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PRENATAL IRON-FOLIC ACID ADHERENCE AND ASSOCIATED FACTORS AMONG PREGNANT WOMEN HAVING FOLLOW-UP CARE IN THE YEKA HEALTH CENTER, ADDIS ABABA, ETHIOPIA

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Rekik Teshome Addis Ababa City Health Bureau, Yeka Health Center, Ethiopia Adama Hospital Medical College, Public Health Department, Oromia regional state, Ethiopia

Godana Arero* Addis Ababa City Health Bureau, Yeka Health Center, Ethiopia Adama Hospital Medical College, Public Health Department, Oromia regional state, Ethiopia*Corresponding Author

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Abstract

Background: Iron deficiency anemia is a condition caused by inadequate intake or low absorption of iron and increased demands during pregnancy. Iron-folic acid supplementation is the main strategy for prevention and control of iron deficiency anemia and its effectiveness depends on adherence to Iron-Folic Acid tablets. **Objective:** The aim of the study was to investigate Prenatal Iron-Folic Acid adherence and associated factors among pregnant women attending antenatal care in the health center at Yeka sub-city Addis Ababa Ethiopia, 2020 **Methods:** A facility-based descriptive study design mainly a quantitative approach was conducted among pregnant women in five selected health centers in the Yeka sub-city from June to July 2020. A sample size of 389 using single population proportion formula by taking prevalence adherence to folic acid supplementation 60.1% was determined. A systematic random sampling technique was used to select the study participants and a pre-tested interview administered structured questionnaire was employed to obtain the necessary information after getting written and informed consent from the concerned bodies and study subjects. The collected data were checked for completeness and consistency and it was coded before data entry. Data was entered, cleaned and analyzed using Statistical Packages for Social Science (SPSS) 25. To indicate the strength of association, odds ratios (OR) and 95% confidence intervals (CI) were used. **Result:** A total of 378 pregnant women were included (97.1% response rate), of which 244 (64.6%) were adhered to (95% CI=59.8-69.6), mother education (AOR=0.01, 95% CI 0.00-0.12), number of ANC visit (AOR = 0.25. 95% CI 0.12-0.55) and health education about IFA (AOR = 0.05, 95%CI (0.01-0.29) were statistically associated with adherence to IFAS among pregnant women. **Conclusions:** The rate of adherence was poor. The reasons for poor adherence were Fear of side effect, forgetting fullness, and failure to get adequate supplements in the health facility.

Introduction:

Iron-folic acid deficiency anemia is a public health concern worldwide, especially in low and middle-income countries. Iron with folic acid is an important micronutrient for physiological function, growth, and development as well as maintenance of life for the mother and her fetus during pregnancy and in later life. Similar to other nutrients, the demand, and constraint of iron and folic acid increase during pregnancy to meet the daily requirement for life development and growth of the fetus during pregnancy (1).

Iron and folic acid supplementation are required to balance increased physiological demand during puberty, pregnancy, and lactation, this significantly increased demand for iron and folic acid is required for the development of fetus and placenta as well as in supporting maternal blood volume(2).

Iron deficiency anemia is a condition caused by inadequate intake or low absorption of iron, the increased demands during pregnancy, and loss of iron through menstruation, Pregnant women are the most prone groups to iron deficiency anemia (IDA), During pregnancy, physiological iron requirements are the highest and the amount of iron absorbed from the diet is not sufficient to meet requirements during pregnancy (3).

Adequate folate intake during the preconception period: before conception and throughout the first twelve weeks of pregnancy helps protect against a number of congenital malformations, including neural tube defects (NTDs) which are the second most common birth defects after congenital cardiac malformations(4).

Neural tube defects are severe abnormalities of the central nervous system that developed in babies during the first few weeks of pregnancy resulting in malformations of the spine, skull, and brain; the most common neural tube defects are Spina-bifida (due to incomplete closure of the caudal neural tube), and encephalitic (due to incomplete closure of the rostral end of the neural tube) (4).

Iron folic acid deficiency anemia contributes to adverse effects on mother and child health. Daily oral IFA supplementation is recommended as part of the Antenatal care to reduce the risk of low birth weight, maternal anemia, and iron deficiency (5). Maternal risks include low weight gain, preterm labor, placenta previa, premature rupture of membrane, cardiac arrest, hemorrhage, lowered resistance to infection, poor cognitive development, and reduced work capacity. Similarly, fetal and neonatal risks include prematurity, low birth weight, and fetal distress which contribute to prenatal morbidity and mortality as well as infants born to anemic mothers will more likely to become anemic themselves(6).

To tackle this worldwide problem, there is a great effort in supplying iron-folic acid to pregnant women. International Nutritional Anemia Consultancy Group (INACG) recommended daily iron intake of 60mg/ iron and 400 micrograms folic acid for 6 months where anemia prevalence is 40% or more and 60mg iron and 400microgram folic acid for 6 months during pregnancy and 3 months after delivery where there is 40% or less prevalence of anemia(7).

Iron folic acid (IFA) adherence is the extent to which patients take medication or condition of sticking to dose and time for taking iron/folate supplements as prescribed by their health care providers or per recommendations (8), Women are said to have adhered to iron/folic acid supplement if they took 65% or more of the supplement, equivalent to taking the supplement at least 4 days a week (6).

Poor adherence to IFAS is associated with low utilization of antenatal care services, inadequate supply of IFA tablets, poor counseling, and lack of knowledge on anemia(9), Ethiopian demographic health survey of 2016 showed that only 5% of

pregnant mothers took an iron with a folic acid tablet for 90 days and 58% of pregnant mothers did not take any iron with a folic acid tablet during their time of pregnancy(10).

The aim of the study is to investigate Prenatal Iron-Folic Acid adherence and associated factors among pregnant women who attend antenatal care in the health center in Yeka sub-city of Addis Ababa Ethiopia

Methods:

Institutional-based cross-sectional study design on 389 from June –July 2020. All pregnant women who attended antenatal care in Ethiopia were reference population, whereas pregnant women had antenatal care in Yeka Sub City Health Centers during the study period. were the source population. The accessible population of this study was all randomly sampled pregnant women who was visit the selected health centers during the data collection period and fulfilled the inclusion criteria whereas all pregnant women who had at least one antenatal care visit to a health institution and were taking iron-folic acid tablets for at least one month before the date of interview were included for the study. All pregnant women who come for the first antenatal visit; those who refuse to take the supplement, lack of IFA tablet, those who were unable to hear and/or speak, and those who have a mental disorder, who were seriously ill at the time of data collection were excluded from the study.

To determine the sample size, the single population proportion formula was used depending on the following assumption:

$$n = \frac{\frac{z\alpha)^2 * pq}{2}}{d^2}$$

n = Sample size,
Z α/2 = Significance level at α = 0.05,
P = Established from previous studies on the IFA adherence rate in Akaki Kality Addis Ababa Ethiopia (p = 60.1%) (27)

d = 0.05 (margin of error). Therefore, based on using the above single population proportion formula, the sample size was calculated as follows: n = 368. Since the source population is <10000, we were adjusted, and n = 354. With the assumptions of the 95% confidence interval (CI) and 10% non-responsive rate, the total sample size was 389.

The sampling procedure was done as follows: First fifteen public health centers in the Yeka sub-city and five health centers (district 11 health center, district 13 health center, Kotebe health center, Ruth health center, and district 14 Hidassie health center) were selected by simple random sampling technique from fifteen health centers for this study. During the four weeks of data collection the number of second, third, and fourth ANC follow up is estimated to be 185 at district 11 health center, 340 at district 13 health center, 310 at Kotebe health center, 280 at Ruth health center, and 323 at district 14 Hidassie health center which gives a total of 1438 ANC follow up. The total estimated number of pregnant women attending antenatal clinics in each antenatal institution for one month was taken, and a proportional sample size was calculated for each institution so as to give the total sample size using the following formula.

nj = Sample size of the jth institution
Nj = total population size of jth institutions
n = Number of respondents to be selected from each institution
N = Total number of pregnant women in the selected institution (1438)

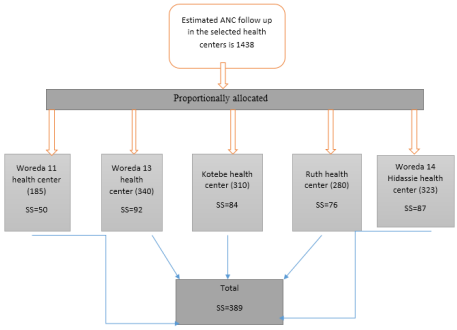
For district11 health center = 389×185/1438=50
For district 13 health center = 389×340/1438=92
For Kotebe health center = 389×310/1438=84
For Ruth health center = 389×280/1438=76
For woreda 14 Hidassie health center = 389×323/1438=87
A total of 389 pregnant mothers were included in the study.

To include 389 women in the study, proportional allocation methods were made based on the number of women who have second, third, and fourth ANC follow-ups at each selected health center in the month proceeding the data collection period. Thus, 50, 92, 84, 76, and 87 women were interviewed from district 11 health center, district 13 health center, Kotebe health center, Ruth health center, and district 14 Hidassie health center respectively. Using this baseline information a proportional number of study subjects by using a systematic random sampling technique was selected from each health center.

The interval was determined as follows:
K=N/n, Where K is the interval of sampling. N is the total number of the population
n is the number of samples with the total number of pregnant women

N=1438 and the minimum sample size being n=389, an interval of K=N/n =1438/389=4th the first study participants will select using the lottery method, and then every 4th unit from the ANC client card will take as a study subject therefore systematic random sampling technique will use to include a sample of 389 study participant.

Figure 3. Schematic presentation of sampling techniques for participants in Yeka City health centers, Addis Ababa, Ethiopia, 2020



The dependent or outcome variable of this study was adherence to IFA supplement (yes or no) whereas independent variables were Socio-demographic variables like age, marital status, religion, maternal education, occupation of mother, husband education, occupation of husband and household income level are considered as socio-demographic variables. Pregnancy and health-related factors: gravida, parity, history of stillbirth, History of abortion, Number of ANC visits, Presence of disease, and other drug use. Health service-related factors such as distance from the health facility, number of supplies per visit, health education, and waiting time. Knowledge about anemia, knowledge about IFA supplementation, and knowledge of the duration of the supplementation was affecting Iron Folic Acid taken. Also, other non-adherence factors like fear of side effects, forget fullness, failure to get adequate supplements in the health facility, long waiting time at the health facility, and lack of information about IFA.

Data were collected by face-to-face interviews using a structured questionnaire adapted from literature with modifications based on research objectives. The questionnaire was developed after a review of a different kinds of literature. The questionnaire was initially prepared in English and translated into the local language (Amharic), and then translated back into English by a different person to check the consistency. Five Female diploma nurses for skillful data collection techniques and gain trust by interviewing women and two health officers were recruited outside the study facilities for data collectors and supervisors respectively. The data collectors and supervisors received a daylong training session on

the objectives and benefits of the study, individuals' rights, informed consent, and interview techniques. The filled questionnaires were checked for completeness and consistency by the supervisors.

The quality of data was assured by training of data collectors, further adjustment to the data collection tool was made after pre-testing it with 5% of the sample size or 19 mothers at woreda 5 Yeka health center (one of the fifteen Yeka Sub-City's health centers) which was not included in the study to improve clarity, understandability, and simplicity of the message.

All of the questionnaires were checked for completeness and accuracy before, during, and after the period of data collection. Throughout the course of the data collection, interviewers were supervised, and regular meetings were held between the data collectors and the principal investigator together in which problematic issues arising from interviews during the data collection and mistakes found during editing were discussed. The collected data was again reviewed and checked for completeness before data entry. The data entry format template was prepared and programmed by the principal investigator.

All the questionnaires were checked for completeness, coded, and entered into Epi data version 3.1 and then transported to SPSS version 25 software package for analysis. Both bivariable and multivariable logistic regression analyses were computed to identify factors associated with IFA supplementation. Variables with a p-value of <0.25 during a bi-variable analysis were incorporated into the multivariable logistic regression to control the possible effects of confounders. Adjusted odds ratio (AOR) with a corresponding 95% confidence interval (CI) was computed to see the strength of the association and a p-value of <0.05 was considered statistically significant.

The questionnaire was first translated to local language and then back to English for checking consistency, and a pre-test of the questionnaire was done. Proper training of the interviewers and close supervision of the data collecting procedures and proper categorization and coding of the data was done.

Results:

Data were successfully gathered from a total of 378 mothers who attended ANC in the health center of Yeka sub-city, which made the response rate 97.17 %. The mean age of the respondents was 26.8 (± 4.6 years) with a minimum age of 18 and a maximum of 40. The majority of the respondents were in the age group of 25-29 (40.7%) and 20-24 (28.3%). Two hundred fifty-four (67.2%) and sixty-three (16.7%) were Orthodox and Muslim followers respectively. More than half of the respondents 226 (59.8%) were housewives, 54 (14.3%) were private and two-thirds 67 (17.7%) were government employees. Regarding educational status one-fourth of respondents, 94(24.7%) have college and 81(21.8%) of the respondents have completed secondary level education. 103(27.2%) and 116(30.7%) of respondents' husbands were college and above and secondary education respectively and 108 (28.6%) and 103 (27.2%) of the respondent's husbands were government employees and private employees respectively.

Table1. Socio-demographic characteristic of the study subjects among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Variable	Category	frequency	Percent
Age (n=378)	15-19	11	2.9
	20-24	107	28.3
	25-29	154	40.7
	30-34	83	22.0
	>35	23	6.1
Marital status (n=378)	Single	9	2.4
	Married	362	95.8
	Divorced	7	1.9
Religion (n=378)	Orthodox	254	67.2
	Catholic	11	2.9
	Protestant	50	13.2
	Muslim	63	16.7
mother education (n=378)	No formal education	10	42.6
	Read and write	79	20.9
	Primary(1-8)	114	30.2
	Secondary (9-12)	81	21.4
	Collage and above	94	24.7
mother occupation(n=378)	House wife	226	59.8
	Private employee	54	14.3
	Government employee	67	17.7
	Merchant	23	6.1
	Daily laborer	8	2.1
husband level of education (n=378)	No formal education	9	2.4
	Read and write	15	4.0
	Primary (1-8)	119	31.5
	Secondary (9-12)	116	30.7
	Collage and above	103	27.2
husband occupation (n=378)	Private employee	103	27.2
	Government employee	108	28.6
	Merchant	53	14.0
	Daily laborer	98	25.9
Income (n=378)	<5000	230	60.8
	>5000	148	39.2

7.2 Obstetric and health-related factors of respondent

Two hundred two (53.4) were multi gravida and One hundred seventy-six (46.6%) were primigravida about half of the participants 198(52.4%) were nulliparous and 59 (15.6%) were multiparous the mean gestational age of the pregnant women during their first visit was 15.13 (± 5.05 weeks) Majority of respondents 258(68.3%) of the respondents started ANC visit less than sixty weeks of gestation 176(46.6%), 126 (33.3%) of pregnant women attended three and four ANC visit respectively whereas the rest had only two ANC visits. When the respondents were asked if they had any history of birth complications such as stillbirths and abortion, 0.3% and 11.4% confirmed they had a history of stillbirth and abortion respectively. Regarding the history of medical problems during the current pregnancy, five-point six percent of women had some medical illnesses during their pregnancy time (table 2).

Table 2. Obstetric and health-related factors of respondent in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Variable	Category	Frequency	Percent
Gravida	Primigravida	176	46.6
	Multigravida	202	53.4
Parity	Nulliparous	198	52.4
	Primipara	121	32.0
	Multipara	59	15.6
history of Still birth	Yes	1	0.3
	No	377	99.7

history of abortions	Yes	43	11.4
	No	335	88.6
Number of ANC visit	Two	76	20.1
	Three	176	46.6
	Four	126	33.3
Gestational age ANC started	<16 weeks	258	68.3
	>16 weeks	120	31.7
Health problem during this	Yes	21	5.6
	No	357	94.4

Participant's knowledge about anemia and benefits of IFA supplementation:

Greater than two-thirds of respondents 268 (70.8%) had Good knowledge of the cause, consequence, risk group, and method of prevention of anemia, while 268 (74.6%) of respondents had Good knowledge of the benefits of IFAS.

Table 3. Participant's knowledge about anemia and benefits of IFA supplementation of respondent in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

variable	category	frequency	percent
Knowledge about anemia	Knowledgeable	268	70.8
	Non-knowledgeable	110	29.1
Knowledge about IFAS	Knowledgeable	282	74.6
	Non-knowledgeable	96	25.4

Adherence to iron-folic acid supplementation:

Adherence to iron-folic acid supplement was 64.6% (95% CI=59.8-69.6), the leading reported reasons for non-adherence were fear of side effects, forgetting fullness, and failure to get the adequate supplement in the health facility which accounts for 71 (18.8%), 48 (12.7%) and 15(4.0%) respectively.

Table 4. Adherence to iron-folic acid supplementation among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

variable	Category	frequency	percent
Adherence	Yes	244	64.6
	No	134	35.4
Reason for not taking the supplement properly	Fear of side effect	71	52.9
	Forget fullness	48	35.8
	Failure to get adequate supplement in the health facility	15	11

Factors associated with adherence to IFA supplements:

Bivariate and multivariable binary logistic regression was done to identify factors associated with adherence to iron foliate supplementation. First, all independent factors that showed association in chi-square were analyzed by bivariate logistic analysis and nine predictors showed significant association with adherence from socio-demographic characteristics mother's education and husband education was significantly associated with an adherent of iron folate supplementation among pregnant, from obstetric related factors number of ANC visit, the month on which she started ANC and health problem during this pregnancy was significantly associated with IFA supplement among pregnant and from health service-related factor of adherence health education about IFA, how many tablets did you collect per visit, waiting time in the health facility and Problem face in the health facility were significantly associated with IFA supplement among pregnant women. Then variables with P-value ≤ 0.25 in the bivariate logistic analysis were entered into multivariable binary logistic regression analysis. Among these, three independent predictors were found significantly associated with IFA supplementation. The result of the Hosmer-Lemeshow goodness-of-fit test was not significant (p=0.145, df=8).

The socio-demographic factor of adherence:

Maternal education was found a significant association with the odds of adherence among those who can read and write (COR= 0.02, 95% CI 0.00-0.05) and Primary (1-8) (COR 0.3, 95% CI 0.15-0.59) as compared to collage and above, Husband level of education also found a significant association with the odds of adherence who can read and write (COR = 0.34, 95% CI 0.08-1.37) more not adhere to IFA supplement as shown on (table 5)

Table 5. Socio-demographic factor of adherence among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Factors	Category	Not Adhered	Adhered	COR (95%CI)	P-value
Age	15-19	4	7	0.93(0.20-4.17)	0.92
	20-24	44	63	0.76(0.29-1.95)	0.57
	25-29	51	103	1.07(0.42-2.70)	0.87
	30-35	27	56	1.10(0.41-2.92)	0.83
	>35	8	15	1	
Mother Level of education	No formal education	3	7	0.40(0.09-1.77)	0.23
	Read and write	70	9	0.02(0.00-0.05)	0
	Primary(1-8)	42	72	0.3(0.15-0.59)	0.00
	Secondary (9-12)	5	76	2.66(0.91-7.74)	0.07
	Collage and above	14	80	1	
Husband level of education	No formal education	5	4	1	0.13
	Read and write	3	12	0.34(0.08-1.37)	0.42
	Primary(1-8)	33	86	1.72(0.45-6.53)	0.69
	Secondary (9-12)	46	70	1.12(0.62-2.00)	0.14
	Collage and above	31	72	0.65(0.37-1.14)	

7.5.2 Obstetric and health-related factors of adherence

According to the Number of ANC visit pregnant women who come for there'd ANC visit there is a significant association with adherence to IFA as compared with those who come for their fourth ANC visit (COR 0.45, 95% CI 0.27-0.74), there is also a significant association between gestational age ANC started women who start ANC before sixty weeks of gestation more likely to adhere to IFA as compared to women who start ANC after sixty weeks of gestation (COR 0.92, 95% CI 0.58-1.45), health problem during this pregnancy was significantly associated with adherence of IFA pregnant women who had a health problem during this pregnancy significant association as compared to no health problem (COR 0.2, 95% CI 0.07-0.52) as shown on table (6).

Table 6. Obstetric and health-related factors of adherence among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Factors	Category	Not Adhered	Adhered	COR (95%CI)	p- value
No of ANC visit	Two	24	52	0.76(0.41-1.43)	0.41
	Three	77	99	0.45(0.27-0.74)	0.00
	Four	33	93	1	
GA ANC started	<16 weeks	93	165	0.92(0.58-1.45)	0.72
	>16weeks	41	79	1	
Health problem	Yes	15	6	0.2(0.07-0.52)	0.00
	No	119	238	1	

Health service-related factors of adherence:

There is a significant association with pregnant women who got health education about IFA is more adhered to IFA as compared to

those who cannot get health education about IFA (COR 1.33, 95% CI 0.86-2.05), there is also a significant association between the number tablets collect per visit women who collect thirty tabs per visit more adhere to IFA as compared to women who collect more than thirty tabs (COR 1.57, 95% CI 0.92-2.68), Waiting time in the health facility was also significantly associated pregnant women who got the service within 30 min is more adhere to IFA as compared to who got the service greater than 30 min (COR 0.65, 95% CI 0.42-1.01) and problem face in the health facility had a significant association, pregnant women, no any challenges they were faced more adhere to IFA as compare to face the challenge (COR 1.51, 95% CI 0.96-2.39).

Table 7. Health service related factor of adherence among pregnant mothers in selected health center Yeka Sub-city Addis Ababa, 2020 (n=378).

Factors	Category	Not Adhered	Adhered	COR (95%CI)	p-value
Health education about IFA	Yes No	77 57	157 87	1.33(0.86-2.05) 1	0.18
How many tablets did you collect per visit	30 90	11 23	184 60	1.57(0.92-2.68) 1	0.09
Waiting time in the health facility	< 30 min >30 min	87 47	134 110	0.65(0.42-1.01) 1	0.06
Problem face in the health facility	Yes No	47 87	64 180	1 1.51(0.96-2.39)	0.07

In multivariable logistic regression mother Level of education, No of ANC visits, and Health education about IFA were significantly associated with adherence to IFAS during pregnancy.0.01 times more likely to be adherent to IFAS than college and above (AOR=0.01, 95% CI 0.00-0.12) No of ANC visit pregnant women who come for 3rd ANC visit were 0.25 more likely to be adherent to IFAS than those pregnant women who come for fourth ANC visit (AOR = 0.25. 95% CI 0.12-0.55) and Mothers who got advice about IFAS were 0.05 times more likely to be adherent to IFAS than those who didn't get advice (AOR = 0.05, 95%CI (0.01-0.29). As shown in the table below (Table 8).

Table 8. Health service related characteristics among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Variable	Category	Frequency	percent
Waiting time in the health facility	< 30 minutes	221	58.5
	> 30 minutes	157	41.5
Health center distance from home	< 20 minutes	246	65.1
	>20 minutes	132	34.9
problem do you face	No	267	70.6
	Shortage of supplement in the	56	14.8
	Long waiting time in the health institution	53	14.0
	Poor health care provider communication	2	0.5
education about iron/folate supplement	yes	234	61.9
	no	144	38.1

Source of information:

This study shows that Health worker plays a very great role in being a Source of information for most pregnant women 301 (79.6%) and 207 (54.8%) about IFA and Anemia respectively, while school werethe least source of information for interviews women

Health service-related characteristics of the study subjects:

According to this study around two-thirds of 246 (65.1%) of women were found around the health centers and only reach the health centers within 20 min, Most of the women 221 (58.5%) have the service within 30 min and 234 (61.9%) of women have got counseling on IFA supplementation during their ANC visit, Regarding problems in the facility 267 (70.6%) mothers response were no any challenges they were faced. But the rest 111 (29.4%) pregnant were faced a Shortage of supplement in the facility, Long waiting time in the health institution, and Poor health care provider communication in the health facility, regarding dispensing of supplement majority of respondent 295 (78.2%) was collected thirty tablets per visit

Table 9. Bi-variable and multivariable logistic regression analysis for associated factors of adherence among pregnant mothers in selected health center Yeka sub city Addis Ababa, 2020 (n=378)

Factors	Category	Not Adhere	Adhered	COR (95%CI)	AOR (95%CI)
Mother Level of education	No formal education Read and write Primary(1-8) Secondary (9-12) Collage and above	3 70 42 5 14	7 9 72 76 80	0.40(0.09-1.77) 0.02(0.00-0.05) 0.3(0.15-0.59) 2.66(0.91-7.74) 1	0.01(0.00-0.12)* 0.41(0.063-2.66) 2.88(0.36-22.78) 0.70(0.09-5.10) 1
Husband level of education	No formal education Read and write Primary(1-8) Secondary (9-12) Collage and above	5 3 33 46 31	4 12 86 70 72	1 0.34(0.08-1.37) 1.72(0.45-6.53) 1.12(0.62-2.00) 0.65(0.37-1.14)	1 0.74(0.11-4.93) 5.77(0.75-44.43) 0.83(0.38-1.85) 0.50(0.23-1.09)
No of ANC visit	Two Three Four	24 77 33	52 99 93	0.76(0.41-1.43) 0.45(0.27-0.74) 1	0.90(0.34-2.37) 0.25(0.12-0.55)* 1
GA ANC started	<16 weeks >16weeks	93 41	165 79	0.92(0.58-1.45) 1	0.97(0.48-1.95) 1
Health problem	Yes No	15 119	6 238	0.2(0.07-0.52) 1	1.38(0.71-2.66) 1
Health education about IFA	Yes No	77 57	157 87	1.33(0.86-2.05) 1	0.05(0.01-0.29)* 1
How many tablets did you collect per visit	30 90	11 23	184 60	1 1.57(0.92-2.68)	1 0.48(0.2-1.17)
Waiting time in the health facility	< 30 min >30 min	87 47	134 110	0.65(0.42-1.01) 1	1.51(0.73-3.10) 1
Problem face in the health facility	Yes No	47 87	64 180	1 0.65(0.41-1.03)	1 1.89(0.86-4.15)

COR: Crude odds ratio, AOR: adjusted odds ratio, CI: confidence interval, Statistical significant at p-value < 0.05,1 is for reference.*

significant variables.

8. Discussions:

Iron and folic acid supplementation have been a major strategy to reduce iron/folic acid deficiency anemia. However, issues of poor adherence remain a challenge. The aim of this study was to determine the rates of adherence and identify factors associated with IFA supplementation among ANC attending pregnant women in the Yeka sub-city selected health center in Addis Ababa, Ethiopia, 2020. This study found that the adherence rate of the pregnant women in the Yeka sub-city selected health center in Addis Ababa, was 64.6% (95% CI=59.8-69.6)

This study revealed that 244(64.6%) of the participants were adherent to IFAS which is consistent with the study conducted in Tikur Anbessa Specialized Hospital 63.6% (16), Eritrean refugee camps, in northern Ethiopia 64.7%(20) and in Akaki Kality Sub City, Addis Ababa, Ethiopia (60.1%) But it was higher than the study conducted in West Dembia district, northwest Ethiopia (52.9%)(22), Northwest Ethiopia (55.3%) (34), Kiambu County, Kenya (32.7%) (35), and Adwa town, Tigray, Ethiopia (40.9%)(11). The probable reason may be the difference in geographic locations and the time gap between studies, differences in awareness of pregnant women about IFA supplementation and educational status and accessibility of health institutions However the adherence rate among women in this study was lower compared to studies done in Mizan-Aman Town, Bench Maji Zone which was (70.6%)(32) and Khartoum, Sudan which was 92.1% (31), And this difference may be due to ANC service delivery facilities, In addition, low attention to adherence issue due to lack of information regarding the severity and magnitude of the problem and poor follow up of the program in this study area may be the other reason for this difference. For instance, no indicators are used to assess the adherence to iron foliate supplementation in the Ethiopian health service reporting system.
As a study result in eight rural districts of Ethiopia among pregnant women who were prescribed supplements, the average level of adherence was 74.9%.the result was much higher than as it compared within this study result. The probable explanation for these might be the variables they used might made difference and also might be due to time difference (36).

This study result was relatively higher as it compared to the study conducted in among Antenatal Care Attendant Mothers in west Dembia district northwest Ethiopia which was 52.9%.The probable reason for this might be the geographical location (22).

Conclusion:

The rate of adherence was 64.6% and reasons for poor adherence were Fear of side effects, Forget fullness, and Failure to get the adequate supplements in the health facility. In this study No of ANC visit, Mother Level of education and health education about IFA were significantly associated variables with adherence of iron folate supplementation.

Recommendation:

With respect to the findings and objectives of the study, some recommendations have been made at different levels.

Government level:

The government plays a greater role in capacity building and provisions of the IFA supplement. Training or refreshment short courses on benefits of IFA supplement and counseling methods are mandatory in order to bring a positive change towards women's attitude and practice of IFA supplement intention. Moreover, the provision of supplements should be proven lesser side effects in different forms. Especially syrups should be available in all health sectors to improve the uptake of IFA supplements.

Community-level:

For communities, at different levels, awareness creation about IFA supplementation and media coverage should be able to support the utilization of IFA supplement. Discussions with women who gave birth previously and families at home should be encouraged. Special attention should be given to any techniques that help the women to remind on daily bases on full courses of the utilization period.

District health office:

Outreach services to enhance access to supplements and also engage the extension health workers in the distribution of the supplements

Facility level:

Providers should counsel pregnant women on IFA supplement benefits, risks if they miss the tablet, and for how long they utilize it. Professionals have a huge gap on IFA supplements especially on periods of start and for how long they provide them. This should be improved by referring to the manuals and guidelines on micronutrient supplementation. Moreover, they should communicate with senior staffs and personnel who had a better experience in this area.

Researcher and scientific community:

Further research on adherence to Iron and folate especially pill count studies complemented with qualitative data would be helpful.

Abbreviations and Acronyms: ANC: Antenatal Care; EDHS: Ethiopian demographic health survey, ETB: Ethiopian Birr; FA: Folic Acid, FEP: Free erythrocyte protoporphyrin; Hgb: Hemoglobin; IDA: Iron; Deficiency anemia; IFA: Iron/Folic Acid; IFAS: Iron folic acid supplementation; INACG: International Nutritional Anemia Consultancy Group; IRB: Institutional Review Board committee; LBW: Low Birth Weight; MCH: Maternal and Child Health; NNP: National Nutrition Planning; NTD: Neural Tube Defect; RDA: Recommended dietary allowance; SNNP: Southern nation and nationality ; SRS: Simple Random Sampling, WHO: World Health Organization.

Declaration:

Ethical Consideration: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board (or Ethics Committee) of the Addis Ababa Business, and Medical College, (project code: ET.AABMC.REC.0283.235). Informed consent was obtained from all subjects involved in the study. Permission to conduct the study was secured from Yeka Sub City health department and permission letter was written to the selected health center to conduct the study. Written informed consent was obtained from each study participants after clear explanation about the benefit and harm of the study. The importance of their participation, the confidentiality of the information, participation was voluntary and refusal to participate has no effect on the subject or any family member.

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Data Availability Statement: The data of this study is found at hand of the corresponding author, and avail at any time needed.

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