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Predictors of compliance with iron and folic acid supplementation during pregnancy among mothers with infants aged 0-11 months in Elgeyo Marakwet County, Kenya

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Abstract
Background: Iron deficiency anaemia remains one of the most common nutritional disorders among pregnant women worldwide. In Kenya, anaemia during pregnancy continues to pose a significant public health challenge despite the routine provision of iron and folic acid supplementation (IFAS) through antenatal care (ANC) services. However, compliance with IFAS remains low, particularly in the Rift Valley region.
Objective: This study aimed to determine the predictors of IFAS compliance during pregnancy among mothers with infants aged 0-11months old attending Maternal and Child Healthcare (MCH) services at Kamwosor Sub-County hospital, Elgeyo Marakwet County.
Methods: A facility-based retrospective cross-sectional mixed-methods study was conducted among 127 randomly selected mothers. Quantitative data were collected using a researcher-administered electronic questionnaire, while qualitative data were obtained through Focus Group Discussions with mothers and Key Informant Interviews with health workers. Quantitative data were analyzed using descriptive statistics, bivariate analysis and multivariable logistic regression, while qualitative data were analyzed thematically.
Results: Overall, 33.3% of mothers were compliant with IFAS, defined as taking supplements for at least 90 days during the most recent pregnancy. The predictors of IFAS compliance included early ANC initiation during the first trimester (AOR = 2.576; 95% CI: 2.521–2.891; $p < 0.01$), attending more than four ANC visits (AOR = 1.911; 95% CI: 1.721–2.121; $p < 0.01$), receiving interpersonal counselling (AOR = 3.949; 95% CI: 3.871–4.124; $p < 0.01$), and having a positive attitude toward IFAS (AOR = 1.932; 95% CI: 1.904–2.311; $p < 0.01$). Frequent IFAS stock outs, reliance on herbal remedies, negative attitudes and beliefs and inadequate counselling were the major barriers to IFAS compliance.
Conclusion: Improving early ANC attendance, strengthening interpersonal counselling, ensuring consistent IFAS supply, and addressing harmful cultural beliefs may enhance IFAS compliance.

Keywords: Compliance, Elgeyo Marakwet, IFAS, iron deficiency anaemia, Kenya, pregnant women, supplementation

Introduction

Iron deficiency anaemia is the most prevalent form of malnutrition in the world [1]. Globally, 30.7% of women of reproductive age and 35.5% of pregnant women suffer from anaemia, respectively [2]. Iron and folic acid deficiency anaemia during pregnancy is a major public health concern, particularly in low- and middle-income countries, with higher prevalence reported across Africa (43.0%) and South Eastern Asia (42.1%). According to WHO (2025), over 60% of the world's anaemia cases amongst women of reproductive age are jointly found in African and South-East Asian regions [2]. In 2021, 36% of pregnant women in Sub-Saharan Africa were reported to have anaemia [3].

Given the high burden of anaemia during pregnancy, IDA significantly increases the risk of obstetric complications, perinatal death, low birth weight, stillbirths, and miscarriage. Moreover, it is associated with impaired mental and motor development of foetus [2]. Iron and Folic Acid Supplementation (IFAS) during pregnancy, as recommended by WHO, prevents maternal anaemia and associated negative outcomes [4]. Evidence suggests that combined IFAS has better therapeutic outcomes and fewer side effects, particularly nausea, compared with single iron or folic acid tablets or syrup [4]. In addition, preconception folic acid consumption lowers the risk of foetal neural tube abnormalities [3, 6]. Consequently, iron and folic acid supplementation for pregnant women is recognized as a high-impact nutrition intervention (HINI).

In Kenya, 48% of women in the reproductive age (WRA) suffer from iron deficiency anaemia (IDA) [6]. IFAS is routinely provided through Focused Antenatal Care (FANC) in accordance with the Kenya Ministry of Health guidelines, which are based on WHO recommendations [5, 7]. However, compliance with the WHO-recommended minimum of 90 days of IFAS during pregnancy remains low. Nationally, only 8% of pregnant women achieve this level of compliance, compared with just 4.3% in the Rift Valley region, where the present study was conducted. IFAS adherence also varies across regions in Kenya, with inconsistent and inconclusive findings to inform evidence-based interventions and policy guidelines.

Despite the routine provision of IFAS through antenatal care services, non-compliance remains a major challenge, and evidence on the determinants of compliance among pregnant women in Elgeyo Marakwet County remains limited [8]. Therefore, there is a need to better understand the factors influencing compliance with IFAS in this setting. It is against this background that the present study investigated the individual- and health system-related predictors of compliance with IFAS among pregnant women in Elgeyo Marakwet County.

Materials and Methods

Study Design and Study area

A health facility-based retrospective cross-sectional analytical study employing a mixed-methods approach was conducted at Kamwosor Level 4 Hospital in Elgeyo Marakwet County between August and September 2024[6]. The study included 127 randomly selected mothers of reproductive age with infants aged 0–11 months. Mothers with infants in this age group were selected to minimize recall bias and facilitate comparison with similar IFAS studies [9]. Eligible mothers who consented to participate were interviewed face-to-face in a private room within the health facility. Qualitative data were collected through key informant interviews (KIIs) with an ANC nurse, nutritionist, clinician, and pharmacist, as well as two focus group discussions (FGDs) involving mothers with infants aged 0–11 months who had not participated in the quantitative interviews.

The sample size of 127 mothers was calculated using Fischer *et al*. (1999) formula:

where:

Z: (1.96 for 95% confidence)

p: estimated prevalence

***q*:** 1 − p

e: 0.05

A prevalence (P) of 8%, based on the 2015 Kenya Demographic and Health Survey, was used to determine the sample size. After substitution into the sample size formula, a minimum sample of 113 mothers was obtained. This was increased by 12% to account for potential non-response, resulting in a final sample size of 127 mothers. Kamwosor Level 4 Hospital was purposively selected because it is the largest sub-county hospital in the area and serves approximately 250 mothers seeking maternal and child health services each month. For the quantitative component, 127 mothers were randomly selected. For the qualitative component, healthcare providers directly involved in antenatal care (ANC) services were purposively selected for the key informant interviews (KIIs), while a total of 20 mothers with children aged 0–11 months who had not participated in the face-to-face interviews were purposively selected to participate in two focus group discussions (FGDs).

The inclusion criteria comprised mothers and healthcare providers who voluntarily agreed to participate and provided written informed consent. Mothers who met the eligibility criteria but were critically ill or had documented mental illnesses in their medical records were excluded from the study.

Data Collection

Quantitative Data

A content-validated, semi-structured, researcher-administered electronic questionnaire was used to collect quantitative data. Mothers were interviewed face-to-face in a private room adjacent to the maternal and child health (MCH) clinic to ensure privacy. Mothers who had delivered at the facility and had not yet been discharged were interviewed at their bedside in the maternity ward during periods of low clinical activity to maintain confidentiality and enable them to express themselves freely. Data were collected electronically, allowing real-time capture and built-in validation checks that improved data quality and enhanced completeness.

The questionnaire was divided into six sections: maternal demographic and socio- economic characteristics, Antenatal Care attendance, IFAS consumption, maternal knowledge and attitude regarding IFAS, individual-related factors and health facility related factors of IFAS compliance. To minimize recall bias, participants were shown an actual IFAS tablet during the interview to aid recall of supplementation practices. In addition, the study included only mothers with children aged 0–11 months to reduce the recall period and improve the accuracy of the information provided.

Qualitative Data Collection

Qualitative data were collected using a semi-structured Key Informant Interview (KII) guide administered by the principal researcher. Purposively selected health professionals directly involved in antenatal care services, including an ANC nurse, a nutritionist, a pharmacist, and a clinician, participated in the KIIs which were conducted at the health facility. Two FGDs with mothers of children 0-11 months old were conducted during the last two days of the study after quantitative data collection at the health facility. The discussions explored maternal perceptions, attitudes, beliefs and practices regarding iron and folic acid supplementation. Participants who had previously completed individual in-depth interviews were excluded from the Focus Group Discussions to preserve the independence of data sources, minimize response contamination and overrepresentation. This approach enhanced the credibility of the findings by ensuring that discussions reflected spontaneous exchanges among participants with independent perspectives [9, 10].

Data Analysis

Variables

IFAS Compliance: This was the main dependent variable. IFAS compliance was defined as taking iron and folic acid supplements for at least 90 days during the most recent pregnancy. The 90-day threshold was based on the WHO 2018 operational guidelines [11] and the Kenya Ministry of Health Guidelines [5].

Maternal knowledge regarding IFAS: Knowledge was assessed using 10 questions covering the colour, dosage, benefits, and consequences of inadequate IFAS intake for both the mother and the unborn baby. Each correct response was awarded a score of 1, while an incorrect or "not aware" response was awarded a score of 0. An overall knowledge score was computed for each participant by summing the correct responses.

Maternal attitude towards IFAS: Attitudes were assessed using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Individual attitude scores were summed and converted into percentages. Respondents who agreed with positive statements and disagreed with negative statements were classified as having a positive attitude toward IFAS. Those who neither agreed nor disagreed with both positive and negative statements were classified as having a neutral attitude toward IFAS.

Quantitative Data Analysis

Quantitative data were processed and analysed using Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics were used to summarize maternal demographic and socioeconomic characteristics, antenatal care attendance, IFAS compliance, maternal knowledge and attitudes regarding IFAS, and health facility related factors. The association between individual and health facility related factors and IFAS compliance was assessed using the Chi square test, Fisher's exact test, and the Mann Whitney U test, with statistical significance set at $\alpha = 0.05$. Predictors of IFAS compliance were identified using multivariable logistic regression. Due to multicollinearity, maternal education level and spouse's education level were excluded from the final model. Four variables remained significant independent predictors of IFAS compliance.

Qualitative Data Analysis

Qualitative data from the key informant interviews and focus group discussions were transcribed verbatim and imported into N*VIVO* 12 software (QSR International, Australia) for deductive thematic coding and interpretation. Thematic analysis was used to identify recurring themes across the KIIs and FGDs. The qualitative findings were subsequently triangulated with the quantitative results.

Ethical Considerations

The study received ethical approval from a nationally recognized ethics review committee (Approval No. PKU/2898/I12021) and a research permit from the relevant national authority (PUB/CC/24/2 VOL.III/218). Written informed consent was obtained from each participant before enrolment into the study.

Results

Demographic and Socio-economic characteristics of mothers with children 0-11 months old

The median age of the mothers was 25 years (IQR = 8), while the median age of their children was 4 months (IQR = 7). Nearly two thirds (64.7%) of the mothers had two or fewer children. Secondary education was the highest level of education attained by most mothers (40.2%) and their spouses (36.0%). Additionally, most households belonged to the lower wealth quintiles (Table 1).

Table 1: The Demographic and socio-economic Characteristics of the respondents

Variables	n	%	M	IQR
Median Maternal Age (N = 127)			25	8
Median Age of the children (months)			4	7
Median Parity (N = 127)			2	2
<= 2 children	82	64.6		
3-5 children	40	31.5		
More than 6 children	5	3.9		
Mothers' education level (N = 127)				
Primary	34	26.8		
Secondary	51	40.2		
College	27	21.3		
University	11	8.7		
Other/ None	4	3.2		
Spouse’s education level (N = 87)				
Primary	16	18.4		
Secondary	31	35.6		
College	28	32.2		
University	8	9.2		
Other/ None	4	4.6		
Mothers' occupation (N = 127)				
Informal employment	59	46.5		
Unemployed/ Student	42	33.1		
Self-employment	14	11		
Formal employment	12	9.4		
Spouses’ occupation (N = 87)				
Informal employment	53	60.9		
Formal employment	20	23		
Self-employment	14	16.1		
Main source of family income (N = 127)				
Informal sector employment	85	66.9		
Formal employment	19	15		
Self-employment	19	15		
Unemployed/Student	4	3.1		
Wealth Index Category (N = 127)				
Highest quintile	10	8.0		
Fourth quintile	32	23.5		
Second quintile	66	51.7		
Lowest quintile (poorest)	19	14.9		

Utilization of Antenatal care Clinics

Nearly all mothers attended antenatal care (ANC) during the pregnancy of the index child. However, initiation of ANC was generally delayed, with mothers attending their first visit at a median gestational age of five months (IQR = 2) (Table 2). Only 12% initiated ANC during the first trimester as recommended by WHO guidelines [12]. The main reasons reported for delayed ANC initiation were perceived lack of need for early attendance, lack of awareness of pregnancy, and competing time demands (Figure 1).

Table 2: Maternal individual related factors to IFA supplementation

Variables	Category	n	%	M	IQR
ANC attendance (N = 127)	Yes	124	97.6		
	No	3	2.4		
Median gestation age of 1st ANC (N = 124) Timing of first ANC visit during gestation (N = 124)	<= 12 weeks	15	11.8	5	2
	> 12 weeks	109	85.8		
Median Total Number of ANC (N = 124)				4	2
	< 4 visits	43	34.7		
	> 4 visits	81	65.3		
Type of supplement received (N = 118)	IFAS	117	99.2		
	Iron Syrup	1	0.8		
Acquisition of IFAS tablets (N=117)	Free	110	94		
	purchased	7	6		
Place of receipt for IFAS (N = 117)	Public facility	110	94		
	Private facility	6			

IFAS compliance (N = 117)						
IFAS intake >= 90 tablets in pregnancy	Compliant Non-compliant	39 78	33.3 66.7			
Reminded to take IFAS tablets (N = 111)	Yes	13	11.7			
	No	98	88.3			
Who reminded respondent to take IFAS	Spouse	6	46.1			
	Health worker	5	38.5			
Received advice from health care provider on utilization (N=127)	Yes	108	85			
	No	19	15			
Received counselling from health						
provider/CHP to overcome the side effects (N=127)	Yes	89	70.1			
	No	38	29.9			
Received messages on side effect management (N = 89)	After meals	47	52.8			
	At bedtime	35	39.3			
	Full stomach	34	38.2			
	With meals	16	18			
	Don't know	2	2.2			

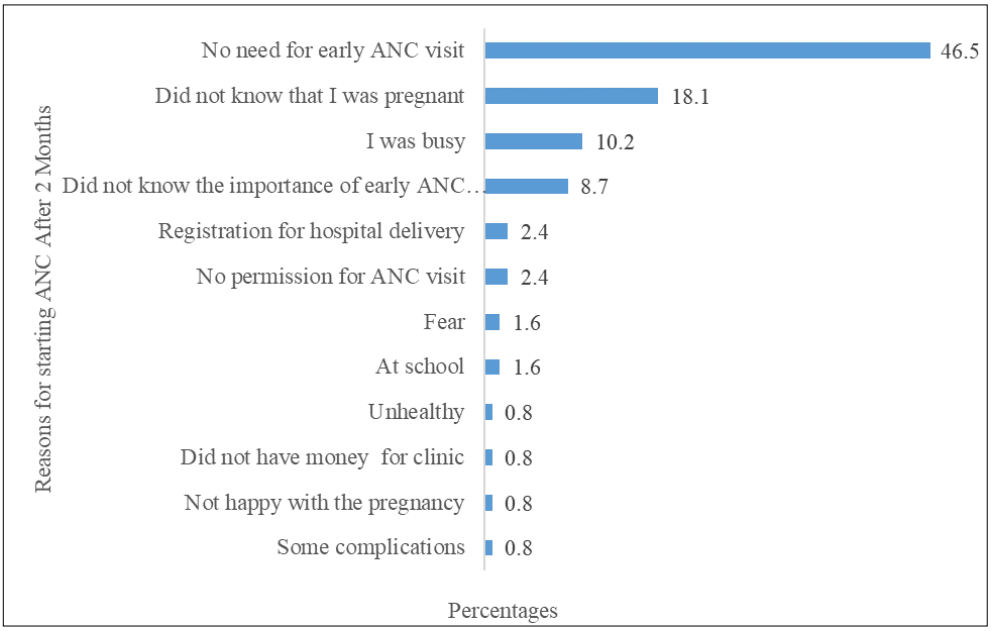

Fig 1: Reasons for late ANC attendance among respondents

The qualitative findings further provided insights into the reasons underlying delayed initiation of antenatal care (ANC) attendance. Participants attributed late ANC initiation to factors such as failure to recognize early pregnancy and the perceived lack of need to attend ANC before delivery. One participant explained:

"I only went to the clinic at the 9th month so as to register for the ANC booklet in order to deliver at the hospital…without it no one will attend to you" (FGD participant Kamwosor, 2024) [6].

Another participant reported:

"I usually go to clinic after 5 months for all my children because I don't realize that I am pregnant early" (FGD participant Kamwosor, 2024).

However, some mothers reported initiating ANC soon after confirming pregnancy, highlighting the influence of pregnancy awareness and social support. For example, one participant remarked:

"I went to the clinic within the first month when I noticed that I was already pregnant" (FGD participant Kamwosor, 2024).

Counselling from health care providers on IFAS

Counselling by healthcare providers emerged as an important factor influencing IFAS utilization. Majority (85%) of respondents received advice on IFAS use either during ANC visits or through home visits conducted by community health promoters. In addition, 70% of participants reported receiving counselling on strategies to overcome barriers to IFAS utilization. Common recommendations included taking IFAS after meals or before bedtime to minimize side effects (Table 2).

The qualitative findings further demonstrated that healthcare providers played a key role in guiding mothers on appropriate IFAS use and managing side effects. Mothers reported receiving instructions during ANC visits on adjusting the timing of IFAS intake and adopting strategies to improve tolerance. One participant explained

"I took IFAS during the day and I felt so bad, the next month I came to clinic, I told the doctor and was told to change timing by taking at night after meals and it helped' (FGD participant Kamwosor, 2024).

Another participant stated

"I was told to take IFAS with milk or porridge to reduce the side effects" **(**FGD participant Kamwosor, 2024).

IFAS receipt, and compliance during pregnancy

Although access to IFAS was high, compliance with the recommended duration of supplementation remained low. Nearly all mothers reported receiving combined IFAS tablets, mainly from public health facilities and free of charge. However, only one third complied with the recommended intake of at least 90 tablets during pregnancy (Table 2). Few mothers reported receiving reminders to take IFAS, with spouses and healthcare providers being the main sources of reminders.

Similarly, 70% of mothers reported receiving IFAS throughout their routine ANC visits (Table 3). Qualitative findings suggested that changes in IFAS packaging and increased awareness of the benefits of supplementation contributed to improved acceptance and consumption among mothers. A healthcare provider explained:

"Mothers currently accept and consume the tablets issued to them since the packaging changed from counted ones in tins to blister packs to minimize exposure to air which affects taste" (KII with a health worker in Kamwosor, 2024).

Another healthcare provider highlighted the perceived benefits of IFAS as a motivation for adherence:

"Mothers are concerned about the well being of their foetus, thus consume fully the IFAS tablets given due to the outcome benefits unlike their compliance to drugs like antibiotics (KII with a health worker in Kamwosor, 2024).

Despite the high availability of IFAS, side effects remained a challenge. However, qualitative findings indicated that many mothers continued taking IFAS after receiving counselling on strategies to manage these effects. A healthcare provider noted:

"Nausea, vomiting and heartburn are common side effects of IFAS" (KII with a health worker, Kamwosor, 2024).

A mother further explained how counselling helped her manage side effects:

"I was told to take meals and rest for some time then swallow to prevent vomiting and it worked well for me" (FGD participant, Kamwosor, 2024).

Maternal knowledge and attitude on IFAS

Overall, maternal knowledge of IFAS was high. Most mothers correctly identified the recommended dosage, benefits and iron-folate rich foods. However, knowledge gaps were observed regarding the tablet colour, timing of initiation, and recommended frequency of intake (Table 3).

Regarding maternal attitude towards IFAS, mothers generally expressed positive attitudes. Most believed that IFAS prevents anaemia, supports fetal growth, and recommended its continued use throughout pregnancy. However, misconceptions remained regarding the adequacy of dietary iron alone and concerns that IFAS may contribute to excessive fetal growth (Table 3).

Table 3: Maternal knowledge and Attitude on the utilization of IFA Supplementation

Maternal Knowledge	**n**	**%**
Color of combined IFAS		
Red	53	45.3
Initiation of IFAS		
First Trimester (<=12 weeks)	74	63.2
Dosage of IFAS		
1 tablet daily	115	98.3
Timing of IFAS Consumption		
Bedtime	69	59
Frequency of IFAS intake		
Once daily during pregnancy	46	39.3
IFAS side effects management		
With meals/after meals	78	66.7
Benefits of IFAS in pregnancy		
Correct benefits	107	91.5
Dangers of not of taking IFAS during pregnancy		
Correct dangers	95	81.2
Common IFAS side effects		
Correct side effects mentioned	83	70.9
Blood-boosting foods		
Correct iron-folate rich foods	114	97.4

N=127

Maternal Attitude	**Agree**	**Neutral**	**Disagree**	
	n (%)	**n (%)**	**n (%)**	**Mean (SD)**
I believe IFAs can prevent anaemia in pregnancy	4 (4.1)	12 (9.5)	111 (87.4)	1.61 (0.79)
I think Early initiation of consumption IFAs is beneficial during pregnancy	0	9 (7.1%)	118 (92.9)	1.46 (0.63)
I think Iron- and folate-rich foods alone prevent fetal abnormalities.	53 (41.7)	20 (15.8)	54 (42.6)	2.9 (1.36)
I believe it is important to take IFAs daily throughout pregnancy	1 (0.8)	7 (5.5)	119 (93.7)	1.56 (0.64)
I think taking IFAs harms the foetus	112 (88.2)	8 (6.3)	7 (5.6)	3.96 (0.78)
I think IFAS helps in foetal growth in addition to a healthy diet	3 (2.4)	7 (5.5)	117 (92.1)	1.6 (0.704)
I believe IFAS consumption should continue despite experiencing some side effects	17 (13.4)	13 (10.2)	97 (76.4)	1.97 (1.02)
I think IFAs intake makes the foetus big	80 (63.0)	15 (11.8)	32 (25.2)	3.21 (1.22)
I believe Health workers provide adequate IFAS follow-up.	12 (9.5)	9 (7.1)	106 (83.5)	1.93 (0.88)
I believe the health provider addressed all my IFAS concerns.	7 (5.5)	11 (8.7)	109 (85.8)	1.77 (0.83)

The qualitative findings largely supported the quantitative results on maternal knowledge and attitudes towards IFAS. Mothers demonstrated awareness of the importance of IFAS during pregnancy, particularly its role in preventing anaemia. One participant explained:

"IFAS is the medicine for pregnant women that increases blood" (FGD participant, Kamwosor, 2024).

Another participant associated IFAS use with positive fetal outcomes:

"IFAS helped to grow my baby's spinal cord so when he was born, he did not have abnormalities" (FGD participant, Kamwosor, 2024).

However, some mothers reported relying on dietary sources of iron due to perceived affordability challenges associated with iron rich foods:

"We rely mostly on fruits and green leafy vegetables as sources of iron folate… we cannot afford expensive iron rich foods like liver" (FGD participant, Kamwosor, 2024).

Another participant alluded to the influence of generational beliefs:

"We are told by our elderly mothers that IFAS is not beneficial since during their time there were no such drugs and their babies were healthy" (FGD participant, Kamwosor, 2024).

Factors associated with IFAS compliance during pregnancy

At the bivariate level, several maternal socioeconomic, healthcare utilization and psychosocial factors were significantly associated with IFAS compliance (Table 4). The magnitude and direction of these associations were further examined using logistic regression analysis.

Table 4: Univariate analysis of factors associated with IFAS compliance

Variable	IFAS Compliance Status				Chi-Sq./ Fisher's' exact value	P-value
	Non-compliant		Compliant			
	n	%	n	%		
Parity Level						
<= 2 children	56	47.9	19	16.2		
3-5 children	28	23.9	10	8.5	0.203	0.993
6 plus children	3	2.7	1	0.9		
Mothers' education level						
Primary	24	20.5	5	4.3		
Secondary	41	35.0	6	5.1		
College	16	13.7	11	9.4	15.980	0.002*
University	4	3.4	7	6.0		
Other/ None	2	1.7	1	0.9		
Spouses' education level						
Primary	16	13.7	1	0.9		
Secondary	20	17.1	7	6.0		
College	17	14.5	11	9.4		
University	3	2.6	5	4.3		
Other/ None	3	2.6	0	0	11.030	0.017*
Mothers' occupation					16.289	0.001*
Formal employment	3	2.6	9	7.7		
Informal employment	41	35.0	13	11.1		
Self-employed	9	7.7	3	2.6		
Unemployed/Inactive	34	2.9	5	4.3		
Spouse occupation						
Formal employment	10	12.0	9	10.8		
Informal employment	42	50.6	10	12.0	6.470	0.042*
Self-employment	7	8.4	5	6.0		
Family main income source						
Formal employment	7	6.0	11	9.4		
Informal employment	66	56.4	14	12.0		
Self-employment	12	10.3	4	3.4	13.491	0.002*
Unemployed/Inactive	2	1.7	1	0.9		
Total ANC visits						
< 4 ANC visits	38	32.8	0			
>= 4 ANC visits	48	41.4	30	25.9	19.714	<0.01*
Gestation age of first ANC						
< 3 months	10	8.6	4	3.4		
>= 3 months	76	65.5	26	22.4	0.061	0.755
Maternal Attitude					7.421	0.015*
Positive attitude	62	53	28	23.9		
Neutral	25	21.4	2	1.7		
Experienced side effects						
Yes	49	41.9	17	14.5	0.001	0.974
No	38	32.5	13	11.1		
Received Counselling on overcoming IFAS side effects						
Yes	59	50.4	27	23.1	5.637	0.017*
No	28	23.9	3	2.6		

The predictors of IFAS compliance

A multivariable logistic regression analysis was conducted to examine the predictors of compliance with iron and folic acid supplementation (IFAS) during the most recent pregnancy among mothers with infants aged 0–11 months. The initial model included nine predictors that were found to be significantly associated with IFAS compliance at the bivariate level (Table 4). Maternal education level and spouse's education level were excluded from the final model due to the multicollinearity. The final model with seven predictors was statistically significant, χ^2 (29, N = 117) = 58.86, p = .01. After adjustment for potential confounders, four variables remained significant predictors of IFAS compliance. One interesting finding was that

receipt of interpersonal counselling on overcoming barriers to IFAS utilization was the strongest predictor. Counselled mothers had higher odds of compliance compared with those who did not receive counselling. Mothers who initiated ANC within the first three months of pregnancy had higher odds of complying with IFAS compared with those who initiated ANC after three months. Mothers who attend ANC four or more times were twice likely to comply with IFAS then those who attended fewer visits. Additionally, mothers with a positive attitude toward IFAS were more likely to comply with supplementation (Table 5).

Table 5: Multivariable logistic regression model on predictors of compliance to IFAS

Factors		95% CI for AOR	
	AOR	Lower	Upper
Mothers' occupation			
Formal employment	REF		
Informal employment	0.931	0.318	1.073
Self-employed	1.055	0.964	1.503
Unemployed/Inactive	1.16	0.071	1.39
Spouse occupation			
Formal employment	REF		
Information employment	0.099	0.006	1.614
Self-employment	0.098	0.005	2.017
Family main source of income			
Formal employment	2.131	0.524	2.215
Informal employment	1.291	0.169	1.561
Self-employment	0.995	0.572	1.73
Timing of first ANC visit during recent pregnancy			
<= 3 months	2.576*	2.521	2.891
More than 3 months	REF		
Number of ANC visits during recent pregnancy			
< 4 ANC visits	REF		
>= 4 ANC visits	1.911*	1.721	2.121
Received interpersonal counselling on overcoming barriers to IFAS utilization effects			
Yes	3.949*	3.871	4.124
No	REF		
Maternal Attitude towards IFAS			
Positive attitude	1.932*	1.904	2.311
Neutral	REF		

AOR = Adjusted Odds ratio; * Significant at 5% level; REF = Reference point

Discussion

This study examined the predictors of compliance with iron and folic acid supplementation (IFAS) among mothers with infants aged 0–11 months in Elgeyo Marakwet County. The findings demonstrated that IFAS compliance was low despite high maternal knowledge and generally positive attitudes toward IFAS. Four significant predictors of compliance were identified: early initiation of antenatal care (ANC), attendance at a higher number of ANC visits, receipt of interpersonal counselling on overcoming barriers to IFAS utilization, and a positive maternal attitude toward IFAS. These findings underscore the importance of strengthening ANC service delivery and behaviour change interventions to improve IFAS adherence.

In this study, mothers initiated their first ANC visit at a median gestational age of five months, with most beginning ANC after the first trimester. This accords with earlier observations in Kakamega County, Kenya, where most mothers also initiated ANC after the first trimester [13]. Although the WHO recommends a minimum of eight ANC contacts during pregnancy [11], most mothers in the present study attended four or fewer visits, consistent with findings from Uganda [14], North -Western Tanzania [15], and Ruiru, Kenya [16]. The main reasons for delayed ANC attendance included a perceived lack of benefit from early ANC, limited knowledge of the recommended timing of the first ANC visit, and cultural beliefs. These findings were corroborated by the qualitative data, where mothers reported delaying ANC because they considered registration for delivery to be the primary purpose of ANC attendance. Delayed ANC initiation may reflect limited awareness of the importance of early pregnancy care or prevailing cultural beliefs [6, 13, 16], suggesting that community norms continue to influence maternal health-seeking behaviour.

Moreover, early ANC initiation during the first trimester was associated with higher likelihood of IFAS compliance, in line with earlier studies in conducted in Kenya [16, 17], North-Western Tanzania [15], Tamil Nadu, India [18], and Bangladesh [19]. Early ANC initiation increases the duration over which pregnant women can receive IFAS, counselling and reinforcement of adherence messages [5, 13, 17, 20]. Early ANC initiation also provides more opportunities for healthcare providers to identify and address barriers to IFAS compliance outcomes [12]. These findings emphasize the importance of promoting early ANC attendance in line with WHO recommendations to maximize the benefits of routine IFAS services.

Contrary to expectations, the widespread availability of free IFAS tablets did not translate into improved compliance. Compliance remained low with only one-third of the mothers meeting the recommended intake of at least 90 tablets during pregnancy [5]. These results reflect compliance rates reported in Kiambu County, Kenya [8] and Uganda [15], whereas substantially higher rates were observed in Kenya - Kakamega County [5, 13], Nakuru North [21], India [19, 22], and Ethiopia [23]. These differences reflect variations in access to

ANC services and socioeconomic conditions. Differences in recall periods and the timing of ANC initiation may also contribute to the observed variation across studies. These findings suggest that improving IFAS compliance requires interventions that address behavioural factors rather than relying solely on routine supplement distribution.

Unlike the previous studies that reported lower levels of maternal knowledge [5, 8, 24] most mothers in the present study demonstrated good knowledge of IFAS. Most mothers also expressed positive attitudes toward the benefits of IFAS despite minor side effects. These findings are comparable to those reported in Ruiru, Kenya [16], Ethiopia [25, 26] and Pakistan [24]. Despite these encouraging findings, compliance remained low. This suggest that knowledge and favorable attitudes alone may not translate to adherence in the presence of structural and socio-cultural barriers [19, 27]. Thus, interventions focusing on improving maternal knowledge need should be complemented by community-based behavior change strategies.

Consistent with previous studies [5, 27, 29], positive attitude was associated with higher compliance with IFAS. Positive attitudes are likely to motivate mothers to initiate and continue supplementation due to perceived IFAS benefits. In contrast, negative beliefs regarding supplement safety may discourage adherence despite adequate knowledge [30]. Qualitative findings supported this interpretation; most mothers reported delayed ANC attendance and preference for traditional remedies based on advice from elderly women. These findings highlight the importance of community-based behaviour change interventions that engage families and influential community members in promoting positive perceptions of IFAS.

Receipt of interpersonal counselling was another strong predictor of compliance. Mothers who received such counselling were four times more likely to adhere to IFAS than those who did not. Interpersonal counselling has been shown to improve adherence by increasing knowledge, address concerns about side effects and promoting positive behaviour change [16, 17, 22, 27, 31–33]. Qualitative findings from the present study further revealed that heavy workloads and staff shortages limited the provision of comprehensive counselling during ANC visits. This suggests that strengthening the capacity of healthcare providers to deliver individualized counselling could substantially improve IFAS adherence.

Strengths of the Study

The key strengths of this study are its mixed-methods design, short recall period, use of a content-validated electronic questionnaire, and adherence to the WHO-recommended recall period for maternal nutrition survey.

Limitations of the Study

A number of caveats need to be noted regarding the present study. First, the cross-sectional design limits the ability to establish causal relationships between the identified predictors and IFAS compliance. Second, the study was conducted in a single health facility, which may limit the generalizability to other clinical settings. Another limitation is reliance on self-reported IFAS intake, which may have introduced recall bias. This was partly mitigated by showing participants actual IFAS tablets during the interviews to aid recall. Despite these limitations, the study provides valuable evidence to inform strategies for improving IFAS compliance in similar settings.

Conclusion and recommendations

This study found that compliance with iron and folic acid supplementation (IFAS) among pregnant women in Elgeyo Marakwet County was below the levels recommended by the World Health Organization (WHO) and the Kenya Ministry of Health. Despite generally high levels of knowledge and positive attitudes, compliance remained suboptimal, suggesting that knowledge alone is insufficient to promote sustained adherence. Key barriers included delayed ANC initiation, inadequate counselling, frequent IFAS stock-outs, and negative sociocultural beliefs. These findings underscore the need for integrated health system and community-based interventions to improve IFAS compliance during pregnancy. The study recommends strengthening of IFAS policy implementation through comprehensive nutrition education, interpersonal counselling and behaviour change communication to address misconceptions. Efforts should also promote early ANC initiation, increase completion of recommended ANC contacts, and expand community-based strategies to improve health-seeking behaviours. Future studies should evaluate the effectiveness of health system and community-based interventions using longitudinal designs and objective measures of compliance to generate stronger evidence for policy and practice.

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