Adherence Level To Iron-Folic Acid Supplement And Associated Factors Among Pregnant Women Attending Antenatal Care In Selected Public Health Facilities Of Ilu Aba Bor Zone, Southwest, Ethiopia 2018.

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Abstracts: Background: Nearly half (41.8%) of pregnant women in the world are anemic and more than 50% of anemia is due to iron deficiency anemia. Iron supplementation has been a major and effective strategy to reduce iron deficiency anemia in pregnancy. However, poor adherence to iron-folic acid supplements hinders the effectiveness of the iron-folic acid supplementation program. This study aimed to assess adherence levels to iron-folic acid supplements and associated factors among pregnant women. **Methods:** An institution-based cross-sectional study was conducted in selected public health facilities in Ilu Aba Bor Zone from April–to May 2021. A systematic sampling technique was employed to select 527 study participants. A Binary logistic regression model was used to determine the association of covariates and dependent variable **Result**: A total of 511 pregnant women participated in the study, making the response rate 96.9%. The adherence level to the IFA supplement was found to be 45.8 %. In multivariable analysis, knowledge of pregnant women on anemia (AOR: 8.2, 95%CI :(4.23, 15.98)), knowledge of pregnant women on IFA supplement (AOR: 2.79, (95%CI: 1.42, 5.51)), experienced side effects (AOR: 0.04, 95%CI: (0.02, 0.07)), complaining faced problem (AOR: 0:33, 95%CI: (0.16, 0.67)) and health education during prenatal follow up(AOR:2.27, 95%CI: (1.17, 4.40)) were significantly associated with adherence level to IFA supplement. **Conclusion and Recommendation**: The adherence level to iron-folic acid was low among pregnant women. Knowledge of anemia, knowledge of IFA & health education were positively associated factors. While experienced side effects & facing problems were negatively associated. Strengthen health education to improve knowledge of pregnant women on anemia, preparing guidance to manage side effects of IFA supplements were recommended.

Keywords: Adherence, Ethiopia, Iron Folic acid, Pregnant women

Introduction

Iron supplementation has been a major strategy in low-income and middle-income countries where micronutrient deficiencies are common and it is an effective strategy to reduce iron deficiency anemia in pregnancy.[1] Poor adherence to iron-folic acid supplements hinders the effectiveness of the iron-folic acid supplementation program.[2] Adherence to (or compliance with) a supplementation is generally defined as the level to which clients take the supplements as prescribed by the health care providers. [3] Iron deficiency is recognized as the most nutritional disorder of public health problem which affects the world but more largely throughout sub-Saharan Africa.[4] It is estimated that 41.8% of all pregnant women which means nearly half of pregnant women in the world are anemic with the highest proportion (56%) affected in developing countries. Half of the anemia in women worldwide is due to iron deficiency.[5] 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.[6] In Ethiopia about one-fourth of women aged, 15-49 (23 percent) are anemic. It is well-documented fact that the risk of iron deficiency anemia is a higher proportion in pregnant women than in others.[7] The proportion of women with any anemia is notably higher in rural than in urban areas (25 percent versus 16 percent). More than a quarter (26.1) of women in the Oromia region are anemic.[8] Supplementation with iron-folic acid is generally recommended during pregnancy to meet the iron and folic acid needs of both mother and fetus.[9,10] But studies at different times and different settings are suggested that poor maternal adherence to iron-folic acid is the main reason for the ineffectiveness of the supplementation programs.[11,12] As the facility-based comparative cross-sectional study conducted on pregnant women at North Western Tigray of Ethiopia founds, the pregnant women's adherence level to iron-folic acid was

only 28.9% in rural and 37.2% in urban the study area.[13] Even though WHO recommends 60mg iron and 400 µg of folic acid during pregnancy on daily basis for six months, there is a huge discrepancy within different areas and among different population groups on the level of compliance on Iron and folic acid.[13,14,15,16,17] There are so many studies conducted to assess the adherence level to the IFA tablet. But most of the works of literature didn't assess the problems in facilities during service time as a factor, thus this study may address these information gaps.

Methods and Materials

Study Design and setting

A facility-based cross-sectional study design was used to Assess Adherence levels to Iron Folic Acid intake among pregnant women during their ANC visit at public health facilities within Ilu Aba Bor Zone, Oromia region, Ethiopia from May to June 2021. Ilu Aba Bor zone is one of the twenty zones in Oromia regional state and is located around 600km away from Addis Ababa in the southwest of Ethiopia. There are 14 districts in the Ilu Aba Bor zone. As Ilu Aba Bor Zonal health department confirms, the population of the zone is 933,345 which is 467,553 male and 465,792 females at the time of 2010 E.C. fiscal year planning. There are 39 governmental health centers and two governmental Hospitals within the indicated zone.

Study Participants

The Source population of the study was all pregnant women coming for 2nd and above ANC visits at public health facilities in Ilu Aba Bor zone and the study, the population was all sampled pregnant women who attended ANC services in selected public health facilities.

Sample size and sampling techniques

The sample size was determined by the single population proportion formula ($n = (Z \alpha/2)2 P (1-P)/ d2$) based on the following assumptions; the proportion of IFA Adherence level (70.6%) from the study conducted in Mizan Aman town.[18] and at 95 % confidence level, 5% margin of error, 10% non-responsive rate and 1.5 design effect. Thus, the final sample size was 527. A Multi-stage sampling technique was used. The first stage is the selection of the Health Facilities from the total HCs in the Zone using the simple random sampling (SRS) technique using the lottery method. The second stage is the selection of eligible women using a systematic random sampling technique after applying proportionate size allocation to the selected Health Centers.

Data collection procedure

A Pre-tested structured interviewer-administered questionnaire was used to collect data from each study subject. The questionnaire was designed based on the study objectives and adapted from related literature with slight modification. It was initially prepared in English and was translated to the local language (Afan Oromo) and back-translated to English to check for its consistency. All data collectors and supervisors were well trained in the data collection process. Data collection was conducted through a face-to-face interview by 12 diploma holder health professionals. The questionnaire was completed after obtaining verbal consent from the study participants. Daily supervision was carried out for the entire length of the data collection.

Study Variables

Iron Folic Acid adherence level is the dependent variable. Whereas Socio-demographic and economic factors (Maternal age, educational status of women, educational status of husband, income, Current occupation, marital status, religion, ethnicity, family size), Obstetric history (Parity, Gravidity, Gestational age), GA at first ANC visit, Frequency of ANC visit, History of stillbirth, History of abortion, History of anemia, Health Education on IFA supplementation, Problems during service time, Experienced side effects, Comprehensive knowledge about anemia/ iron deficiency anemia and Comprehensive knowledge of iron and folic acid are independent variables.

Operational Definitions

Good adherence: - Pregnant women said to have adhered to iron-folic acid supplements if they took the supplement at least 5days per week in the previous week before the study. [15,19]

Poor adherence: - Pregnant women said to have poorly adhered to iron-folic acid supplement if they took the supplement less than 5 days per week in the previous week before the study

Satisfactory knowledge on Anemia: - Pregnant women are said to have satisfactory knowledge on Anemia if they scored greater than the mean value of five questions for anemia after computing the index.[21]

Satisfactory knowledge on IFA: - Pregnant women said to have satisfactory knowledge of IFA supplements if they scored greater than the mean value of four questions for iron-folic acid after computing the index. [21]

Measurements

To assess the level of knowledge about anemia during pregnancy, respondents were asked five questions on major cause's anemia, common sign, and symptoms of anemia, possible consequences of anemia, the most susceptible group for anemia, and methods to prevent anemia. Those who scored greater than the mean value were considered as somehow satisfactory knowledge and those who scored less than or equal to the mean value were considered as not satisfactory knowledge. To assess the level of knowledge about iron-folic acid, four questions were asked to respondents on the benefit of IFA, risks of the supplementation and for how long period should iron-folic acid supplement is recommended. At the last respondents who score greater than the mean value were considered as knowledgeable and those who scores less than or equal to the mean value were considered as less knowledgeable.[18] Mean score was used for both variables the cut-off point since data were normally distributed.

Data process and analysis

The collected data were checked, coded, and entered into Epi-Data version 3.1 and then exported to SPSS version

20 for analysis. Descriptive data analysis was used to describe the Adherence level to IFA for pregnant mothers. Different frequency tables, graphs, and descriptive summaries were used to describe the variables. The associated factors were assessed by the Binary logistic regression model. Odds Ratio estimated with 95% CI to show the strength of association and P-value < 0.05 was used to declare statistical significance.

RESULTS

Socio-demographic characteristics of the study respondents

A total of 511 pregnant women attending ANC at public health facilities participated in the study with a response rate of 96.9%. The mean age of the respondents was 28.1 and ±6.3 standard deviation. Three-forth 388(75.9%) of the respondents were in the age group of 20-34 years. 362 (70.8%) of respondents were rural residents and 29.2% of respondents were urban residents. Most of the respondents 484(94.7%) were married. More than half 271 (53%) of the respondents' family size was within the interval of four to six in number. Regarding the educational status of respondents, 209(40.9%) of respondents were unable to read and write. Two hundred fourteen (41.9%) of participants were house (Table1).

Pregnancy obstetric and health-related factors

Most of the study participants (85.7%) were multigravida and 73(14.3%) were prim gravida. From the total study participants, 15.9% were null parous and 54.2% were multiparous. The mean gestational age of respondents during the study period was 27.7 weeks and (SD= ±4.7) weeks. More than half (57.3%) of respondents were in the second trimester (Table2).

Respondents' knowledge about anemia

Three hundred fifty-two (68.9%) of respondents had good knowledge of possible causes while 52.1% of respondents had not known at least one consequence of anemia. Around 66% of respondents had mentioned at least one symptom of anemia and considered as they had good knowledge of the signs and symptoms of anemia. More than one-third (77.5%) of respondents 77.1% of respondents had good knowledge on explaining the most susceptible groups and the prevention methods of anemia respectively. Hence respondents who answer at least one correct answer for a specific category of the question with multiple responses were counted as knowledgeable for the specific anemia-related questions.

This study shows that nearly 80% of respondents had taken IFA tablets for less than or equal to two months, around 19% of respondents had taken IFA supplements for three months and above. (Figure 1)

Adherence Level to Iron Folic Acid Supplement

Based on the operational definition given among the total 511 participants 234 (45.8%) of pregnant women have poor adherence levels whereas 277(54.2%) of pregnant women have Good adherence levels. (Figure 2).

Reasons for poor adherence to IFA supplementation among pregnant women

Among all respondents who were poor adherents, 72.9% reported fear of its side effects. At the same time, 37.5% of pregnant women had mentioned that they couldn't take all doses because of forgetfulness (Table3).

Factors associated with adherence to IFA supplement

In the bivariate analysis age of respondent, place of residence, marital status, educational status of women, educational status of husbands, frequency of ANC visits, gestational age at first ANC visit, knowledge of women on anemia, knowledge of women on benefits of IFA supplement, the experience of side effect, duration of taking IFA supplement, and health education at the time of supplement were significantly associated with Adherence level to IFA supplement at p-value was ≤ 0.25. In the multiple logistic regression knowledge of women on anemia, knowledge of women on benefits of IFA supplement, the experience of side effects, and health education during the supplement were found to have a statistically significant association with Adherence to IFA at p-value were ≤ 0.25. Pregnant women who had satisfactory knowledge of anemia were more than 8 times more likely adhto ere to iron folate supplements than those pregnant women who had no satisfactory knowledge of anemia (AOR:8.22, 95%CI:4.23, 15.98). Similarly, pregnant women who had satisfactory knowledge of IFA supplement were 2.7 times more likely Adherent to IFA supplement than those pregnant women who had no satisfactory knowledge of IFA supplement (AOR:2.79, 95%CI:1.42, 5.51). Also, Pregnant women who had experienced side effects during taking the IFA supplement were 95% times less likely to ere to the supplement than pregnant women who had not experienced side effects (AOR:0.04, 95%CI: 0.02, 0.07). Pregnant women who had to get health education at the time of supplementation were 2.3 times more likely to adhere to the IFA supplement than those pregnant women who had not gotten health education on intake of IFA (AOR:2.27, 95%CI: 1.17, 4.40) (Table 4).

DISCUSSION

This study revealed that the adherence level to IFA supplements among pregnant women was 45.8%. It is found that the adherence level of this study is greater when compared with the study conducted in Misha district South Ethiopia (39.2%)[19], Goba, Southeast Ethiopia (18%)[21], Mecha district Western Amhara Ethiopia (20.4%)[22], Afar Ethiopia (22.9%)[23], and Vientiane municipality (34.4%)[24] and lower than study conducted in Southeastern Nigeria (84.8%)[25], Eight rural districts of Ethiopia(74.9%)[14], Mizan Bench Maji Ethiopia(70.6%)[18] and Addis Ababa(60.1%)[26]. The most likely explanation for these differences in adherence level might be from the difference in awareness difference among pregnant women, geographical location or it may be from increased service accessibility. Pregnant women who had satisfactory knowledge of anemia were 8.2 times more likely to adhere to iron folate supplements than those pregnant women who had no satisfactory knowledge of anemia. This study was consistent with the study conducted in Misha district, South Ethiopia in which pregnant women who were with good knowledge were

4.45 times more likely to be adherent than pregnant women with poor knowledge. [19]. This study revealed that pregnant women who had satisfactory knowledge of IFA were 2.7 times more likely to be compliant than pregnant women who had not satisfactory knowledge of the supplement. The finding of this study is consistent with the studies conducted in Mecha district, West Amhara, which was, pregnant women with higher knowledge on benefits of IFA were 5.25 times more likely to be compliant than pregnant women with lower knowledge.[22] and also the study conducted in Goba district, Southeastern Ethiopia finds that pregnant women with poor knowledge on benefits of IFA were 62% times less likely to be compliant with the supplement than pregnant women with good knowledge of IFA. This study finds that, among 277 pregnant women who were defined under poor adherence, 72.9% of them describe that they lose to take the right dose of supplement because of its side effects. This finding is higher when compared with different studies in Nigeria, Senegal, Ismailia, and Mecha district, Western Amhara Ethiopia which was 41.7%, 34%, 23.9%, and 54% respectively. [22,27,28,29] The probable reason for the difference may be the status of counseling pregnant women during the supplementation at facilities. In this study, pregnant women who were experienced side effects during taking the supplement in their current pregnancy were 96% times less likely to be compliant with to IFA supplement than those pregnant women who were not experienced any side effects. This finding is similar to the findings of the study conducted in Mizan Bench Maji Ethiopia.[18] The possible reason may be side effects hinder taking the tablets as scheduled. Good communication, serving clients within a short time of arrival at the facility, and providing adequate supplements as the schedule for pregnant women were factors to enhance a good adherence. This study revealed that health education during the prenatal visit and at the time of collecting IFA was another important independent factor that determines adherence level. Here in this study, those pregnant women who were provided health education were 2.27 times more likely to be compliant with IFA supplements than pregnant women who were not provided health education on the matter. This finding is in line with a study conducted in Akaki Kaliti, Addis Ababa, Ethiopia, in which was pregnant women who were counseled were 1.17 times more likely to be adherent than pregnant women who were not provided with counseling [30]. The study conducted in Goba district, Southeastern Ethiopia also supports this finding since it approves, those pregnant women provided health education were 4.03 times more likely to be compliant to IFA supplement than pregnant women who were not provided health education during prenatal [21]. The probable reason for this could be health education is used as a better channel to disseminate important information on iron-folic acid supplements.

CONCLUSION

The study underlined that the adherence level to IFA supplement is poor which is only 45.8% among pregnant women attending ANC visits at public health facilities of Ilu Aba Bor Zone. Adherence level remains low within the zone and doesn't meet WHO recommendations. Knowledge of pregnant women on anemia, knowledge of pregnant women on IFA supplement, the experience of side effects, and health education during the time of ANC visits were significantly associated with adherence level to iron-folic acid supplement among pregnant women. health education, a strong counseling system, and good communication skill at all health facilities including hospitals, health centers should be strengthened.

Abbreviations

ANC: Antenatal Care; AOR =Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; EDHS: Ethiopian Demographic Health Survey; IFA: Iron Folic Acid; SPSS: Statistical Package for Social Science; WHO: World Health Organization

Ethical Consideration

Ethical clearance and approval of the study were obtained from the Ethical Review Board of Metu University, Faculty of Public Health, and Medical science. All study participants were informed about the confidentiality of the information and that they have a full right to participate or decline from participating in the study. Oral consent was obtained from every study subject and written consent was obtained from parents or guardians, for those less than 18 years.

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Annex 1: Tables

Table 1: Socio-demographic characters of the participants of pregnant mothers attending ANC follow up in public health facilities of Ilu Aba Bor zone 2021

Variables	Category	Frequency	Percent
Age in years	15-15	36	7
	20-34	388	75.9
	35-49	87	17
Place of residence	Rural	362	70.8
	Urban	149	29.2
Ethnic group	Oromo	410	80.2
	Amhara	59	11.5
	Tigre	12	2.3
	Gurage	17	3.3
	Others	13	2.5
Religion of respondents	Orthodox	212	41.5
	Muslim	140	27.4
	Protestant	152	29.7
	Catholic	4	0.8
	Others	3	0.6
Current marital status	Unmarried	27	5.3
	Married	484	94.7
Family size	3-Jan	122	23.9
	6-Apr	271	53
	>6	118	23.1
Educational status of respondents	Can't read and write	209	40.9
	Primary (1-8)	187	36.6
	Secondary (9-12)	83	16.2
	College and above	32	6.3
Educational status of husband(n=501)	No formal education	82	16.4
	Primary (1-8)	208	41.5
	Secondary (9-12)	126	25.1
	College and above	85	17
Occupation of respondent	Housewife	214	41.9
	Farmer	88	17.2
	Merchant	89	17.4
	Gov't employee	42	8.2
	NGO	6	1.2
	Student	8	1.6
	Self-employee	55	10.8
	Others	9	1.8

Table 2: Pregnancy obstetric-related characteristics of pregnant women attending ANC at public health facilities of Ilu Aba Bor zone, 2021.

Variables	Category	Frequency	Percent
Frequency of ANC visit	Two times	249	48.7
	Three times	204	39.9
	Four and above times	58	11.4
Gravidity	Primi gravida	73	14.3
	Multi gravida	438	85.7
Parity	Null parous	81	15.9
	Primi parous	153	29.9
	Multi parous	277	54.2
Gestational age at the current visit	Second trimester	293	57.3
	Third trimester	218	42.7
Ever experienced stillbirth	Yes	37	7.2
	No	474	92.8
Ever experienced abortion	Yes	53	10.4
	No	458	89.6
anemia in the current pregnancy	Yes	79	15.5
	No	432	84.5

Table 3: Reasons for poor adherence level to IFA supplement among pregnant women who were attending ANC at selected public health facilities of Ilu Aba Bor zone, Ethiopia 2021.

Reasons described for poor adherence(n=277)	Category	Frequency	Percent
Forget fullness	Yes	104	37.5
	No	173	62.5
Too many pills	Yes	39	14.1
	No	238	85.9
Fear of side effects	Yes	202	72.9
	No	75	27.1
Unpleasant tests	Yes	29	10.5
	No	248	89.5
Fear of harm to the fetus	Yes	28	10.1
	No	249	89.9
Failure to get the adequate supplement at HF	Yes	9	3.2
	No	268	96.8
Long waiting time at HF	Yes	14	5.1
	No	263	94.9
Poor communication with health providers	Yes	80	28.9
	No	197	71.1

Better to get from a dietary source	Yes	6	2.2
	No	271	97.8
Other reasons	Yes	3	1.1
	No	274	98.9

Table 4: Multivariable model showing factors associated with adherence level to IFA supplement by selected variables, among pregnant women attending ANC visit at public health facilities of Ilu Aba Bor zone, South West Ethiopia, 2021.

Variables	Adherence level to IFA supplement		COR(95% CI)	AOR(95% CI)	P-Value
	Good	Poor			
Age					
15-19	13(36.1)	23(63.9)	0.88(0.39, 1.97)	1.79(0.43, 7.53)	0.422
20-34	187(48.2)	201(51.8)	1.45(0.90, 2.33)	1.62(0.74, 3.58)	0.229
35-49	34(39.1)	53(60.9)	1	1	
Place of residence					
Rural	154(42.5)	208(57.5)	1	1	
Urban	80(53.7)	69(46.3)	1.57(1.07, 2.29)	0.75(0.38, 1.49)	0.411
Current marital status					
Unmarried	8(29.6)	19(70.4)	1	1	
Married	226(46.7)	258(50.5)	2.08(0.89, 4.84)	2.66(0.50, 14.13)	0.251
Educational status of respondents					
Unable to read and write	72(34.4%	137(65.6)	1	1	
Primary(1-8)	93(49.7)	94(50.3)	1.88(1.26, 2.82)	1.47(0.69, 3.13)	0.324
Secondary(9-12)	49(59.0	34(41.0)	2.74(1.63, 4.62)	1.49(0.51, 4.37)	0.47
College & Above	20(62.5)	12(37.5)	3.17(1.47, 6.85)	1.01(0.18, 5.58)	0.993
Educational status of husbands					
No formal education	29(35.4)	53(64.6)	1	1	
Primary(1-8)	89(42.8)	119(57.2)	1.37(0.81, 2.32)	1.32(0.55, 3.17)	0.536

Secondary(9-12)	66(52.4)	60(47.6)	2.01(1.14, 3.56)	1.01(0.35, 2.96)	0.98
College & Above	48(56.5)	37(43.5)	2.37(1.27, 4.43)	1.21(0.33, 4.46)	0.779
Frequency of ANC visits					
Two times	107(43.0)	142(57.0)	1	1	
Three times	102(50.0)	102(50.0)	1.33(0.92, 1.93)	1.55(0.75, 3.22)	0.237
≥ Four times	25(43.1)	33(56.9)	1.01(0.57, 1.79)	0.46(0.15, 1.41)	0.174
Gestational age at first ANC					
First trimester	21(55.3)	17(44.7)	1	1	
Second trimester	208(45.0)	254(55.0)	0.66(0.34, 1.29)	0.84(0.29, 2.42)	0.74
Third trimester	5(45.5)	6(54.5)	0.67(0.18, 2.59)	0.72(0.09, 5.88)	0.757
Knowledge on anemia					
Not satisfactory	30(12.7)	206(87.3)	1	1	
Satisfactory	204(74.2)	71(25.8)	19.73(12.35, 31.53)	**8.22(4.23, 15.98)**	**.001****
Knowledge on IFA					
Not satisfactory	52(22.7)	177(77.3)	1	1	
Satisfactory	182(64.5)	100(35.5)	6.195(4.18,9.19)	**2.79(1.42, 5.51)**	**.003****
Duration of IFA taken					
One month	81(39.7)	123(60.3)	1	1	
Two months	92(44.9)	113(55.1)	1.24(0.84, 1.83)	1.16(0.55, 2.44)	0.69
Three months	41(58.6)	29(41.4)	2.15(1.24,3.73)	1.45(0.49, 4.29)	0.504
>3 months	16(61.5)	10(38.5)	2.430(1.05,5.62)	0.75(0.16, 3.47)	0.717
Others	4(66.7)	2(33.3)	3.04(0.54, 16.97)	3.73(0.41, 34.02)	0.244
Ever experienced a side effect					
Yes	30(12.4)	211(87.6)	0.05(0.03, 0.07)	**0.04(0.02, 0.07)**	**.001****
No	204(75.6)	66(24.4)	1	1	
Health education at the time of supplement					
Yes	185(60.1)	123(39.9)	4.73(3.19, 7.01)	**2.27(1.17, 4.40)**	**.015****
No	49(24.1)	154(75.9)	1	1	

Annex 2: Figures

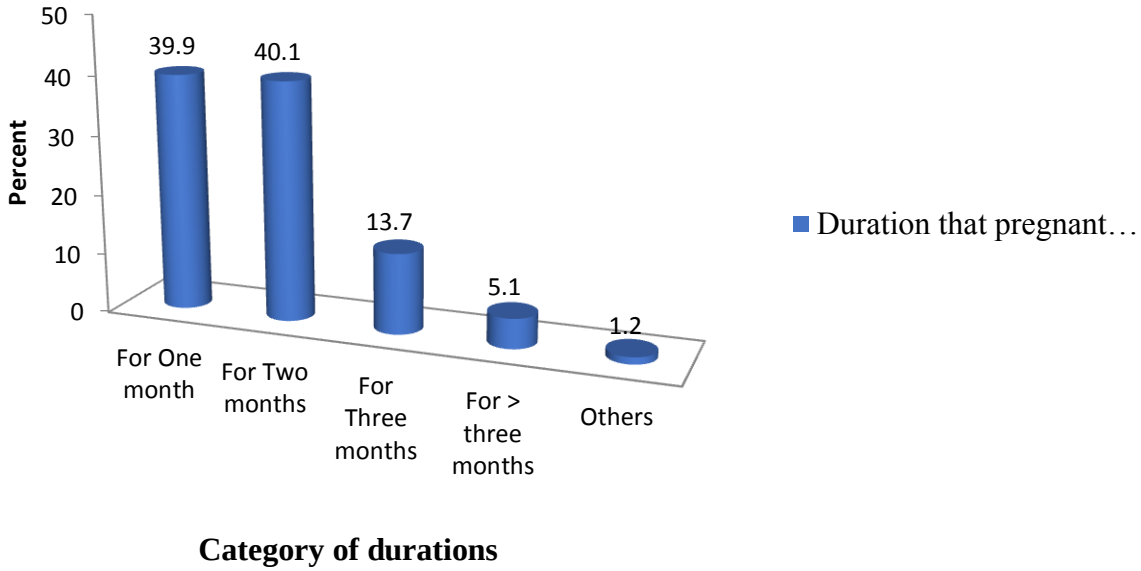

Figure 1: Duration that pregnant women had taken iron-folic acid supplement Ilu Aba Bor zone, South West Ethiopia 2021.

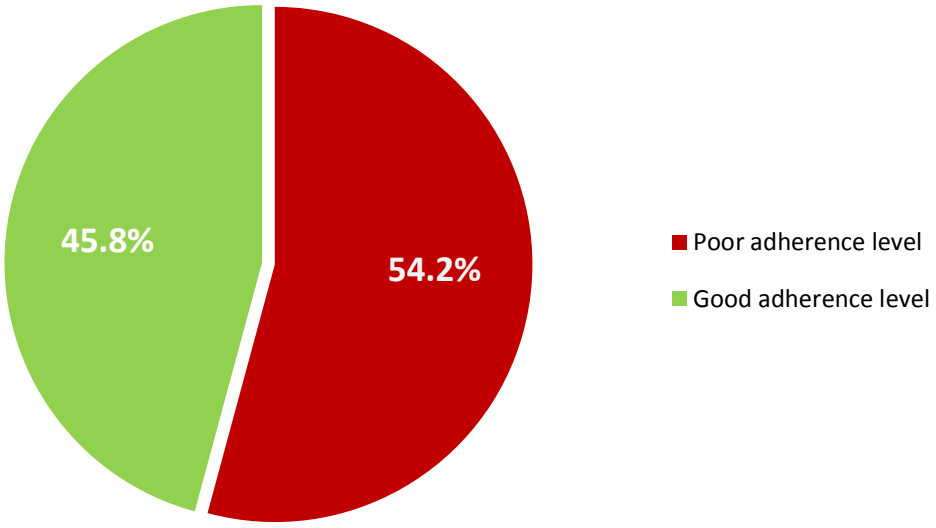

Figure 2: Self-reported adherence level to iron-folic acid among pregnant women attending ANC at public health facilities within Ilu Aba Bor zone, Ethiopia 2021.

Ethical Considerations

Ethical clearance and approval of the study were obtained from the Ethical Review Board of Metu University, Faculty of Public Health, and Medical science. All study participants were informed about the confidentiality of the information and that they have a full right to participate or decline from participating in the study. Oral consent was obtained from every study subject and written consent was obtained from parents or guardians, for those less than 18 years

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Authors' contribution
Tariku Nigussie: Conceptualization; data curation; formal analysis; investigation; methodology; software; writing-original draft. **Ebbisa Negara**: Formal analysis; methodology; software; supervision; validation; writing-review & editing.

Competing interest
The authors declare that they have no conflict of interests

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