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Investigating Determinants Impacting the Uptake of Iron/Folic Acid Supplementation among Antenatal Attendees at Hoima Regional Referral Hospital: A Prospective Analysis

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ABSTRACT

This cross-sectional study aimed to identify and analyze the determinants affecting the utilization of Iron/Folic Acid Supplements (IFAS) among women attending antenatal care (ANC) at Hoima Regional Referral Hospital (HRRH) in Hoima City, Western Uganda. Conducted from February to March 2021, this regional hospital-based study employed convenience sampling to recruit 345 pregnant women receiving ANC services at HRRH. Questionnaire tools were utilized for data collection, ensuring accuracy and completeness. Data underwent coding and entry into Epi Info version 7, subsequently analyzed using SPSS version 22.0. Descriptive statistics summarized the variables, while frequencies and percentages were presented through figures and tables. Bivariate and multivariate logistic regression analyses were performed to ascertain factors associated with IFAS utilization. The Hosmer-Lemeshow test assessed the goodness-of-fit of the final logistic regression model. Findings revealed that 42.1% of pregnant women attending ANC at HRRH utilized IFAS. The majority (82.03%) attended less than four ANC visits, with 43.19% reporting anemia during their current pregnancy. Moreover, 84.93% resided more than 30 minutes away from the hospital. Significant determinants influencing IFAS utilization included knowledge about its benefits, history of abortion, awareness about anemia, receiving health education on IFAS during ANC visits, and encountering no problems at the health facility ($p < 0.05$). The study highlights a low level of IFAS utilization among ANC attendees at HRRH. Factors such as awareness of IFAS benefits, history of abortion, knowledge about anemia, receiving education during ANC visits, and encountering no facility-related issues significantly influenced the uptake. Efforts to enhance education and address logistical barriers could improve IFAS utilization among pregnant women attending ANC at HRRH.

Keywords: Iron, folic acid, anemia, Pregnant women, Antenatal care.

INTRODUCTION

Iron deficiency is the single most important nutrient deficiency that affects the lives, especially pregnant women and children [1, 2]. Globally, more than two billion people, accounting for over 30% of the global population are affected, the highest being in developing countries [3]. Although many developing countries including Uganda are now implementing iron/folic acid supplementation (IFAS) through antenatal care programs, only a few countries have reported significant improvement in IFAS adherence and factors that may influence its uptake [4]. Pregnant women have a high risk of iron and folic acid deficiency owing to the increased nutrient requirement during pregnancy [5-7]. According to the World Health Organization (WHO) and Uganda Clinical Guidelines (UCG), all pregnant women should receive and consume a standard dose of 200 mg iron and 400 μg folic acid once daily for 6 months starting from the first month of pregnancy or at the time of their first antenatal visit and three months of postnatal period to prevent iron and folate deficiency [8, 9]. Iron is a trace mineral that is important for fetal growth

and development. Iron is found in red blood cells to carry oxygen needed throughout the body. It is also essential for normal neuronal development [10-12]. Similarly, folic acid is another important micronutrient used in the synthesis of neurotransmitters particularly during early pregnancy. It has an essential role in synthesizing DNA during organogenesis and thus prevents neuro-tube defects [13, 14]. The latest Uganda Demographic Health Survey (UDHS) report shows that 31.8% of all women aged 15-49 years had some form of anemic [15]. Another Ugandan study to determine the prevalence of anemia and associated risk factors among pregnant women attending antenatal care in Gulu and Hoima Regional Hospitals reported anemia prevalence of 32.9% and 12.1% respectively. In both hospitals poor iron/folic acid intake was cited among the causes of the anemia in pregnancy [16]. Decreased utilization of folic acid among pregnant mothers may be due to poor access and lower level of antenatal care service utilization, inadequate IFAS supply, poor counseling, poor knowledge about anemia, and certain bad beliefs regarding IFAS [17-19].

Iron deficiency can lead to several adverse outcomes including low birthweight, preterm delivery, stillbirth, and maternal and neonatal mortality [20, 21]. Oral iron and folic acid supplementation is a feasible and cost-effective strategy in the prevention and control of iron and folic acid deficiency anemia during anemia [22]. Pregnant women are particularly at high risk of iron and folate deficiency due to increased nutrient requirements. Moreover, in developing countries infections such as HIV/AIDS and TB also lead to increased demand for micronutrients [23-25]. More so, malaria is a serious health risk for pregnant women. Malaria increases the risk of anemia in pregnant women [26-28]. According to the Demographic Health Survey of 2016, 31.8% of women of reproductive age were anemic. In addition, a previous study in Hoima Regional Referral Hospital (HRRH) noted that poor uptake of IFAS was responsible for 12.1% of anemia among pregnant women [16]. Factors associated with this poor utilization of IFAS among pregnant are not well understood due to the paucity of data. This underscores the need to study the factors influencing adherence to iron/folate supplements to facilitate initiatives towards strengthening the iron/folate supplementation programs and reducing negative maternal birth outcomes associated with it. Hence this sought to determine factors influencing the utilization of iron/folic acid supplements among women attending antenatal care at Hoima Regional Referral Hospital (HRRH).

METHODOLOGY

Study design

A regional health facility-based cross-sectional study design was employed.

Area of Study

The study was conducted in an antenatal clinic at Hoima Regional Referral Hospital. The hospital is found in Hoima district in western Uganda. Hoima district is bordered by districts of Masindi in the north, Kiboga in the east, Kibaale in the south, and Lake Albert in the west. The hospital is about 200 km west of Kampala city. The hospital caters to the populations of the greater Bunyoro region overall grossing a population of over 3 million people and it has a bed capacity of 300 beds.

Study population

The study involved pregnant women attending antenatal care clinics during the time of study period.

Inclusion criteria

- All pregnant women were attending ANC at HRRH.

Exclusion criteria

- Pregnant women who were attending ANC at the unit but were not willing to participate in the study.

Sample size determination

This will be determined by using Kish's formula [29] which states that,

$$N = \frac{Z^2(p(1-p))}{\varepsilon^2}$$

Where;

N = the required sample size

p= Proportion of women adhering to IFAS estimated to be 28.7% (Agegnehu et al. [30]).

ε = margin of error on p (set at 5%)

z= standard normal deviate corresponding to 95% confidence level (=1.96)

$$\mathbf{N = \frac{1.96^2(0.287(1-0.287))}{0.05^2} = 314}$$

345 pregnant women were recruited in the study, 10% more than the calculated sample size to cater for incompleteness.

Sampling technique

The study use convenience consecutive sampling where each pregnant woman that come in and agreed to participate was enrolled.

Data collection methods

Structured questionnaires were used to collect data from the respondents.

Data Processing and analysis

Questionnaire tools were checked for their accuracy and data completeness, then data was coded and entered into Epi info version 7, then exported into SPSS version 22.0 for analysis. Descriptive statistics was used to summarize the variables. Figures and tables were used to summarize frequencies and percentages of the variables. Bivariate and multivariate logistic regression analysis were computed to determine factors associated with iron and folic acid utilization. Variables with a p - value of < 0.2 during a bivariate analysis were incorporated in a multivariate logistic regression model to control for confounding. Adjusted odds ratio (AOR) with corresponding 95% confidence interval (CI) were computed to see the strength of the association and a p-value of < 0.05 was considered statistically significant. Hosmer and Lemeshow test was utilized to test the goodness-of-fit of the final logistic regression model and provided a p-value of 0.35.

Quality control

The questionnaire was pretested amongst pregnant women attending ANC at Kampala International University Teaching Hospital prior to the actual data collection. The collected data was checked immediately after finalizing the questionnaire for completeness and consistency of information collected.

Ethical considerations

Ethical approval was sought from Kampala international university western campus Faculty of clinical medicine and dentistry and an introduction letter was given after to seek permission for data collection. A written and verbal consent was sought from the respondents before they recruited in the study.

RESULTS

Table 1: Socio-demographic characteristics of women attending antenatal care at HRRH

Variables	Category	Frequency (N=345)	Percent (%)
Age	15–19	21	6.09
	20–29	231	66.95
	30+	93	26.96
Religion	Christian	244	70.72
	Muslim	46	13.33
	Others	55	15.95
Residence	Urban	131	37.64
	Rural	214	62.36
Maternal Education	None	41	11.88
	Primary education	144	41.74
	Secondary education	104	30.14
	Tertiary	56	16.24
Occupation	House wife/Subsistence faming	279	80.86
	Business	49	14.20
	Employed	17	4.94
Marital status	Married	334	96.81
	Single	11	3.19
Husband education	None	3	0.88
	Primary education	207	60.00
	Secondary education	83	24.05
	Tertiary	52	15.07
Family size	1–3	127	36.81
	4 - 6	211	61.16
	>6	7	2.03
Income	<150,000	238	68.99
	150,000	107	31.01
	>150,000	82	19.90

Majority of the women 66.95% attending the antenatal clinic at HRRH that were recruited in the study aged between 20–29, married 96.81%, Christians by faith 70.72%, residing in a rural setting 62.36%, attained at least a primary education 41.74%, housewives practicing subsistence farming for income source 80.86% and most of them having a monthly income less than 150,000 Uganda shillings 68.99%.

Obstetric, health and health facility related characteristics of women attending antenatal care at HRRH

Table 2: Obstetric, health and health facility related characteristics of the respondents

Variables	Category	Frequency (N=345)	Percent (%)
Number of ANC visits	≤ 4 visit	283	82.03
	> 4 visit	62	17.97
History of abortion during last pregnancy	Yes	21	6.09
	No	324	93.91
History of anemia during your last pregnancy	Yes	81	23.48
	No	264	76.52
History of anemia during your current pregnancy	Yes	149	43.19
	No	196	56.81
Health education given about supplements in the ANC clinic	Yes	106	30.72
	No	239	69.28
Problem faced in HF during collecting IFAS	Yes	83	24.06
	No	262	75.94
Distance from home to health facility	> 30 Minute	52	15.07
	< 30 Minute	293	84.93

Majority of the women 82.03% had attended less than 4 antenatal care visits with 43.19% reporting an anemic deficiency in their current pregnancy and 84.93% living more than 30 minutes away from the hospital.

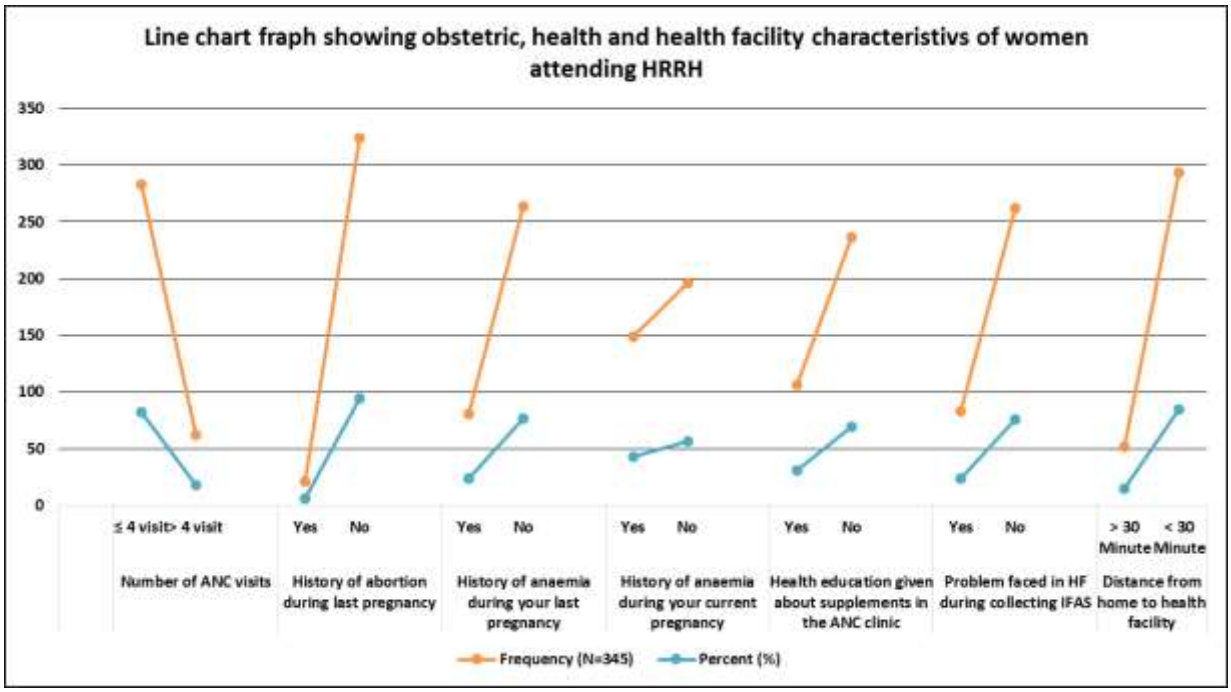

Figure 1: Obstetric, health and health facility related characteristics of the respondents

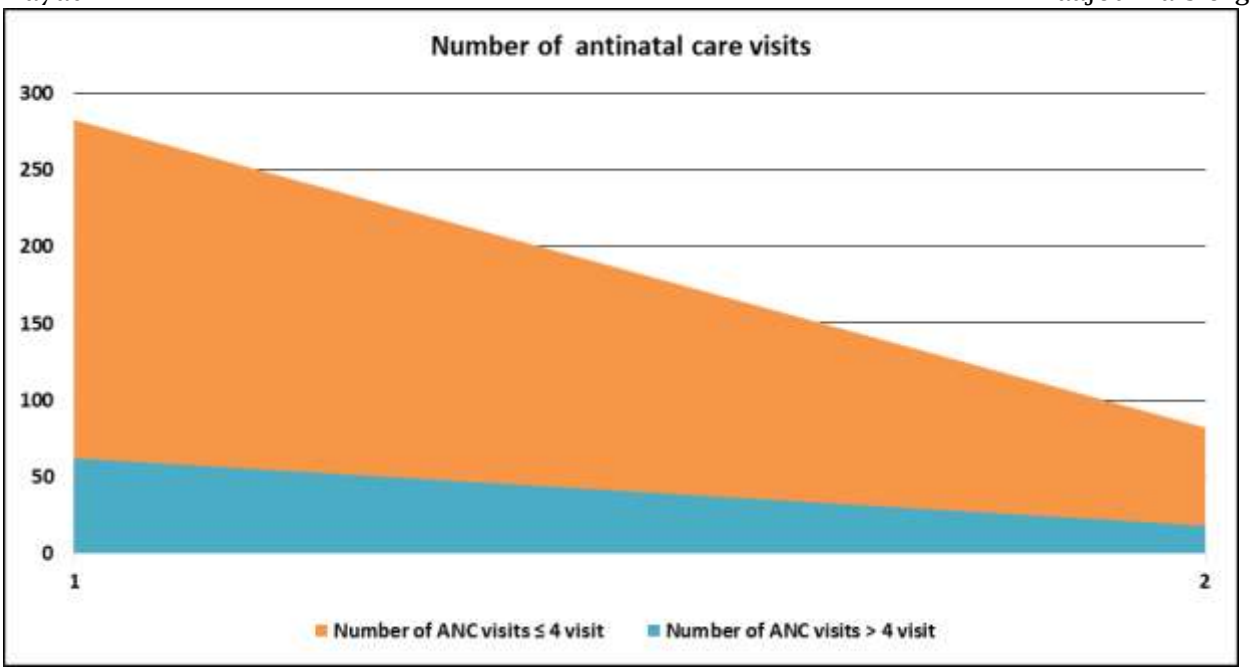

Figure 2: Area chart graph showing graphical difference in antenatal care visits

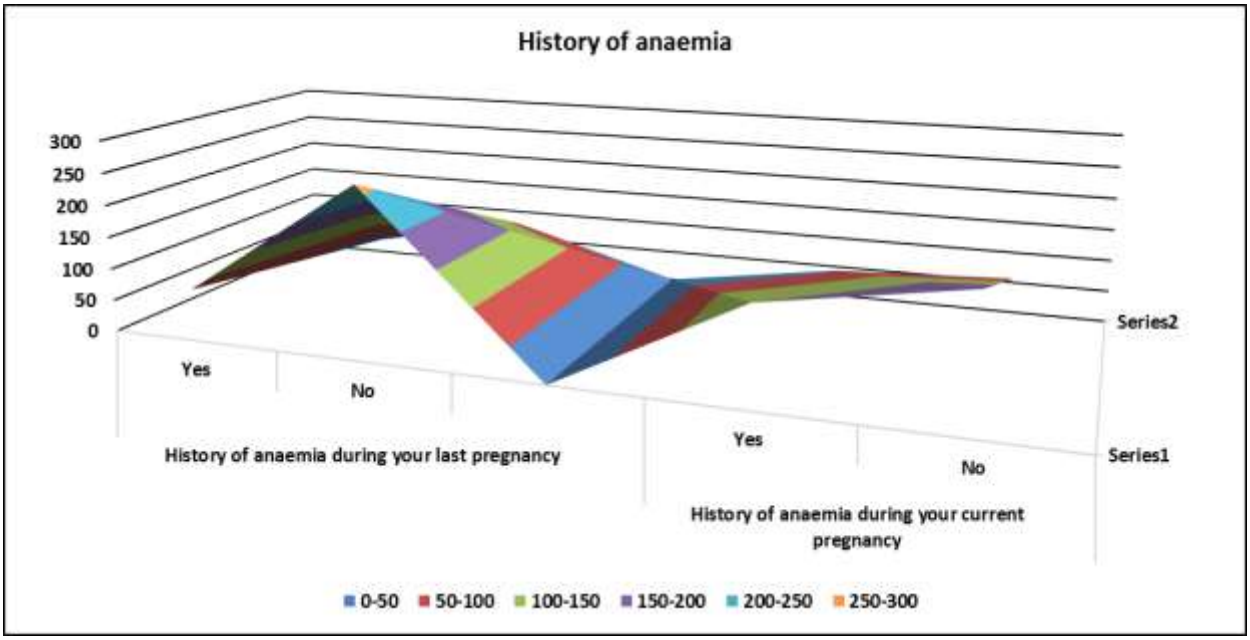

Figure 3: D surface graph showing history of anemia in previous and present pregnancies

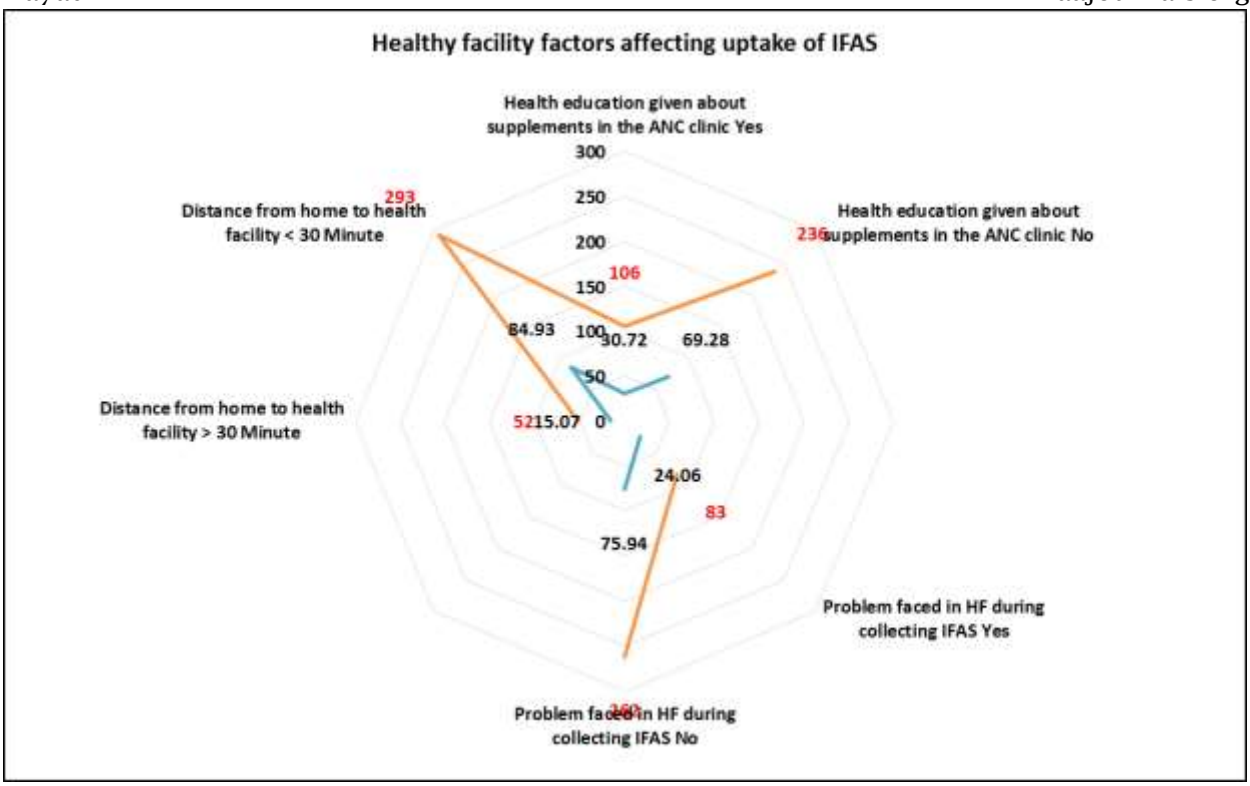

Figure 4: Radar Graph showing Health facility factors influencing uptake of IFAS

Table 3: Factors Associated with utilization of Iron and Folic Acid Supplementation among pregnant women attending antenatal care at HRRH

Variables		Utilization		COR (95%CI)	AOR (95%CI)	P-value
		Yes,no (%)	No, no (%)			
Distance to health facility	> 30 min	97 (33.1)	196 (66.9)	1	1	
	< 30 min	39 (75.0)	13 (25.0)	1.81 (1.20 - 2.42)	1.05 (0.52 - 3.50)	0.391
Knowledge about anemia	Knowledgeable	22 (10.3)	191 (89.7)	5.14 (1.92 - 8.08)	2.04 (1.04 - 4.42)	0.014
	Not knowledgeable	34 (25.8)	98 (74.2)	1	1	
HE given about IFAS	Yes	84 (79.4)	22(20.6)	6.52 (2.66 - 9.08)	2.54 (1.44 – 6.52)	0.001
	No	35 (14.6)	204(85.4)	1	1	
Number of Children	0	25 (35.2)	46 (64.8)	1.22 (0.67 - 2.85)	0.85 (0.12 - 3.54)	0.662
	1–3	106 (47.7)	116(52.3)	1.87 (1.01 - 4.95)	1.4 (0.26 - 4.50)	0.513
	≥4	40 (76.9)	12 (23.1)	1.04 (0.56 - 3.85)	0.64 (0.10 - 3.80)	0.485
History of abortion	Yes	32 (78.0)	09(22.0)	2.64 (1.20 - 4.84)	3.57 (1.82 - 9.05)	0.002
	No	155 (76.7)	47(23.3)	1	1	
Knowledge of IFAS	Knowledgeable	137 (59.8)	92(40.2)	4.05 (2.25 - 8.25)	3.12 (1.58 - 6.97)	0.002
	Not knowledgeable	35 (30.2)	81(69.8)	1	1	
Problem faced in HF	Yes	39 (56.5)	30 (43.5)	1	1	
	No	59 (21.4)	217(78.6)	3.13 (1.55 - 5.92)	4.50 (1.90 - 14.00)	0.001

In both bivariate and multivariate analysis, factors of knowledge about benefits of IFAS supplementation, having a history of abortion, knowledge about anemia, health education received about IFAS supplements during ANC visits and encountering no problem in the health facility turned up to be significantly associated with utilization of IFAS supplementation after adjusting and controlling for all other variables at P value of < 0.05. Pregnant women who didn't encounter any problem at the health facility were 4.5 times more likely to utilize IFAS supplementation in comparison to those who encountered problems [Adjusted Odds Ratio (AOR) = 4.50, 95% Confidence Interval (CI) = (1.90 - 14.00)]. Likewise, pregnant women having previous history of abortion were over 3 times more likely to utilize IFAS tablets [AOR = 3.57, 95% CI = (1.82 - 9.05)]. Also,

receiving health education about the importance of IFAS supplementation increased the likelihood of IFAS utilization [AOR = 2.54, 95% CI = (1.44 – 6.52)]. A high likelihood of utilizing IFAS was also observed among pregnant women who had knowledge about the benefits of the supplementation [AOR = 3.12, 95% CI = (1.58 - 6.97)] and being knowledgeable about anemia during pregnancy [AOR = 2.04, 95% CI = (1.04 - 4.42)] as shown in Table 3.

DISCUSSION

This study has been able to establish that 43.19% of pregnant women attending antenatal care at HRRH utilized IFAS for mineral supplementation. This finding presents a relatively similar study in Ethiopia that reported 47.6% and one in Malawi that reported 49.2% [31]. However, studies in South Africa and Iran have reported higher percentages IFAS utilization among women with similar characteristics at 54.5% and 60.07% respectively [32, 33]. The difference between this present study and the previous ones that reported higher findings can be attributed to the access and economic factor which were reported positively influence utilization in both Iran and South Africa yet compared to our population of study, the Iran and South African one was better in those aspects.

This study shows that majority of the women 82.03% had attended less than 4 antenatal care visits with 43.19% reporting an anemic deficiency in their current pregnancy and 84.93% living more than 30 minutes away from the hospital. This pattern of obstetric and pregnancy factors findings is corroborated similar studies in Tanzania and Kenya were the percentage pregnant women with less than 4 ANC visits was almost equal to the percentage of the women staying more than 30 minutes from the nearest health facility were they could access ANC and by extension IFAS [34, 35]. However, even though the percentages give a picture of correlation between number of ANC visits and health facility distance, after adjusting and controlling for all other variables at P value of < 0.05 the distance from health facility in terms of times as not significant p=0.391. This is a contradiction with the Kenyan study that found a significant association of facility distance and IFAS utilization where pregnant women staying 30 minutes further than the nearest health facility were less likely to utilize IFAS [36]. This study has been able to establish presence of a significant association between history of abortion and IFAS utilization among the study subjects. Pregnant women having previous history of abortion were over 3 times more likely to utilize IFAS tablets [AOR = 3.57, 95% CI = (1.82 - 9.05)]. This finding is corroborated by a study in Ethiopia and Mozambique [31, 37]. Fear was reported as a factor that may cause women to adhere to IFAS in the instance of an abortion history because of not wanting history to repeat its self [31]. A study in Kenya showed that women with a history of abortion had higher knowledge about IFAS than others of the opposite category [36]. Increased knowledge may increase likelihood of utilization as it has also been established as a significant factor in this very study. Knowledge about the benefits of the IFAS had a signification association with utilization of the supplements a multivariate model after adjusting and controlling for all other variables at P value of < 0.05 [AOR = 3.12, 95% CI = (1.58 - 6.97), p=0.002]. This finding is consistent with other studies conducted in Ethiopia and Iran [31, 33]. This can be attributed to the fact that increased knowledge facilitates easier informed decision making thus making it easy for the women who have this knowledge at their disposal. The finding in this same study that women who knew about anemia the utilized IFAS more than the rest further justifies our position of submission. Being knowledgeable about anemia during pregnancy was significantly associated to utilization of IFAS by women at HRRH were women with such knowledge were twice more likely to utilize IFAS [AOR = 2.04, 95% CI = (1.04 - 4.42) p=0.014]. A similar study in Bangladesh is consistent with our findings here [38]. This significant influence of the knowledge about anemia may also be related to the knowledge they had about the benefits of IFAS thus consequences of these significant associations of both knowledge

result in and the prevention strategy. Health education was also found to be a significant determinant of IFAS utilization among women at HRRH [AOR = 2.54, 95% CI = (1.44 – 6.52) p=0.001]. Women who received health education were 2.5 times more likely to utilize IFAS than those who did not receive. Similar findings were reported Brazil and from New Zealand [39, 40]. The possible explanation may be that pregnant women who received health education might have the opportunity to understand the purpose, importance, possible side effects and duration and dosage of the supplement and thus make informed decision to utilize IFAS. Pregnant women who didn't encounter any problems were 4.5 times more likely to utilize IFAS supplementation in comparison to those who encountered problems [AOR = 4.50, 95% CI (CI) = (1.90 - 14.00) p=0.001]. The finding is consistent with findings from Mulago Hospital, Nigeria and Ethiopia [4, 41, 42]. Assefa et al. [31] attributed this association to long waiting time to get the supplement, inadequate supply of IFAS tablets in the health facility. Worthy of note is the fact that vegetables and fruits are alternative sources of iron and folic acid. Plant-based products like fruits and vegetables have ample concentration of nutrients that are crucial for healthy living. Adequate consumption of fruits and vegetables is advocated especially during pregnancy [43-45].

CONCLUSION

Fewer women attending ANC at HRRH are utilizing iron and folic acid supplement tablets. The factors determining utilization of IFAS include knowledge about benefits of IFAS supplementation, having a history of abortion, knowledge about anemia, health education received about IFAS supplements during ANC visits and particular problems encountered at the health facility are.

Recommendations

The study has accordingly established a significant association between problems faced at the health facility and utilization of IFAS, however based on the project objectives, this facility-based problems were not investigated. We recommend a fully-fledged study to ascertain these problems and the extent to which they are causing a burden. Less than 50% of the women at the facility were utilizing IFAS based on WHO recommended guidelines. We recommend that a prevalence study be conducted in the same population to ascertain the burden of anemia to the population.

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