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Acceptance of multiple micronutrient supplementations (MMS) and iron and folic acid supplement utilisation among pregnant and lactating women in the rural part of Ethiopia, 2022: a cross-sectional study

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ABSTRACT

Objective To assess the acceptance of multiple micronutrient supplements and current iron and folic acid supplement utilisation among pregnant and lactating women in rural Ethiopia.

Design Community-based cross-sectional study using a mixed method.

Setting This study was carried out in five regions (Oromia, Gambela, Sidama, SNNPR (Southern Nations, Nationalities and Peoples Region) and Somali) of Ethiopia, 2022. A multistage random sampling technique was employed. A structured questionnaire was used to collect data from 410 pregnant and lactating women. A purposive sampling technique was used to select participants for the five Focused Group Discussions and fifteen Key Informant Interviews. Both bivariable and multivariable logistic regression analysis was conducted with a p value<0.05, and a 95% CI was considered statistically significant. Qualitative data were coded and analysed thematically.

Participants A total of 410 pregnant and lactating women.

Results The overall level of iron-folic acid utilisation was 59.3%. The odds of using iron-folic acid among pregnant and lactating women in the Sidama region are significantly lower compared with Oromia (adjusted OR (AOR)=0.12, 95% CI: 0.04, 0.38). Lactating women have significantly lower odds of using iron-folic acid compared with pregnant women (AOR=0.09, 95% CI: 0.05, 0.17). Taking medication or supplements significantly increases the odds of iron-folic acid use (AOR=2.41, 95% CI: 1.16, 4.95). Recommending a new nutrition supplement significantly increases the odds of iron-folic acid use (AOR=2.38, 95% CI: 1.21, 4.68).

Conclusions The consumption of iron-folic acid supplements among pregnant and lactating women in Ethiopia is lower than in other studies. Factors associated with iron-folic acid utilisation include region, taking medication/supplements, recommending nutrition and being a lactating mother. To ensure accessibility, the product should be sold in all town shops, pharmacies and through home delivery. Additionally, a strategy should be developed to provide access to the product in each adjacent community centre. Awareness creation should be a priority for community members to avoid misconceptions about pregnancy-related supplements.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ A major aspect of the current study is the use of a mixed-methods approach, which makes the findings more robust by enabling a more nuanced understanding of maternal micronutrient deficits.
⇒ The current study, although useful in demonstrating an association between exposures and outcomes, has its capacity to demonstrate causation intrinsically limited due to the fact that both the exposures and outcomes were measured simultaneously.
⇒ Further, the participants' response to willingness to pay for future multiple micronutrient supplementations does not reflect actual behaviour and participants may provide responses they think are expected or socially acceptable.

INTRODUCTION

Adequate maternal micronutrient status is especially critical during pregnancy and lactation for the child's growth.[1–3] The prevalence of micronutrient deficiencies is highest in low- and middle-income countries (LMICs), primarily due to inadequate dietary intake and limited access to diverse foods.[4] Iron-deficiency anaemia is one of the most common nutritional disorders worldwide, affecting populations in both high-income countries and LMICs.[5] Iron

deficiency is the leading single nutrient deficiency in the world, affecting the lives of more than 2 billion people and accounting for over 30% of the world's population, particularly in developing countries.[6] According to the WHO report, 38.2% of global and 46.3% of pregnant women in the African region are affected by anaemia.[7] In Ethiopia, the prevalence of iron and folic acid (IFA) utilisation among pregnant women was 46.15%.[8] Different studies found that age, antenatal care (ANC) follow-up, educational level, wealth, knowledge, attitude and receiving health information related to supplementation were significantly associated with IFA utilisation.[5]

In 2015, the WHO and the Ethiopian Government recommended initiating daily IFA supplementation during pregnancy as early as possible, as a part of antenatal care programmes for positive pregnancy outcomes. In Ethiopia, different nutrition intervention activities have been implemented in the form of community-based nutrition to prevent the occurrence of iron–folate deficiencies during pregnancy by enhancing the nutritional status of women.[1] The Ethiopian Federal Ministry of Health in its ANC guideline recommended that all pregnant women should take 60 mg elemental iron (ferrous sulfate, ferrous fumarate, or ferrous gluconate) and 0.4 mg folic acid daily for 6 months (180 tablets).[9]

The introduction of multiple micronutrient supplementations (MMS) in 2020, as a part of maternal nutrition programming, is an opportunity to accelerate the progress toward several Global Nutrition Targets. MMS containing 15 vitamins and minerals in pregnancy leads to a number of positive effects in pregnancy, including a lowering of the prevalence of low birth weight babies, the number of babies born small for gestational age and the prevalence of preterm deliveries.[3 10]

WHO released recommendations for countries to consider the inclusion of the MMS as part of their ANC service package and scale up based on local research contexts. Recent global evidence has concluded that antenatal MMS is superior to IFA supplementation. With support from the Children Investment Fund Foundation (CIFF) UK, UNICEF is supporting the Ministry of Health (MoH) and the Regional Health Bureau to roll out MMS among pregnant women in 21 target woredas selected in five regions (Oromia, SNNP, Sidama, Somali and Gambella regions) of Ethiopia, aiming at generating optimal demand for MMS, improving the delivery of recommended maternal nutrition services through ANC, and strengthening systems as well as an enabling environment (supply chain, information, regulatory and local production). Since it requires formative research, this study aimed to assess the current status of IFA supplement utilisation and acceptance of MMS among pregnant and lactating women in rural parts of Ethiopia.

METHODS AND MATERIALS

Study design and setting

A community-based cross-sectional study was conducted in Ethiopia across five regions (Oromia, Gambela, Sidama, SNNPR (Southern Nations, Nationalities and Peoples Region) and Somali) during the months of XX–XX in 2022. The study employed a concurrent mixed approach that combined both qualitative and quantitative data.

Inclusion and exclusion criteria

All pregnant women and lactating mothers who resided for at least 6 months in the study area were included in the study. However, all pregnant women and lactating mothers who were seriously ill or who had been clinically diagnosed as mentally ill were excluded from this study.

Sample size calculation

As shown below, the sample size was determined by using the following formula:

$$S = \mathrm{DE}\left[\frac{NZ^2p(1-p)}{R\left[(N-1)e^2+Z^2p(1-p)\right]}\right]$$

where DE refers to the design effect (2)
Z refers to the value of the standard normal distribution for the 97.5th percentile (1.96)
p is the prevalence of IFA (0.5)
N is the number of households in the selected woredas
R is the non-response rate (10%) and
e is the degree of precision which is set to be 5%

With these assumptions, the final sample size was 410 households, which were proportionally distributed across the selected woreda in the regions (table 1).

Sampling procedure

A multistage cluster sampling was employed to select the study units from these areas. Initially, the decision to deliberately choose five specific regions as the target areas for the survey was made. The primary factor taken into consideration during the selection process was the notable concentration of rural areas within these regions. This deliberate choice was driven by the aim of obtaining a representative sample that accurately reflected the characteristics and perspectives of rural communities. In a follow-up, in these regions, randomly selected woredas were chosen using a simple random sampling technique from a list of woredas. Accordingly, a total of 10 woredas, 5 from Oromia, 1 from Gambela, 1 from Sidama, 2 from SNNPR and 1 from Somali were selected. Then, from each woreda, two kebeles and two enumeration areas (EAs) with homes of lactating and pregnant women were randomly chosen. Finally, a listing of households with expectant and nursing mothers was made with the help of the health extension worker of the chosen kebele. A sample of households was chosen from the list, yielding a sample of 410 pregnant and lactating mothers (mothers who were feeding breast milk to their infant/child during the data collection period)[11] for the quantitative study.

The Focus Group Discussion (FGD) and Key Informant Interview (KII) participants were selected through

Table 1 Socio-demographic characteristics of pregnant and lactating women in rural parts of Ethiopia, 2022 (n=410)

Variables	Category	Frequency	Percentage (%)
Age (years)			
	15–24	143	35.0
	25–34	218	53.0
	35–49	49	12.0
Number of children			
	1	115	28.0
	2–4	226	55.0
	≥5	69	17.0
Number of children less than 5 years			
	0	29	7.0
	1	239	58.0
	2	122	30.0
	3 and above	18	5.0
Pregnant or lactating women			
	Pregnant women	179	44.0
	Lactating women	227	55.0
	Both	4	1.0
Marital status			
	Married	405	98.8
	Other	5	1.2
Educational level			
	No education	109	27.0
	Read and write	14	3.0
	Grade 1–4	69	17.0
	Grade 5–8	137	33.0
	Grade 9–12	69	17.0
	Diploma or vocational school and above	12	3.0
Occupation			
	Housewife	332	81.0
	Small business	45	11.0
	Daily labourer	22	5.4
	Employed office work	8	2.0
	Other types	3	0.7
Access to television			
	Yes	67	16.3
	No	343	83.7
Access to radio			
	Yes	214	52.2
	No	196	47.8

Marital status: other included (divorced, widowed, separated).

a purposive sampling technique, which involves purposefully choosing individuals who possess specific knowledge or experience relevant to the research objectives. This approach ensures that the participants have insights and perspectives that are valuable for the study. Following the selection process, a total of 15 KIIs were conducted. Key informants are health professionals, health extension workers (HEWs) and administrators. These interviews provided in-depth information and allowed researchers to gather detailed insights from experts in the field. In addition to the KIIs, five focus group discussions were carried out. FGDs involved bringing together pregnant and lactating mothers and engaging them in a guided discussion regarding issues of IFA utilisation and acceptance of MMS. In each of the FGDs, X–Y participants were involved. The FGDs provided a broader range of viewpoints and allowed for the exploration of different ideas and perspectives.

Study variables

Dependent variables

IFA supplement utilisation refers to the use or consumption of IFA supplements. Pregnant women or lactating mothers were said to be using IFA supplements if they took above or equal to 60% of iron/folate tablet supplements until the last visit or up to the third trimester, but if it was less than 60% it was said to be non-user.[12]

MMS acceptance, on the other hand, refers to the willingness of mothers (pregnant and lactating) to pay for MMS.

Independent variables

Age of the women, status of the women (pregnant/lactating), educational level, region, number of children, monthly income, media exposure, employment status (employed/unemployed) and marital status were identified after reviewing relevant literature.[1 5 6 8 10 13–20]

Operational definitions

- IFA supplementation: Iron (30–60 mg) and folic acid (40 µg) supplement that is taken daily by pregnant adolescent and adolescent women throughout pregnancy to reduce the risk of low birth weight, maternal anaemia and ID.
- Multiple micronutrient: The daily nutritional supplement of 15 or more essential micronutrients for pregnant women to take throughout pregnancy to ensure that infants receive adequate levels of vitamins and minerals.
- MMS acceptance: Willingness of pregnant women to take the supplement.

Data collection and analysis

After a comprehensive review of the literature, a structured questionnaire was prepared for gathering quantitative data. To ensure the validity and reliability of the questionnaire, a pretest was conducted. The pretest involved administering the questionnaire to a small subset of participants, comprising 5% of the total sample

size. These participants were chosen from settings similar to the target population but located outside the districts that were eventually included in the final sample. The purpose of this pretest was to identify any potential issues or challenges with the questionnaire, such as ambiguities or difficulties in understanding the questions. Based on the results of the pretest, necessary amendments were made to the language and structure of the questionnaire. Of note, the tool was prepared in the English language, and the data collection was done using the Amharic version of the tool. To maintain the accuracy and consistency of the translation, a third person performed the back-translation of the tool to English.

Six nurses with diploma certificates were trained as data collectors, and two BSc degree holders were appointed as health officers to supervise for 2 days. They were equipped with the necessary skills to engage with the participants, answer any questions they might have and ensure that the data collection process proceeded smoothly. To maintain quality control, supervisors were assigned to oversee the data collection process. These supervisors played a vital role in checking and reviewing the completed questionnaires on a daily basis. Their primary objective was to ensure the consistency and completeness of the collected information. By carefully reviewing the questionnaires, they could identify any potential errors, inconsistencies or missing data. This close monitoring and supervision helped to maintain the integrity and reliability of the collected data.

Quantitative data were entered and analysed using SPSS V. 26. The results of the descriptive statistics were summarised by using the mean, SD, percentage, frequency tables and graphs. Both bivariate and multivariable logistic regression analyses were conducted. Those variables that had a p value of ≤0.25 in bivariate logistic regression analysis were taken as candidate variables for multivariable logistic regression analysis. Moreover, an adjusted OR (AOR) with a 95% CI was used to interpret the effects in using IFA. In multivariable logistic regression analysis variables having a p value with 95% CI were considered statistically significant. Qualitative data were coded, thematised and analysed by using OPEN CODE software V. 4.03. Thematic analysis was conducted to generate potential themes and categories. The finding was presented by citing quotations.

Patient and public involvement

None.

RESULTS

Socio-demographic characteristics of participants

A total of 410 participants were involved in the study, with a response rate of 100%. More than half of the participants, 53%, were in the age group between 25 and 34 years old; 55% were lactating women, and 55% of the participants had 2–4 children. Moreover, only 16% of participants have access to television in their homes (table 1).

Service utilisation during and after pregnancy

A total of 32.8% of women get antenatal and postnatal care services from all regions; of those, the majority (16.7%) of women were from the Oromia region, followed by SNNP (7.2%). Regarding IFA supplementation, 32.5% of women from all five regions get IFA (figure 1).

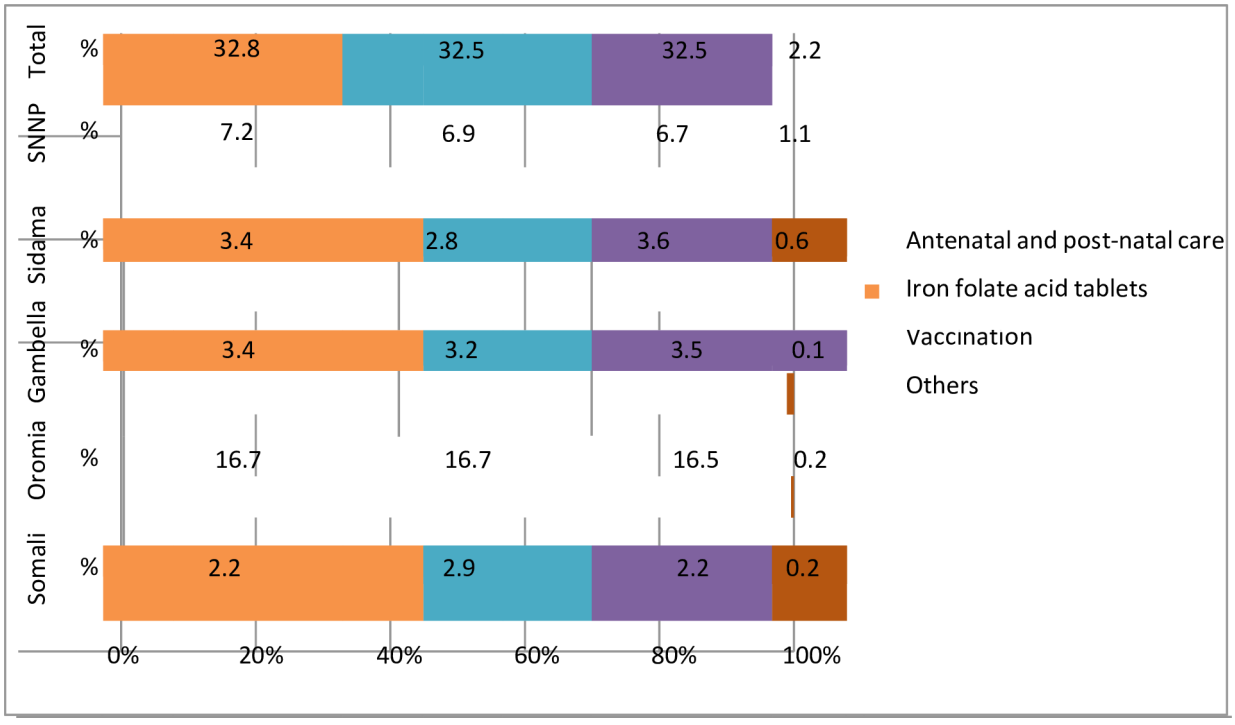

Figure 1 The type of services received by the women in the five regions. SNNP, Southern Nations, Nationalities and People.

Use of IFA and other supplements

The overall prevalence of IFA utilisation among rural women was 59.3%. Among the women who used IFA, 36.1% were pregnant women, 22.2% were lactating women. Regarding the regional IFA utilisation coverage, 29.8% of the rural women were residing in Oromia, followed by Somali (7.3%), SNNP (6.3%), Gambella (5.9%) and Sidama (2.4%).

It was found that despite knowing about the importance of IFA utilisation, most women believe it is only important during pregnancy. Due to this misconception, most lactating women avoided taking IFA during breastfeeding. One respondent from SNNP stated that 'I used IFA tablets when I was pregnant, but I stopped taking them after giving birth. I believe the tablet is taken only during pregnancy; it is not important after delivery. Everybody knows it as a pregnant women's tablet. Nobody told me to take it after delivery' (Participants from the SNNP region).

More than half (53.4%) of the participants stated that the benefits obtained from IFA utilisation were their most motivating factor to use IFA, and 24.6% of the women mentioned that they were motivated to use IFA to avoid risks for themselves and their children. Most (95.1%) of the women said HEWs convinced them to use IFA, while 5% said they were motivated by a friend or the mass media.

More than two-thirds of the participants (61.3%) used a special reminder to take the IFA, and 25.1% used counting the days on paper. This was supported by a qualitative finding: women used different reminders, like putting IFA in front of the bed and telling others to remind them (figure 2).

> ….I always put the IFA in front of my bed in order to easily remember the time to take the tablet. (In depth Interview (IDI), Oromia)

Another participant said,

> ….My husband, my children or relatives remind me to take the tablet while I forgot to take it. I rely on them to remember me the time to take the IFA…. (FGD, SNNP)

Barriers to the use of IFA and other supplements

The major barriers to using pregnancy-related supplements mentioned by respondents were fear of side effects (29.6%), bad taste (21%), difficulty of remembering to take supplements (14.9%), lack of support from family and being busy with other tasks. This was supported by qualitative findings obtained from FGD and KII participants, in which they stated that nausea, burning pain, discomfort and constipation were side effects of the IFA supplement. They also mentioned that the feeling

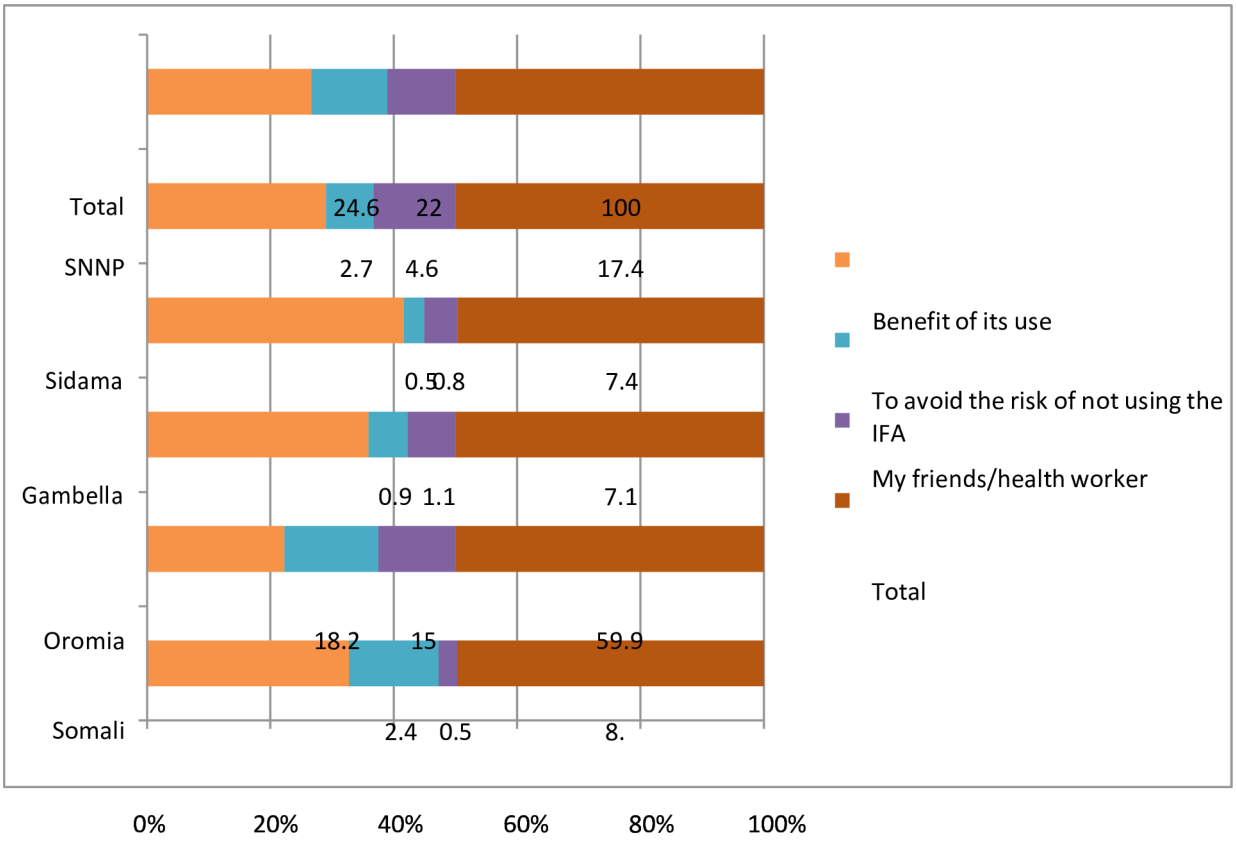

Figure 2 Reasons to use IFA among pregnant and lactating women. IFA, iron and folic acid; SNNP, Southern Nations, Nationalities and People.

of discomfort is exacerbated by taking the tablet before eating.

> Gastric pain is a common side effect among mothers. The gastric pain that results from the use of IFA is unavoidable. In such cases, they will be advised to take the capsules at night because taking it during sleep time may reduce pain. (KII from SNNP)

> "There is nothing that prevents me from taking it. However, I may skip taking it when I can't get food to eat. Because taking IFA with an empty stomach causes a burning feeling in my body. I will take it when I eat adequate food. (Respondent from Somali)

The FGD participants also reported difficulty remembering to take the IFA due to their workload and being busy.

> It is too difficult to remember since they will be busy with routine home activities along with caring for children. Some of them said, "sometimes when we go to other places, we do not carry it and forget it. (Participants from Somali)

Cultural norms related to IFA utilisation

As shown in online supplemental figure 3, about 9.3% of participants reported that cultural norms discourage the use of IFA supplements during pregnancy. Regarding regional variation, in Somali and Oromia, infertility is the major cultural norm that discourages them from using IFA supplements during pregnancy (60% and 66%, respectively), while in Gambella, social beliefs and fear of side effects (health risks) which discourage the use of IFA supplements during pregnancy. As a result of a qualitative finding, the community wrongly perceives the product to cause infertility, increases the fetus' weight and complicates the delivery, so they prefer not to use it. This perception is so strong in the remote rural subkebeles of the Somali region where HEWs do not have access.

> there is a long standing believe that any health products given to women alone is seen with suspicion and wrongly lead the community to conclude that it will have health side effects and to the extent of causing infertility. (KII respondent from Somali region)

Predictors of IFA use among pregnant and lactating women

A bivariable logistic regression analysis was conducted. Hence, variables with a p value of ≤0.25 in bivariable logistic regressions were entered into multivariable logistic regression for further statistical testing. Thus, age, region, number of children, status of women (pregnant/lactating), educational level, employment status (employed/unemployed), media exposure, taking medication/supplements, recommending a new nutrition supplement, monthly income and being sick during pregnancy were candidates for multivariable logistic regression. In multivariable logistic regression, region, taking medication or supplements, lactating women and recommending a new nutrition supplement were significantly associated with IFA utilisation.

The odds of using IFA among pregnant and lactating women in the Sidama region are significantly lower compared with Oromia (AOR=0.12, 95% CI: 0.04, 0.38). Lactating women have significantly lower odds of using IFA compared with pregnant women (AOR=0.09, 95% CI: 0.05, 0.17). Taking medication or supplements significantly increases the odds of IFA use (AOR=2.41, 95% CI: 1.16, 4.95). Recommending a new nutrition supplement significantly increases the odds of IFA use (AOR=2.38, 95% CI: 1.21, 4.68) (table 2).

Acceptance of MMS among pregnant and lactating women

More than half (54.8%) of the participants believed that a lack of awareness might make it difficult for women not to use the product. One-fourth of them said that its cost might be a challenge. This was supported by the qualitative finding that reported lack of awareness might make it difficult for women to use the new multi-micronutrient supplement. On the other hand, 49.5% of women believe that its health benefits can make it easier for women to use the product, while 21% believe that availability can contribute more. More than half of the participants (56.6%) said it was essential to take the supplement. Most women (87%) are open to receiving MMS instead of IFA (table 3).

MMS promotion

More than half of the participants (58%) suggested that pictures and written summaries in local languages should be included in the package of the MMS product. Similarly, most FGD participants suggested that it is good to have a picture of pregnant and lactating mothers on the product. Everyone will identify it easily, consider it an essential product for mothers, and take it confidently. After all, 67.3% of the participants have chosen 'healthy pill for mothers and children' and 'additional food for pregnant mothers' as the best names for MMS.

> The tablet can be named "Iron" because most mothers are familiar with this name. They all call the IFA shortly 'iron tablet' [iron kinin]. Similarly, posting posters with photos of babies and pregnant and lactating women also help women to give attention by looking at pictures. (KII, respondent from Oromia)

> It's good if there is a picture of pregnant and lactating mothers on the product. Because everyone identifies it easily, consider it as an essential product for mothers and take it with confidence. (FGD respondent from Oromia)

On the other hand, most of the participants in Oromia agreed that the name of the product should be translated into local languages so that most women can understand and remember it easily.

> Most of us don't remember the name, even to buy from pharmacies and to tell its benefits to our colleague and others. (FGD respondents from Oromia)

Table 2 Predictors of IFA use among pregnant and lactating women in selected regions of Ethiopia, 2022 (n=410)

Variable	Category	IFA utilisation		COR	P value	AOR (95% CI)
		No	Yes			
Region						
	Oromia	65	140	1		1
	Somali	24	16	0.31	0.054	0.39 (0.15, 1.02)
	Gambela	17	23	0.63	0.616	1.24 (0.54, 2.83)
	Sidama	29	14	0.22	<0.001	0.12 (0.04, 0.38)*
	SNNP	32	50	0.73	0.054	0.38 (0.14, 1.02)
Age (years)						
	≤25	51	92	1		1
	25–29	57	79	0.77	0.518	0.82 (0.44, 1.51)
	≥30	59	72	0.68	0.077	0.56 (0.30, 1.06)
Number of under-five children						
	No	4	25	1		1
	1	101	138	4.57	0.713	1.27 (0.36, 4.51)
	≥2	62	80	0.94	0.164	1.49 (0.85, 2.62)
Current status of the women						
	Pregnant	31	152	1		1
	Lactating	136	91	0.14	<0.001	0.09 (0.05, 0.17)*
Educational level						
	No formal education	59	64	1		1
	Primary	78	128	1.513	0.175	1.59 (0.81, 3.12)
	Secondary above	30	51	1.567	0.071	2.19 (0.94, 5.09)
Employment status						
	Unemployed	132	200	1		1
	Employed	35	43	0.81	0.230	0.71 (0.37, 1.35)
Monthly income (ETB)						
	<2200	65	75	1		1
	2200–5400	78	117	1.30	0.415	0.70 (0.29, 1.66)
	>5400	24	51	1.84	0.214	1.31 (0.47, 3.59)
Access to media						
	No	76	103	1		1
	Some	82	131	1.18	0.593	0.86 (0.50, 1.48)
	Better	9	9	0.74	0.110	0.33 (0.08, 1.29)
Sick during pregnancy						
	No	93	105	1		1
	Yes	74	138	1.65	0.196	1.41 (0.84, 2.38)
Takes medication or supplement						
	No	36	25	1	1	1
	Yes	131	218	2.39	0.018	2.41 (1.16, 4.95)*
Recommends a new nutrition supplement						
	No	42	30	1		1
	Yes	125	213	2.39	0.012	2.38 (1.21, 4.68)*

*statistically significant at $p<0.05$.
AOR, adjusted OR; COR, crude OR; ETB, Ethiopian birr; IFA, iron and folic acid; SNNP, Southern Nations, Nationalities and People.

Table 3 Acceptance of MMS among pregnant and lactating women in rural regions of Ethiopia, 2022 (n=410)

Questions	Options	Frequency	Percentage (%)
Anticipated challenges for using MMS			
	Its cost	128	24.3
	Lack of awareness	288	54.8
What could make it easier to take MMS			
	Its health benefits	362	49.4
	Ease of availability	158	21.6
	Its safety	115	15.7
	Its cost	97	13.2
How essential do you think supplementation is for the newly coming MMS?			
	Very essential	232	56.6
	Good	162	39.5
	Neutral	16	3.9
How easy or difficult do you think it is to access the newly coming MM?			
	Easy	353	86.1
	Difficult	24	5.9
Would you be open to receive MMS instead of IFA?			
	Yes	355	86.6
	No	25	6.1
	I do not know	30	7.3
How easy or difficult is it to remember to take the supplements every day?			
	Easy	372	90.7
	Difficult	38	9.3
Are there any cultural rules or taboos against using such supplements?			
	Yes	65	15.9
	No	317	77.3
	I do not know	28	6.8

IFA, iron and folic acid; MMS, multiple micronutrient supplement.

Respondents also suggested the MMS package be 38% red, 27% white and 15% green so as to make it attractive and used by women. Also in the qualitative findings, most of the FGD participants preferred the red colour on the pack of the MMS, and the KII also supports this suggestion.

> I prefer a red color because it is easy to differentiate from other drugs which cannot be taken during pregnancy, like Albendazole. So, mothers will not be confused about taking MMS with a red color. (FGD respondents from SNNP)

> Similar to the IFA, if the color is red, mothers may see it as a similar product and easily take the new product. But if it is changed, they may see it as a new product and hesitate to take it until they are sure of the benefit of the tablet. (KII respondents from SNNP)

However, two of the participants from the Oromia region said they prefer the product's colour to be green because they believe the colour green is connected with good faith and prosperity. Also, some others would like it if the product's colour was white to make it similar to other medicines. Regarding the effective channel of advertisement required to convince rural women to use MMS, advertising through HEWs, direct messaging and advertising through the health service providers are effective ways of advertising the MMS.

Moreover, qualitative findings indicate that HEWs, health professionals, older adults, social media and television are convenient and accessible channels for promoting and advertising the product. In addition, social networks like the Women Development Army (WDA) and the Pregnant Women Conference (PWC) were trusted communication channels for convincing people about MMS, and because many people participate in the meetings, health workers can deliver important information to the people gathered in the meetings.

Regarding the message that should be advertised, 51.7% of the participants claimed the message should contain 'Vitamins for pregnant mothers', and the remaining 48.3% preferred the message to contain 'pregnant mothers must eat vitamins every day'. Carrying out public campaigns and direct messaging through the local language and using posters written are also mentioned as the best ways to advertise the MMS. Besides, other participants recommended that an awareness creation programme be conducted at every gathering, including 'Idir, Ikub, Mahaber or others'.

Willingness to pay for future MMS

Nearly 17% of participants responded that they are willing to pay for future MMS supplements, while 83% said they prefer to get them for free. For future MMS packs, those willing to pay specified that they are willing to pay an average of 74 birrs for each pack. They are willing to pay a maximum of 400 birrs, but the minimum they are willing to pay is 10 birrs per pack for 30 tablets per month (online supplemental table 1).

More than half (61%) of them said it should be given free of charge to all pregnant and lactating women. While 31% said it should be free only for the poor, the rest said it should be free for low-income families and people with disabilities. The qualitative study also probed the FGD participants' intentions regarding future MMS products and whether they would like it if it were delivered to them at a cheap/fair price (online supplemental table 1). The majority of the participants agreed and loved to take it freely as usual, but some of the women FGD participants said:

> Frankly speaking, even though our society is poor, they have a habit of improperly using any product

given to them freely. Because of this, putting some value on the product will guarantee the proper use of the supplement. Therefore, it should be sold at a fair price. However, the product should be free for the poor and those who can't afford it. (FGD, SNNP)

All shops in the town (64.1%), pharmacies (62.2%) and community work home delivery (47.6%) are the three best outlets mentioned by participants to get MMS in their areas (online supplemental table 4).

DISCUSSION

This study is aimed to assess IFA utilisation and acceptance of MMS among pregnant and lactating women in rural parts of Ethiopia. The overall prevalence of IFA utilisation among pregnant and lactating women was 59.3% (54.4%, 63.9%). Among the women who used IFA, 36.1% were pregnant women, and 22.2% were lactating women. This finding is higher than the study findings reported in Aykel town, Northwest Ethiopia and Lay Armachiho Health Centers, Northwest Ethiopia.[18 19] The possible justification for the discrepancy might be due to differences in socio-cultural features, health-seeking behaviour, study population and contextual differences across different regions of the country. However, the current finding is lower than those of the studies done in Dire Dawa, Eastern Ethiopia, Dangila, Northern Ethiopia and Bangladesh.[20–22] This might be attributed to differences in time, study setting and target population. This study is primarily targeted at pregnant and lactating women, unlike the study done in Dire Dawa, which was conducted among pregnant women attending ANC.

The region was significantly associated with IFA utilisation. Those women who resided in Sidama were less likely to use IFA as compared with those residing in Oromia. This might be due to differences in maternal healthcare service utilisation, mainly ANC visits in the regions which are attributed to the inconsistency in the utilisation of IFA supplementation among women in those regions.[8] The other possible reason might be differences in the availability and accessibility of those supplements across different regions. Socio-cultural and economic factors may also contribute to this discrepancy. Policymakers should consider that regional variation while designing interventions on MMS utilisation.

Taking medication or supplements was significantly associated with IFA utilisation. Taking medication or supplements increases the likelihood of using IFA. This might be attributed to the adaptation of women to taking pills and developing a tolerance for the side effects of those pills, which enhance their utilisation as well as adherence to IFA utilisation. This is a novel finding that the current study adds to the existing scientific knowledge.

Being a lactating woman was significantly associated with IFA utilisation. Lactating women were less likely to use IFA compared with pregnant women. This was supported by the qualitative finding that women perceive IFA should be taken during pregnancy but not during lactation.

I used IFA tablets when I was pregnant, but I stopped taking them after giving birth. I believe the tablet is taken only during pregnancy; it is not important after delivery. Everybody knows it as a pregnant women's tablet. Nobody told me to take it after delivery. (Participants from the SNNP region)

Recommending a new nutrition supplement was significantly associated with IFA utilisation. It increases the odds of IFA utilisation. This might be due to a higher intention to accept new supplements, which may in turn increase their utilisation behaviour. The qualitative findings of this study claimed that nausea, burning pain, discomfort and constipation were side effects of the IFA supplement. Those side effects and forgetfulness were the major hindering factors for IFA adherence. This is supported by the study done in eight rural districts of Ethiopia and Eswatini.[14 23] Some FGD participants also mentioned cultural norms as a barrier to using IFA supplements. This is supported by the study done among seven countries in Africa and Asia.[15] More than half of the participants (56.6%) were willing to take MMS. Comparably, most women (87%) intended to receive an MMS instead of an IFA. More than half of the participants (58%) suggested that pictures and written summaries in local languages should be included in the package of the MMS product. Similarly, most FGD participants suggested that it is good to have a picture of pregnant and lactating mothers on the product. Everyone will identify it easily, consider it an essential product for mothers, and take it confidently. After all, 67.3% of the participants have chosen 'healthy pill for mothers and children' and 'additional food for pregnant mothers' as the best names for MMS. On the other hand, most of the participants in Oromia agreed that the name of the product should be translated into local languages so that most women can understand and remember it easily. This implies that availing MMS products in the local language and using appealing pictures have a paramount effect on the level of utilisation of MMS among pregnant and lactating women.

Respondents also suggested the MMS package be 38% red, 27% white and 15% green so as to make it attractive and used by women. Also in the qualitative findings, most of the FGD participants preferred the red colour on the pack of the MMS, and the KII also supports this suggestion. However, two of the participants from the Oromia region said they prefer the product's colour to be green because they believe the colour green is connected with good faith and prosperity. Also, some others would like it if the product's colour was white to make it similar to other medicines. Regarding the effective channel of advertisement required to convince rural women to use MMS, advertising through HEWs, direct messaging and advertising through health service providers are effective ways of advertising MMS. According to the qualitative data, most FGD participants mention that it is possible

and convenient to promote and advertise the product through HEWs, health professionals, older adults, social media and media like radio and television. Furthermore, social networks such as the WDA and the PWC were trusted communication channels for convincing women about MMS. The meetings are attended by many people, so health workers have the opportunity to provide important information to them. Regarding the message in the advertisement, 51.7% of the participants claimed the message should contain 'Vitamins for pregnant mothers,' and the remaining 48.3% preferred the message to contain 'pregnant mothers must eat vitamins every day'. Carrying out public campaigns and direct messaging through the local language and using posters written in the local language are also mentioned as the best ways to advertise the MMS. Besides, other participants recommended that an awareness creation programme be conducted at every gathering, including 'Idir, Ikub, Mahaber, or other community gatherings'. Programme implementers should create awareness through public gatherings in which a lot of women will be found in one place. Using such type of place is a cost-effective and efficient way of implementing various public health intervention programmes due to its typical feature of addressing a larger group of people at a time.

In contrast to 83% of participants who indicated they preferred to receive future MMS supplements for free, nearly 17% of participants said they would be ready to pay for them. Those willing to pay specified that the average amount of money they can pay for future MMS per pack is 74 birrs. They are willing to pay a maximum of 400 birrs, while the minimum they are willing to pay is 10 birrs per pack for a month, which is for 30 tablets. More than half (61%) of them said it should be given free of charge to all pregnant and lactating women. While 31% said it should be free only for the poor, the rest said it should be free for low-income families and disabled people. In the qualitative study, participants were also surveyed regarding their intentions about future MMS products and whether they were delivered at a fair or cheap price. As usual, the majority agreed and loved free MMS products. This implies that utilisation of MMS would be higher when the service is given for free. MMS products should be affordable, available and accessible for those pregnant and lactating mothers at no cost.

CONCLUSION

The level of IFA supplement usage among pregnant and lactating mothers in Ethiopia is low as compared with other study findings. The region, taking other medications, recommending nutrition and being lactating were factors associated with IFA utilisation among pregnant and lactating women. The qualitative findings reported that regarding brand name and logo options, it was recommended that the name be 'healthy pill for mothers and children', 'additional food for pregnant mothers' or just 'iron'. Regarding the logo options, having a picture of a 'pregnant woman and a mother taking care of their baby' can improve the perception of women towards the supplement. Most of the participants preferred the supplement colour to be red. Creating awareness should be strengthened for the community members to avoid misconceptions about pregnancy-related supplements and to improve the community members' awareness. Creating access and providing the product in each nearby community facility should be a strategy to make the product more accessible. Those findings recommended that programme designers, health practitioners and public health experts should consider those factors while designing MMS intervention programmes. MMS programmes should be context-specific by considering the local language and colour preference of the pregnant and lactating women in each region. MMS services should also be affordable or be available for free.

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Patient consent for publication Not applicable.

Ethics approval This study was approved by the Ethiopian Public Health Institute Ethical Review Board (Reference number: EPHI/613/306). A permission letter was obtained from the district health office and each woreda administrator after the purpose and objective of the study was informed, written informed consent was obtained from each study participant aged 18 and above. For participants under the age of 18, parental consent was obtained in addition to their permission. All participants were informed that participation was on a voluntary basis and that they could withdraw from the study at any time if they were not comfortable with the questionnaire. To maintain confidentiality, data were collected and analysed anonymously.

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