# Relationship between compliance to Iron and Folic Acid Supplementation and Anaemia among Pregnant Women in Nyeri County, Kenya

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**Abstract:** Folate deficiency has been associated with abnormalities in both mothers and fetuses. This study therefore sought to determine the prevalence of non-compliance with IFAS among pregnant women and to determine if IFAS non-compliance influences anemia in Nyeri County, Kenya. This was a mixed methods study. Pregnant women attending antenatal care in level 4 and level 5 facilities were targeted. A sample of 385 respondents was calculated using modified formulae by Fisher. Questionnaires were used to collect information form the expectant mothers. The mean age was 31 years. The mean income was KES 50,912. Majority (64%) of respondents lived in rural areas. Majority (56%) of the respondents in the study indicated that they had at one time forgotten to take their IFAS supplements. Majority (55%) of the participants had hemoglobin levels of between 121 g/l and 150 g/l while 37% of the participants had hemoglobin levels of below 120 g/l. Chi-square tests showed a significant relationship (p=0.018) between compliance to IFAS and prevalence of Anemia. The study concluded that increasing prevalence of anemia among pregnant women can be attributed to the high prevalence of non-compliance among pregnant women in Nyeri County. Pregnant women should therefore be sensitized on the importance of complying with iron and folic acid supplements.

*Keywords: Iron, Folic acid, IFAS, Pregnant women, Anemia*

## INTRODUCTION

When a woman is pregnant, it marks an important stage in her life and those close to her; this affects her directly and indirectly. An increase in iron and folic acid occurs due to hormonal and physiological changes in her body (Siabani *et al.*, 2018). Iron and folic acid dietary sources should be provided through diet to meet the daily-recommended dietary allowances in pregnancy, which in some cases are usually insufficient from dietary sources (Bothwell, 2000) therefore women in developing Countries must be supplemented with iron and folic acid as a preventive strategy of anaemia during pregnancy (Dinga, 2013). Subsequently, the body losses are unregulated. Dietary sources must contain foods of high biological value and must be taken with others that boost absorption as the body itself works on releasing iron from recycling hepatocytes and macrophages ( Dev & Babitt , 2017) . Iron deficiency is the most widespread common nutrition disorder globally affecting more than 30% of the World's population more so women and children (Miller, 2013). World Health Organization notes that 46.3% of the African region and globally 38.2% of pregnant women has anemia. Pregnant women are at risk of iron and folic acid deficiency due to an increase in nutrient demands as a result of the developing fetus and increasing blood volume (WHO, 2008).

Demands for folate increase during pregnancy because it is also required for growth and development of the fetus. Folate deficiency has been associated with abnormalities in both mothers (anemia, peripheral neuropathy) and fetuses (congenital abnormalities) (Greenberg, Bell, Guan & Yu 2011). There are drugs that inhibit absorption of folic acid or inhibit conversion of folate to its active form resulting to folic acid deficiency (Khan & Jialal, 2018). Compliance to Iron and folic acid supplementation is affected by a few factors that include poor compliance to the drug regimens, gastro intestinal side effects, frequency of side effects, fear of having big

babies, insufficient service delivery, personal problems (Ibrahim *et al.*, 2011), stock outs of drugs in the health facilities, in adequacy of counseling by health care workers on the use and the benefits of the supplements, low uptake of health care services, lack of information on the iron and folic acid supplements, inconsistence on anemia knowledge, but research recommends that 1000 micro grams of iron is necessary for mother and fetus during pregnancy (Dinga, 2013).

Indirectly anemia is the main cause of high maternal and neonatal deaths, It is worth noting that When the anemia prevalence in pregnant women is 40.0% or more, it is considered a severe public health problem (Okube, Mirie, Odhiambo, Sabina & Habtu, 2015). Therefore, The Government of Kenya  has come up with strategies to deal with anemia which include supplementation of Iron and Folic acid, implementation of Focused Antenatal care even though there have been challenges which have resulted in sub optimal coverage and low rates of compliance (MOH, 2013). Iron and folic acid supplements are provided free of charge in government health facilities. However, the major problem is noncompliance to the supplements which now affects effectiveness in fighting iron deficiency anemia this could be due to culture issues, environmental factors, lack of awareness, personal behaviors, side effects, inadequate service delivery and social demographic status(Mithra *et al.*, 2013).

Iron deficiency anemia is a risk factor for maternal and perinatal mortality and morbidity and was projected to have contributed to 115,000 of the 510,000 Maternal deaths (22%) and 591,000 of the 2,464,000 perinatal deaths (24%) occurring annually around the world (WHO, 2011a). The incidence of maternal mortality resulting from anemia is 34/100 000 live births (Helmy *et al.*, 2018). The World Health Organization estimates that 41.8% of women who are pregnant globally are anemic. In Kenya, anemia prevalence is estimated to be at 55.1% accounting to about 10% maternal and 20% perinatal deaths (Kamau *et al.*, 2018), 46.4% of non-pregnant women are anemic. According to KNBS and ICF Macro 2010, In Central Kenya where Nyeri County lies 56.3% of pregnant women take Iron supplements for less than 60 days, 2.6% take for 60-89 days while as 28.5 % do not take iron tablets during pregnancy. Data on non-compliance of iron and folic acid in Nyeri County is scarce and a study on determinants of non-compliance to iron folic acid supplementation during pregnancy was needed. This study therefore Sought to determine the prevalence of non-compliance with IFAS among pregnant women and to determine if IFAS non-compliance influences anaemia in Nyeri county, Kenya.

## METHODOLOGY

This was a mixed methods study. The study was conducted in Nyeri County one of the 47 counties in Kenya. Pregnant women attending antenatal care in level 4 and level 5 facilities were targeted.  The study targeted this population of the expectant women aged 18- 49 years of age coming for antennal services in the level 4 and level 5 public health facilities in Nyeri County. The information was collected in the maternal child health clinic. A sample of 385 respondents was calculated using modified formulae by Fisher as shown below.

n=  $\dfrac{z2p(1-p)}{e2}$

z = is the Z value for the corresponding confidence level (i.e., 1.96 for 95% confidence);

e = is the margin of error (i.e., 0.05 = ± 5%) and

p = is the estimated value for the proportion of a sample that have the condition of interest.

P= 30% (the most conservative estimate) = 0.34 (Miller, 2013).

Therefore          n= $\dfrac{1.96 \times 1.96 \times 0.34\,(1- 0.3)}{0.05 \times 0.05} = 385$

The study employed the use of a structured researcher administered questionnaire. Questionnaires were used to collect information form the expectant mothers. Descriptive statistics were used to analyze the quantitative data which was presented in form of frequency and percentage tables, bar graphs and pie charts. Chi-square tests were conducted to determine association of IFAS non-compliance on anemia. The data was analyzed using SPSS. Tables were used to present findings.

## RESULTS

### Socio-Demographic Characteristics of Respondents

A total of 385 expectant women aged 18- 49 years of age coming for antennal services in the level 4 facilities and in level 5 facility in Nyeri County participated in the study. This means that the study achieved a maximum (100%) response rate. Results showed that 44% of the respondents were aged between 25 and 31 years while those aged between  32 and 38 years accounted for 30% of the respondents. The mean age was 31 years. The findings show that 47% of the respondents had acquired secondary education. Majority (66%) of the participants in the study were married and 47% of the respondents had acquired secondary education. Results showed that 34% were self-employed, 18% were unemployed and 11% were housewives. The average monthly income for 25% of the participants earned between KES 10,001 and KES 25,000 while 21% earned below KES 10,000. The mean income was KES 50,912. Majority (69%) of the respondents had between 1 and 3 children. The average parity was 1 child. Majority (56%) of the respondents were expecting their second child. Majority (64%) of respondents also lived in rural areas.

*Table 1 Socio-Demographic Characteristics of Respondents*

| Characteristic | Category | Frequency | (%) |
|---|---|---|---|
| Age (years) | <24 | 50 | (13) |
| | 25-31 | 169 | (44) |
| | 32-38 | 116 | (30) |
| | 39-45 | 39 | (10) |
| | >46 | 11 | (3) |
| Marital status | Married | 254 | (66) |
| | Single | 131 | (34) |
| Education | Primary | 150 | (39) |
| | Secondary | 181 | (47) |
| | College | 46 | (12) |
| | University | 8 | (2) |
| Income (KES) | <10,000 | 81 | (21) |
| | 10,001 - 25,000 | 95 | (25) |
| | 25,001 - 50,000 | 43 | (11) |
| | 50, 001 - 75,000 | 49 | (13) |
| | 75,001 - 100, 000 | 36 | (9) |
| | >100,001 | 81 | (21) |
| Parity | None | 89 | (23) |
| | 1-3 | 266 | (69) |
| | 4-6 | 30 | (8) |
| Residence | Urban | 139 | (36) |
| | Rural | 246 | (64) |

### Prevalence of IFAS Non-Compliance

Majority (56%) of the respondents in the study indicated that they had at one time forgotten to take their IFAS supplements. In the previous one week prior to the study, 33% had forgotten to take their IFAS supplements. This shows that non-compliance to IFAS was high among the respondents. This is consistent with findings of Ibrahim *et al.* (2011), Taye *et al.* (2015) and Gebreamlak *et al.* (2017) who in studies conducted in Egypt, Amhara, Ethiopia and Addis Ababa, Ethiopia respectively found that compliance of prenatal iron and folic acid supplementation remained low in the areas that the study was conducted.

*Table 2 Prevalence of IFAS Non-Compliance*

|  | Yes n(%) | No n(%) |
|---|---|---|
| Forgot to take  IFA supplements | 216(56) | 169(44) |
| Forgot to take  IFA supplements in previous 1 week | 127 (33) | 258(67) |

Results in Table 3 show that among those who had at one time forgotten to take their IFAS supplements, 44% forgot due to being busy at work, 28% because of side effects and 26% simply forgot

*Table 3 Reason behind forgetting to take Supplements*

| Reason | Frequency (%) |
|---|---|
| Simply forgot | 56 (26) |
| Side effects | 60 (28) |
| Work commitments | 95 (44) |
| Forgot to carry | 39 (18) |
| Lost them | 19 (9) |
| Others | 6 (3) |

**Prevalence of Anemia**

Majority (55%) of the participants had haemoglobin levels of between 121 g/l and 150 g/l while 37% of the participants had haemoglobin levels of below 120 g/l. The mean haemoglobin level was 126 g/l. The results therefore show that majority of participants had acceptable levels of haemoglobin (121 g/l and 150 g/l).

*Table 4 Hemoglobin Levels  among Pregnant Women*

| Hemoglobin Level (g/l) | Frequency (%) |
|---|---|
| <120 | 142 (37) |
| 121-150 | 212 (55) |
| >151 | 31(8) |
| Total | 385(100) |

**Relationship between IFAS Non-Compliance and Prevalence of Anemia**

Forgetting to take supplements in one week was compared to haemoglobin levels.  Chi-square tests showed a significant relationship (p=0.018) between compliance to IFAS and prevalence of Anaemia.

*Table 5 Chi-Square output between IFAS Non-Compliance and Prevalence of Anaemia*

|  | Chi-square ($\chi2$) | Degree of freedom (df) | (P-value) |
|---|---|---|---|
| Residence * IFAS Compliance | 1.203 | 1 | 0.273 |
| IFAS Compliance * Anemia | 10.118 | 3 | 0.018 |
| IFAS compliance * Child Mortality | 0.265 | 1 | 0.606 |

**DISCUSSION**

This study sought to determine the prevalence of non-compliance with IFAS among pregnant women and to determine if IFAS non-compliance influences anemia. Majority (56%) of the respondents in the study indicated that they had at one time forgotten to take their IFAS supplements. In the previous one week prior to the study, 33% had forgotten to take their IFAS supplements. Majority

(55%) of the participants had hemoglobin levels of between 121 g/l and 150 g/l while 37% of the participants had hemoglobin levels of below 120 g/l. The mean hemoglobin level was 126 g/l. Chi-square tests showed a significant relationship (p=0.018) between compliance to IFAS and prevalence of Anemia. This implies that compliance to IFAS may reduce the prevalence of Anemia among pregnant women. Iron and folic acid are essential micronutrients for proper physiological activity, growth and survival. Like so many other nutrients, during pregnancy their demand increases and a supplement is needed to meet the daily needs of pregnancy. Increased demand for iron and folates due to physiological and hormonal changes in pregnant women and fetal consumption contribute to increased chances of deficiency of iron and folate. Therefore, Iron and Folic acid are better given to pregnant women in supplements to raise hemoglobin concentration with the goal of decreasing anaemia levels to the maximum degree possible at the end of the day. To this end, several developed nations and developing countries like Kenya have adopted systems of iron supplementation. Consequently, IFAS compliance during pregnancy is seen as a key factor in iron deficiency anaemia prevention and regulation. This is consistent with findings of Sing *et al.* (2014), Taye *et al.* (2015) and Niguse and Murugan (2018) in studies conducted in Nepal and Ethiopia who found that iron supplements compliance is an important factor in prevention and treatment of iron deficiency anemia.

## CONCLUSION

The study concludes that the prevalence of non-compliance among pregnant women in Nyeri County was high. Majority of respondents had missed taking their tablets. This is a concern as IFAS supplementation is only effective when adhered to religiously. In addition, increasing prevalence of anaemia among pregnant women can be attributed to the high prevalence of non-compliance among pregnant women in Nyeri County. Pregnant women should therefore be sensitized on the importance of complying with iron and folic acid supplements. The women can be trained on setting reminders and having someone such as spouse remind them of taking the supplements to reduce forgetfulness. Health workers and especially nurses working in health facilities in the MCH should be given refresher courses to enhance their counselling skills. This will enable them counsel women better on the need and importance of complying with IFAS. IFAS supplements should be given to pregnant women at the MCH and not at the pharmacy to reduce waiting time.

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