*
Second trimester	72 (72.2)	27 (27.3)	8.484 (4.421–16.286)*	3.451 (1.316–9.050)*
Third trimester	22 (23.9)	70 (76.1)	1	1
Family income				
151–650	3 (12.0)	12 (88.0)	0.007 (0.001–0.071)*	0.013 (0.001-0.200)*
651–1400	14 (25.0)	42 (75.0)	0.017 (0.002–0.136)*	0.027 (0.002–0.315)*
1401–2350	52 (69.3)	23 (30.7)	0.113 (0.014–0.894)*	0.157 (0.015–1.688)
2351–3550	47 (72.3)	18 (27.7)	0.131 (0.016–1.046)	0.129 (0.012–1.420)
3551–5000	41 (75.9)	13 (24.1)	0.158 (0.019–1.292)	0.149 (0.013–1.698)
5001–10,000	20 (95.2)	1 (4.8)	1	
How long to take tab				
Have knowledge	69 (39)	11 (9.2%)	1	1
Have no knowledge	108 (61.0)	108 (90.8)	0.159 (0.080–0.318)*	0.290 (0.122–0.687)*
Problem faced in the facility				
Yes	62 (35)	94 (79)	0.143 (0.084–0.246)*	0.214 (0.102–0.448)*
No	115 (65)	25 (21)	1	1

NB* shows statistically associated at $P<0.05$. IFA: Iron and folic acid, ANC: Antenatal care, COR: Crude odds ratios, CI: Confidence intervals, AOR: Adjusted odds ratios

DISCUSSION

This study was done to assess the determinants of adherence to IFA supplements among pregnant women attending antenatal clinics in Asella town, Southeast Ethiopia.

The adherence rate of IFA supplement found in this study is 59.8%, and this result was consistent with studies done in the city of Mangalore and Lucknow, Maharashtra, India. This consistency might be due to urban based, and the pregnant women might get information from the health center.[12,13] Similar study was conducted in Oromia region, Amhara region in Ethiopia ,the result showed that the adherence rate was found very low, and another study found in eight rural districts in SNNP result reveled that adherence rate was high, this difference might be due to availability and supply of drugs in the health center in different region.[6,10,14]

This study result reveals that the reason for not adherence of IFA by pregnant mothers was forgotten fullness, belief that many pills will harm the fetus, fear of side effects, and increase of baby weight. This finding was similar with study done in Mecha district, Amhara region, Ethiopia, Kenya, and India.[11,14]

In this study residence, education, gravida, ANC visit, ANC starting time, income, family size, importance on taking medication, women faced problems in health facilities, and shortage of drug in high-content screening were all statistically significant and these were independent determinants in this study.

In this study, residence of the mothers showed significant association, which was similar to the 2011 EDHS indicated that the usage of iron tablets is much higher among urban women than rural women.[6]

This study revealed that maternal education influenced on IFA supplementation. Women who completed at least secondary school were more than 6 times more likely to adhere with IFA supplementation compared to uneducated mothers. This finding was consistent

with many studies in Ethiopia and West Bengal state, India.[6,15,16] This might be explained in different ways, education is more likely to enhance female awareness on micronutrient deficiency and ways to overcome these deficiencies. Overall, educated women had greater ability to stick to health-care inputs such as IFA which offer better care for both the infant and the mother.[17,18]

In this study, lower family income mothers were less likely to adhere with IFA supplementation compared with higher family income. This result was consistent with studies done in Ethiopia,[16] India,[17] Nepal,[18] and Pakistan.[19] This could be attributed to the fact that lack of access, availability of medicine, and high-income group can affordable to buy outside to continue.

This study revealed that primigravid women were usually less likely to stick to the supplementation than multigravida women; this could be primigravid women that they did not have adequate knowledge on the importance of IFA during pregnancy and need of supplementation, and this result was similar with the study done in India[20] and Kenya.[21]

In this study, pregnant mother who visited the ANC clinic for 2–3 times for antenatal checkup was 0.38 times less likely to adhere with IFA supplement than mothers who had 4 and above visits. This study finding was consistent with study done in Kenya, which revealed that the women who had more than 4 ANC visits, those with 0, 1, 2 and 3, those with 0, 1, 2, and 3 visits had 0.04, 0.33, 0.50, and 0.60 times less odds of iron supplement utilization, respectively. Mothers who visited ANC for ≥4 days were more likely to take iron-folate supplements for 90+ days and be supplemented for more days (45.8) than <4 days visitors.[22]

In this study, the result shows that pregnant women who start ANC follow-up in the first trimester had better adherence than those who start an ANC visit in third trimester. ANC follow-up registration time was independently associated with IFA supplementation and the same finding was consistent with studies done in India.[19] This might be due to previous pregnancy experience taken supplements.

In this study result finding showed that the pregnant women who don't had knowledge about duration of taking iron/folic acid supplementation, they were had more than 70 % of unlikely to adhere with IFA supplement for 90 and more days, this findings was consistent with study done in the Macha district, Ethiopia.[13]

Finally, this study found that shortage of IFA supplement problem in the health-care facilities was independent predictors of IFA supplement adherence, and this finding was consistent with studies done in urban and rural Pakistan, which shows shortage of supplement within the facility, is independent predictors of IFA supplementation.[22]

CONCLUSION

The study identified the different factors among pregnant women of adherence to iron/folic acid were maternal education, gravidity, ANC visit starting time, family monthly income, knowledge about the duration of supplement and problems faced in the facility. Consequently, maternal education, adequate supply of IFA supplements in health-care facility, early starting ANC visit, health education on duration of supplementation, and ANC visit recommended.

ACKNOWLEDGMENTS

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