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MATERNAL DETERMINANTS OF NON-COMPLIANCE TO FOLIC ACID SUPPLEMENTATION AND IRON AMONG PREGNANT WOMEN IN NAKURU NORTH SUB-COUNTY, KENYA

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Abstract

The objective of the study was to establish the maternal determinants of non-compliance. A cross-sectional study design was used targeting pregnant women aged 18 – 49 years attending antenatal clinic (ANC) in six health facilities in the Nakuru North sub-county. Non-compliance with IFAS was defined as taking supplements for less than 5 out of 7 days per week. The study findings revealed that 27.1 per cent of the respondents were non-compliant. Reasons for non-compliance were given as side effects, bad taste and missed clinics. About a third (37.6%) of the participating pregnant women first visited the Antenatal Clinic when they were over four months pregnant, and (31.8%) indicated that they had not received information on the benefits of IFAS. The odds ratio indicated that pregnant women were more likely to comply if they did not have side effects (OR=1.47) and initiated ANC early (OR=1.33). Therefore, this study demonstrated that the mother-related determinants of non-compliance were lack of knowledge about the benefits of IFAS, side effects and late ANC attendance. Thus, there is a need for a review of the advice given to pregnant mothers visiting ANC to emphasise the need for timely ANC visits, the benefits of IFAS and the management of side effects due to IFAS.

Key terms: Non-compliance, maternal determinants, Iron and Folic acid.

1.0 INTRODUCTION

Iron and folic acid are micronutrients essential for normal physiological function, growth and development, and the maintenance of life. Their deficiency causes biochemical or physical changes, especially anaemia and its consequences (WHO, 2017). Micronutrient deficiencies (hidden hunger) in Kenya have been found even among population groups with enough food to meet the recommended daily allowances for energy requirements (MoH, 2011). These deficiencies can have negative impacts on the health of the mother and their children before and during pregnancy and after birth. Iron and folate deficiency is particularly common during pregnancy due to their increased maternal and foetal requirements (MoH, 2012; MoH, 2013).

2.0 LITERATURE REVIEW

Anaemia in pregnancy is the main cause of the global burden of disease, with iron deficiency anaemia being responsible for more than half of the cases. The global prevalence of anaemia in pregnancy ranges from 41.8–43.8 per cent, with the greatest (61.3%) burden being found in Africa and then in South East Asia at 52.5 per cent (Kamau et al., 2018). In Kenya, anaemia in pregnancy is still a public health problem, with the prevalence being persistently high, currently at 55.1 per cent, resulting in an estimated 10 per cent of maternal deaths and 20 per cent of perinatal deaths (Siteti et al., 2018; MoH, 2013).

Expectant women are more vulnerable to anaemia because of several factors, including biological changes (menstrual period), food insecurity, under nutrition attributed to poverty, inadequate knowledge of proper dietary practices, gender inequalities and increased iron and folic acid deficiency. Furthermore, pregnant women experience increased micronutrient demand, especially iron, for the growth of the foetus and metabolism, which cannot be easily met by diet alone because of the poor intake and low absorption of iron (Benedicto, 2020).

Iron and folic acid supplementation are one of the most affordable and effective global intervention strategies for the control of anaemia in pregnancy, with the resultant benefits of reduced maternal-child morbidity and mortality. This is necessitated by the fact that a regular diet does not meet the high body's nutrient demand in pregnancy because of insufficient amounts and/or low bioavailability in diets (Nisar & Dibley, 2014). Therefore, following the WHO guidelines, Kenya adopted the IFAS program targeting to achieve 80 per cent coverage. Indeed, the IFAS tablets are currently routinely provided through all public health facilities during antenatal care, free of charge for daily use throughout pregnancy.

The effectiveness and success of the policy interventions on anaemia prevention in pregnancy largely depend on compliance to IFAS. Although the efficacy of daily IFAS supplementation has been demonstrated particularly in reducing anaemia (Ahmed et al., 2019), national IFA supplementation programs in many countries, including Kenya, have had difficulty in achieving levels of coverage and adherence necessary to effectively reduce anaemia (Siekmans et al., 2019). Many experts have come to believe that the major reason the national supplementation programs have failed is pregnant women's non-compliance with iron and folate (Kamau et al., 2018).

Studies suggest that compliance (or not) is greatly determined by rational decisions that patients make after weighing the costs versus benefits of medical advice, influenced by their surrounding social and cultural circumstances (Bilimale et al., 2019). The non-compliance to iron folate supplementation may be

influenced by the social, demographic, and economic factors facing pregnant women. This was well articulated by a study on determinants of the prevalence of anaemia and poor uptake of IFA in the Kiboga district in Uganda (Mbule et al., 2013). They argued that poverty and inadequate access to nutrition and health education information contributed to low compliance and utilisation of the public-health intervention package to fight anaemia in pregnancy.

Various other factors have been associated with IFAS non-compliance, including forgetfulness, birth order, travel, age, perceived side effects, socioeconomic status, supplement stock-outs as well as lack of clear understanding of the importance of IFAS in pregnancy due to insufficient counselling (Gebremedhin et al., 2014; Mithra et al., 2013). Other barriers identified include inadequate IFA distribution, poor access and utilisation of ANC services, and beliefs against the use of drugs in pregnancy, among others. However, the concern for both the mother and the baby's health influences higher compliance to IFAS (Pal et al., 2013) as well as the improved physical well-being of the mother with the relief of signs and symptoms of anaemia, especially improved appetite and reduced fatigue.

Despite efforts to promote IFAS, there has yet to be a commensurate decrease in the number of women suffering from anaemia or increased IFAS compliance in Kenya (MoH, 2013). Reports show that only about 8 per cent of pregnant women take IFAS for more than 90 days (KDHS, 2014). Adherence to IFAS among pregnant women attending ANC at Thika hospital in Kiambu County was 24.5 per cent (Dinga, 2013). Similarly, in Machakos County, only 18 per cent of the women took IFAS (Juma et al., 2015). Locally, in Nakuru County, 99.2 per cent of the women surveyed who carried a pregnancy to full term between 2018 and 2019 were given IFAS. However, the mean consumption of IFAS during the entire pregnancy period was only 51.7 days (ISG Survey, 2020).

Therefore, there is an urgent need to address the factors influencing compliance and develop innovative strategies to reduce them to increase IFAS coverage and, ultimately, substantially reduce the pregnancy-related anaemia burden for improved maternal and child outcomes. However, information on the reasons for continuous low compliance with IFAS in Kenya is scarce. This study, therefore, sought to determine the maternal factors influencing non-compliance.

3.0 METHODOLOGY

Study Design and Setting

The study adopted a cross-sectional design. It was conducted in six health facilities in Nakuru north sub-county, namely, Bahati sub-county hospital, Dundori health centre, Engashura health centre, Kiwamu health centre, Kabatini health centre and St. Anthony health centre. The six health facilities are spread across the five wards of Nakuru north sub-county.

Study Population

The target population was pregnant women aged 18-49 years attending antenatal clinics in the selected facilities.

Sample Size and Sampling Procedure

The sample size was calculated using a formula by Fisher et al. (1999) as follows:

$$n = \frac{Z^2pq}{d^2}$$

Where:

n = the desired sample size.

z = the normal standard deviation at the required confidence level.

p = the proportion in the target population estimated to have characteristics being measured = 0.327

q = 1-p (1-0.327 = 0.673)

d = the level of statistical significance set. (0.05)

$$n = \frac{196^2 * 0.327 * 0.673}{0.05^2} = 338$$

Since the total number of pregnant women in the study area was less than 10,000, the following correction formula was used to calculate the final sample size

$$n = \frac{n}{1+(n-1)/N(monthly\ attendance)} = \frac{338}{1+(338-1)/1000} = 253$$

An extra 10 per cent was added to cater for any loss of information to give a sample size of 279.

10/100 * 253 = 25.3

Therefore 253 + 26 = 279

A stratified sampling technique was used to distribute the sample among the 6 health facilities proportionate to the average monthly ANC attendance using the following formula:

Participants per facility = $\frac{AMC}{N} * n$

Where:

AMC= Average monthly attendance

N = Total monthly attendance

n= Sample size

This is a method of getting representative data from a heterogeneous group in order to minimise the error of estimation (Neutens & Rubinson, 2014). Systematic random sampling was used in selecting participants from each health facility, where every fourth patient that met the inclusion criteria was selected, minimising selection bias. The first participant was picked each day randomly, and then every fourth woman who met the inclusion criteria until the sample size required was reached in each facility.

Data Collection Methods

Data were obtained using a pretested semi-structured questionnaire developed based on the objectives of the study. The questionnaire consisted of three parts. The first part had information on the socio-demographic characteristics of the mothers, while the second part contained questions exploring IFAS intake and the factors influencing non-compliance. The questionnaire was researcher administered.

A pretest was done two weeks before the main study to ensure reliability. The pretest was conducted using 10 per cent of the sample size in one of the dispensaries. The reliability of the questionnaire was determined using Cronbach's alpha coefficient test, and a correlation coefficient of 0.79 was established. The questionnaire was validated by having experts in the department of human nutrition going through

the questionnaire to assess its content, construct, criterion, and face validity. Their feedback was then used to refine the tool before using it for the actual data collection. Trained research assistants administered the questionnaire to pregnant women who met the criteria of inclusion and consented to the study.

Data Analysis

Data collected was coded, cleaned, sorted, and entered into the statistical package for social sciences (SPSS), version 21, for data analysis. Univariate analysis was done using descriptive statistics (frequencies and percentages) in order to summarise the data, and the results were presented using charts, graphs and tables. Non-compliance to IFAS was assessed on the basis of the reported number of IFAS tablets taken in the preceding week (seven days) before the interview. Pregnant women who had taken less than 70 per cent of the expected IFAS tablets in the week preceding the interview, a corresponding of less than five tablets per week, were considered non-compliant.

Relationships were determined using Chi-square (at a significance level of alpha = 0.05) to ascertain the significance of the association between education level, income, age and parity with IFAS compliance status. In addition, the odds ratio was conducted in order to determine the influence of the length of gestation, knowledge, side effects and ANC visits on non-compliance. Significance was determined at a P-value of less than 0.001, and data were presented using tables.

4.0 RESULTS AND DISCUSSION

Socio-demographic Characteristics of Study Participants

A total of 258 questionnaires were well-filled (92.5%) and therefore valid for utilisation in the retrieval of data for this study. A majority (55%) of the pregnant women were aged between 20 and 29 years, while a minority (3.5%) were over forty years of age. The mean age was 27.69 (SD ± 6.0) years. Most (83.7%; n=216) were protestant Christians, and (88.8%), of the participating pregnant women were married.

Prevalence of IFAS Non-compliance

The majority (72.9%) of the study participants had taken IFAS for ≥ 5 days at the time of the study. Those who indicated taking IFAS for < 5 days and were not compliant were (27.1%) as shown in the table below.

Table 1: Proportion of Pregnant Women not complying with IFAS Intake

		Frequency	**Per cent**
Number of days taken IFAS in previous week	0-4 days	70	27.1
	5-7 days	188	72.9
	Total	**258**	**100.0**

The Association between Demographic and Socioeconomic Characteristics and IFAS Compliance

The study established that there was a significant relationship (χ^2= 4.796, P value= 0.018) between education level and IFAS compliance status. Additionally, there was a significant relationship (χ^2= 9.98, P value= 0.040) between income and IFAS compliance status (Table 2). Therefore, the education level and income of the pregnant women participating in the study influenced their intake of IFAS supplements or their compliance with the supplementation. The study noted no significant relationship between IFAS compliance status and age, religion, marital status, occupation and number of children (P>0.05).

Table 2: The Association between Demographic and Socioeconomic Characteristics and IFAS Compliance

	Variables	Chi-Square test	P value
IFAS compliance status	Length of gestation	10.732	0.045**
	Education level	4.796	0.018**
	Income	9.998	0.040**
	Age	8.432	0.152
	Religion	7.564	0.063
	Marital status	12.856	0.273
	Occupation	7.264	0.087
	Number of children	5.731	0.367

P Value $\leq$ 0.05

Maternal Factors Influencing IFAS non-Compliance

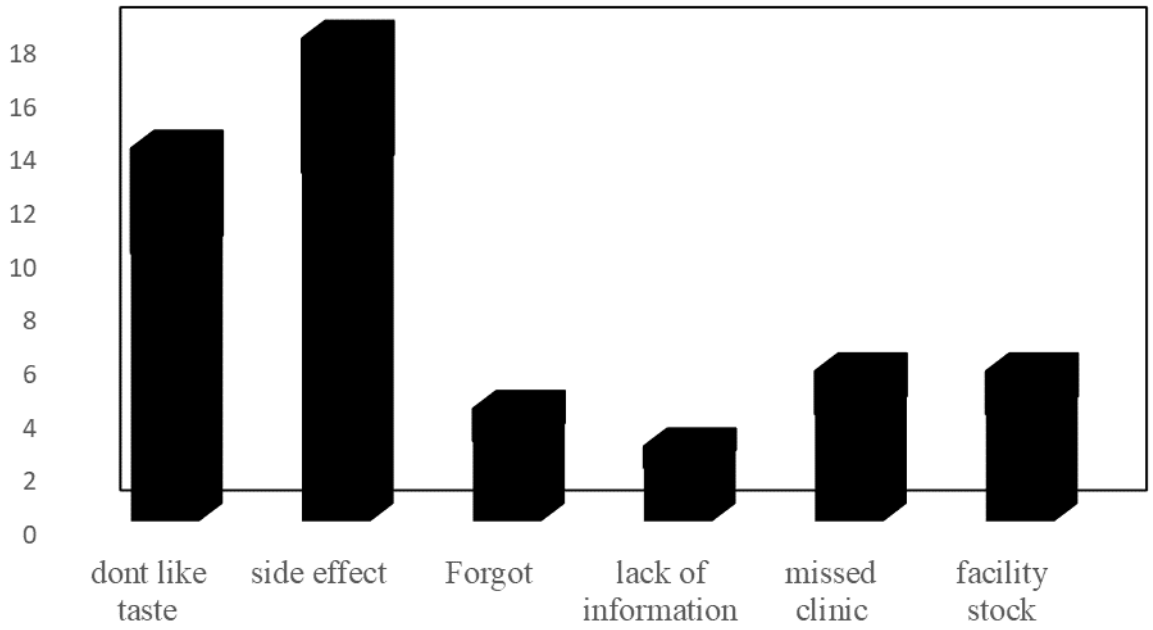

Figure 1: The Reasons for not Using IFAS as Recommended

Less than half (44.2%; n=114) of the women taking IFAS indicated that they did not experience any challenges taking IFAS, while (38%; n=98) stated that the side effects associated with IFAS intake were their

greatest challenge. The minority (2.7%; n=7) listed stock-outs as the primary challenge, and 9.7 per cent (n=25) stated that they had a challenge with forgetting to take their IFAS

Association between IFAS Compliance Status and some Selected Variables

The study participants that were advanced in their gestation were 1.28 times more likely to comply with IFAS than those in early gestation. The respondents with knowledge on IFAS were 1.31 times more likely to comply with IFAS than those without, while respondents without side effects due to intake of IFAS were 1.47 times more likely to comply with IFAS than those with side effects. In addition, the participants who initiated their ANC visits early were 1.33 times more likely to comply with IFAS than those who did not.

Table 3: Association between IFAS Compliance Status and some Selected Variables

Variable	OR	P value
Length of gestation	1.28	<0.001
Knowledge about the benefits of IFAS	1.31	<0.001
Side effects of IFAS uptake	1.47	<0.001
Timely ANC visits	1.33	<0.001

These findings are similar to a study that established that a majority of women visited healthcare facilities for their antenatal care towards the end of their first trimester (Nisar & Dibley, 2014). Even though research showed that pregnant women attending ANC tend to be more informed and compliant with their IFAS supplementation uptake, than those who do not, or those who delay their onset of seeking ANC services (Perumal et al., 2013).

The study established that there was no significant association between the income and education level of the participating pregnant women and their compliance to IFAS. These findings support that the pregnant women who took part in the study would be compliant or fail to be compliant whether they earned highly or had a high level of education or not. However, the study noted a significant relationship between the knowledge of the benefits of IFAS and the IFAS compliance status of pregnant women. Similar findings established that adherence to IFAS supplementation among pregnant women in Sub-Saharan Africa is not influenced by their income levels or levels of education (Fite et al., 2021). However, in contrast to these findings, research in Kiambu found that the education level of pregnant women did influence their compliance with IFAS in Kiambu County, Kenya (Kamau et al., 2018).

5.0 CONCLUSION AND RECOMMENDATION

Conclusion: This study revealed that the maternal factors influencing the IFAS non-compliance status of pregnant women included a lack of knowledge about the benefits of IFAS, side effects associated with IFAS and untimely ANC visits, which led to the late acquisition of the IFAS.

Recommendation: The study recommends a review of the advice given to pregnant mothers visiting ANC to emphasise the need for timely ANC visits, the benefits of IFAS and the management of side effects due to IFAS.

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