

## Research Article

# Compliance to Iron-Folic Acid Supplementation among Pregnant Muslim Women in Imphal, Manipur, India: A Cross-Sectional Study

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## ABSTRACT

**Background:** Intermittent Iron and Folic Acid Supplementation (IFAS) is advised in areas where the prevalence of anaemia among pregnant women is  $\geq 20\%$ . Effectiveness and successful interventions of national strategy will depend on compliance to IFAS. This study was conducted to determine the proportion of antenatal mothers compliant to Iron-folic acid supplementation and to identify the factors influencing it. **Objective:** The current study was conducted to determine the proportion of antenatal mothers non-compliant to IFAS and also to identify the factors affecting it. **Materials and Methods:** A cross-sectional study among pregnant women attending ante-natal clinic was done from September, 2020 to February, 2021 at an Urban Primary Health Centre, Imphal East District. Patients aged  $\geq 18$  years, completed 12 weeks of pregnancy and started IFAS were consecutively enrolled according to OPD registration list and interviewed using a pre-tested questionnaire. Logistic regression was performed for determining association between selected variables, taking  $p < 0.05$  for statistical significance. **Results:** Out of 142 women participated in the study, 97 (68%) were compliant to IFAS. Women who were multigravida (AOR: 0.14; 95% CI: 0.038-0.48), self-purchased IFAS (AOR: 0.16; 95% CI: 0.054-0.47) were found to be less likely to be compliant to IFAS. Women of good knowledge score (AOR: 6.4; 95% CI: 1.7-23.8) regarding anaemia and IFAS were more likely to be compliant. **Conclusion:** Almost one-third of participants (91; 64.1%) were compliant to IFAS and it was associated with better knowledge. Being employee, multigravida and having

purchased IFA by self were negatively associated with compliance. IFAS. There is a need to scale up health awareness on IFAS and Ante Natal Care coverage of antenatal IFAS supply through community level workers.

## KEYWORDS

Antenatal check-up, IFAS compliance, pregnant women

## INTRODUCTION

Iron and folic acid are essential micronutrients for normal human physiological function, growth and development as well as for maintenance of life. Their demand during pregnancy is increased creating a need for daily supplementation to meet requirement in pregnancy. World Health Organization (WHO) defines anemia as blood hemoglobin concentration less than  $11 \text{ gm dL}^{-1}$  or hematocrit  $< 37\%$  in pregnant women<sup>1</sup>. The most common cause of anemia worldwide is iron deficiency, resulting from prolonged negative iron balance, caused by inadequate dietary iron intake or absorption, increased needs for iron during pregnancy or growth periods and increased iron losses as a result of menstruation and helminth (intestinal worms) infestation. Maternal anemia is associated with mortality and morbidity in the mother and baby, including risk of miscarriages, stillbirths, prematurity and low birth weight<sup>2</sup>.

Globally, anemia affects half a billion women of reproductive age, 29% of non-pregnant women and 38% of pregnant women<sup>2</sup>. In India, the prevalence of anemia in

pregnant women is 50.4%. In the state of Manipur, the prevalence of anemia in pregnant women is 25.2%<sup>3</sup>.

According to WHO, intermittent Iron and Folic Acid Supplementation (IFAS) is advised in menstruating women living in settings where the prevalence of anemia is 20% or higher. Daily iron and folic acid supplementation is being recommended as part of antenatal care, to reduce the risk of low birth weight, antenatal anemia and iron deficiency. In areas where the prevalence of anemia among pregnant women is lower than 20%, IFAS in non-anemic pregnant women is advised to prevent anemia and to improve pregnancy outcomes<sup>2</sup>.

In India, according to guidelines by Intensified-National Iron Plus Initiative Strategy (I-NIPI), prophylactic dose for Iron Folic Acid (IFA) supplementation is daily intake of one IFA tablet containing 60 mg elemental iron and 500 mcg folic acid, starting from 4th month of pregnancy and to be continued for 180 days post-partum<sup>4</sup>. But effectiveness and successful intervention of such national strategy will depend on the compliance to IFAS. Compliance describes the degree to which a patient correctly follows a medical advice. The factors affecting compliance can be health system factors or patient factors or both, which have not been studied extensively<sup>5</sup>. Thus, this important area needs to be looked into.

## **MATERIAL AND METHODS**

### **Study design and setting**

A cross-sectional study was conducted in Urban Primary Health Center (UPHC), Kshetrigao, Imphal East District of Manipur from September, 2020 to February, 2021. The Center was located in the Urban Field Practice Area of Jawaharlal Nehru Institute of Medical Sciences and catered to a population of 13,697 which were predominantly Muslims and had an estimate of around 200 cases of pregnancy registered annually according to the 2019 survey data by the UPHC.

### **Study population and setting**

The study was conducted among the registered pregnant women attending ANC clinic at the UPHC. The inclusion criteria consisted of age 18 years and above, gestational age >4 months of pregnancy, started on IFAS tablets and willing to participate in the study. Those who came for their 1st ANC visit or having severe anemia or with history of medical conditions where IFAS was contraindicated such as Thalassemia etc., were excluded from the study.

### **Sample size determination and sampling procedure**

Considering the 23.6% prevalence of compliance to IFAS from a previous study done in Tamil Nadu by Kumar and Priya<sup>5</sup>, taking 7% as absolute allowable error at 95% confidence interval, an estimated sample size of 142 was calculated. Eligible participants were consecutively enrolled according to their OPD sequence until the sample size was reached.

### **Study tool and technique**

A pre-tested, semi-structured interview schedule containing variables such as socio-demographic profile, previous obstetrical history and method of availing IFA supplements were included based on review of literatures. It further had sections on assessing factors related to compliance or non-compliance to IFAS. Also, there were 9 questions for assessing IFA knowledge of respondents and a score of 1 or 0 was awarded based on their correct or incorrect responses.

### **Operational definitions**

Compliant to IFA supplementation was considered as when the ante-natal mother self-reported of not missing 3 consecutive IFA doses in a week<sup>5</sup>.

IFA knowledge was termed as good if the knowledge score was  $\geq 5$  and poor if the knowledge score was  $< 4$  out of a maximum score of 9.

### **Data processing and analysis**

Data analysis was done with IBM SPSS version 20 (IBM Company, Chicago, Illinois, United States). For descriptive statistics, frequency and percentages were used. Bivariate and multivariate logistic regression was performed to assess association between compliance and the independent variables. A  $p < 0.05$  was considered as statistically significant.

### **Ethical consideration**

The study obtained ethical clearance from the Institutional Ethics Committee (Registration no. ECR/1333/Inst/MN/2020) of JNIMS. Informed verbal consent was taken from respondents. For maintaining anonymity, code numbers were assigned against their ANC registered numbers.

## **RESULTS**

### **Patient characteristics**

A total of 142 pregnant women participated giving a response rate of 95%. Mean age (SD) of the participants

was 25 (3.76) years. Three-fourths of the respondents were found to have completed primary education (71.8%). Only one-tenth (11%) of them are employed. More than half of the family belonged to nuclear family (60%). More than three-fourths of the respondents were multigravida (73.2%). Less than three-fourths had history of anemia in earlier pregnancies. One-third of the participants belonged to lower-middle socio-economic class (30%). About three-fourths (72.5%) of them had poor knowledge score of IFAS. More than half of them (54.9%) received IFAS from government supply (Table 1).

More than two-thirds (91; 64.1%) of all the study-participants were aware of the possibility of developing anaemia during pregnancy. Half of them (79; 55.6%) said that they should take due care for it. One-third of them (44; 31%) knew the signs of anaemia. A total of 52 (36.6%) knew that anaemia can be prevented. The complications of anaemia were known to only a few of them (22; 15.5%). One-third of all the study-participants (49; 34.5%) had good knowledge of iron rich foods. A small number (19; 13.4%) knew about the importance and

benefits of folic acid supplementation during pre-conception period. (Table 2) summarizing the various scores, only 39 participants (27.5%) were found to have good knowledge on IFAS.

### **Factors associated with compliant to iron and folic acid supplementation (IFAS)**

Out of 142 participants, 97 (68%) were compliant to IFAS, the remaining 45 (32%) being non-compliant. Among the compliant participants, more than half of them (58; 59.8%) said that they took the supplement according to advice from healthcare worker. And a quarter of them (27; 27.8%) was aware of the side-effects of IFA. Forgetting to take was the commonest reason (14; 31%) cited by the non-compliant participants. The other reasons were constipation, stomach pain, stock not available and vomiting (Table 3).

Nine independent variables which included age, educational status, occupation, socio-economic status, type of family, history of anaemia in previous pregnancy, gravida status, knowledge score of IFAS and method of acquiring

**Table 1:** Background characteristics of study-participants (n=142)

Variables	Numbers	Percentage
<b>Education</b>		
• No formal education	11	7.9
• Primary	102	71.7
• Secondary	29	20.4
<b>Occupation</b>		
• Employed	16	88.7
• Unemployed	126	11.3
<b>Socio-economic status</b>		
• Upper	15	10.6
• Upper middle	39	27.5
• Middle	28	19.7
• Lower middle	41	28.9
• Lower	19	13.3
<b>Gravida</b>		
• Primigravida	38	26.8
• Multigravida	104	73.2
<b>Family type</b>		
• Nuclear	85	59.9
• Joint	57	40.1
<b>History of anemia in earlier pregnancy</b>		
• Yes	21	14.8
• No	121	85.2
<b>Knowledge of IFAS</b>		
• Good	39	27.5
• Poor	103	72.5
<b>Method of acquiring IFAS</b>		
• Government supply	78	54.9
• Self-purchased	64	45.1

**Table 2:** Knowledge of anaemia and IFA (n = 142)

Components	Responses (%)	
	Yes	Yes
Ever heard about anaemia in pregnancy	91 (64.1)	51 (35.9)
Should pregnant women be bother about it	79 (55.6)	63 (44.4)
Aware of signs of anemia?	44 (31.0)	98 (69.0)
Knowledge on how to prevent anemia	52 (36.6)	90 (63.4)
Aware of complications of anemia in pregnancy	22 (15.5)	120 (84.5)
Knowledge on iron rich foods	49 (34.5)	93 (65.5)
Aware of how to diagnose anaemia	33 (23.2)	109 (76.8)
Aware of importance of folic acid supplementation during preconception period	19 (13.4)	123 (86.6)
Understanding benefits of taking folic acid	19 (13.4)	123 (86.6)

**Table 3:** Reasons for IFAS non-compliance (n = 45)

Responses	Number of non-compliant participants (%)
Constipation	13 (28.88)
Forgetfulness	14 (31.14)
Stomach pain	7 (15.55)
Vomiting	1 (2.22)
Finished	4 (8.88)
Stock unavailable	6 (13.33)

**Table 4:** Predictors of IFAS compliance (n=142)

Variables	Numbers	Percentage	COR (95% CI)	AOR (95% CI)
Age			0.98 (0.89-1.08)	-
<b>Education</b>				
• No formal education	11	7.7	1.0	1.0
• Primary	102	71.8	-	-
• Secondary	29	20.4	-	-
<b>Occupation</b>				
• Employed	16	88.7	0.31 (0.10-0.89)*	0.20 (0.04-0.88)*
• Unemployed	126	11.3	1.0	1.0
<b>Socio-economic status</b>				
• Upper	15	10.6	-	-
• Upper middle	39	27.5	0.68 (0.22-2.09)	-
• Middle	28	19.7	7.58 (1.36-42.09)	-
• Lower middle	41	28.9	0.745 (0.24-2.27)	-
• Lower	19	103.4	1.0	1.0
<b>Gravida</b>				
• Primigravida	38	26.8	1.0	1.0
• Multigravida	104	73.2	0.31 (0.12-0.81)*	0.14 (0.03-0.47)*
<b>Family type</b>				
• Nuclear	85	59.9	1.0	1.0
• Joint	57	40.1	0.77 (0.37-1.57)	-
<b>Previous history of anaemia in pregnancy</b>				
• Yes	21	14.8	1.0	1.0
• No	121	85.2	0.84 (0.30-2.33)	-
<b>Knowledge of IFAS</b>				
• Good	39	27.5	3.3 (1.28-8.72)*	6.4 (1.7-23.8)*
• Poor	103	72.5	1.0	1.0
<b>Means of acquiring IFA</b>				
• Government supply	78	54.9	1.0	1.0
• Self-purchased	64	45.1	0.47 (0.22-0.96)*	0.16 (0.05-0.47)*

IFAS were examined for presence of association with IFAS compliance for bivariate logistic regression and finally statistically significant variables were subjected to multivariate logistic regression. It was seen that being employee, multigravida and having purchased IFA by self were negatively associated with compliance. Only having

good knowledge on IFAS was found to be positively associated with compliance (Table 4).

## DISCUSSION

Our study found out that 68% of the respondents were compliant to IFA supplementation which is consistent with

the 69% compliance found from a study conducted in Chennai, Tamil Nadu in 2018<sup>5</sup>. However, the current study findings were higher when compared to studies conducted by Mithra *et al.*<sup>1</sup> at Mangalore (64.7%), Pal *et al.*<sup>6</sup> (62%) and Neupane *et al.*<sup>7</sup> at Nepal (55.7%), Kessani *et al.*<sup>8</sup> at Pakistan (63.1%), Birhanu *et al.*<sup>9</sup> at Ethiopia (55.3%), Kamau *et al.*<sup>10</sup> at Kenya (32.7%) and Dutta *et al.*<sup>11</sup> (61.7%)<sup>1,6-11</sup>. This difference could be because of the better healthcare services available through the UPHC and also the current study area being an urban area. Time gap between different studies, different lifestyles and customs might have also influenced the compliance rates.

Regarding reasons for non-compliance in IFAS, being forgetfulness constituted majority of the responses (31.14%) in our study. This finding was similar to the study-findings made by Mithra *et al.*<sup>1</sup> and Dutta *et al.*<sup>11</sup> in India<sup>1,11</sup>. Lutsey *et al.*<sup>12</sup> from their study reflected that fear of increased fetus size was the highest response<sup>12</sup>. Studies conducted in India and other developing countries also emphasized the fear of side effects as the main reason for non-compliance to IFAS<sup>5,12,13</sup>. The inconsistency can be attributed to the difference in health-care system and iron supplementation program-related implementation strategies at the primary health care level which needs further probing into the responses through qualitative research methods. Measures such as directly observed oral iron supplementation can help improve compliance and reduce the prevalence of anemia<sup>14</sup>.

Our study also observed that, employed women had less chances of being compliant to IFAS. The study also revealed that self-purchased method of availing IFA tablets was found to be less compliant than availing from supply under health programs. However, these may need to be evaluated further by increasing the number of participants. This study revealed that multigravida women were less likely to be compliant as compared to primigravida. This finding was found to be consistent with study-findings made by Mithra *et al.*<sup>1</sup> and Kamau *et al.*<sup>10</sup>. This could be explained considering that, 1st time pregnant mothers are usually very cautious and careful in following advices regarding IFAS the benefit of herself and the fetus<sup>6</sup>.

According to present study, having good knowledge of IFAS was found to be more compliant to IFAS than their counterparts. Similar findings were reported by Dutta *et al.*<sup>11</sup>, Sadore *et al.*<sup>15</sup> Assefa *et al.*<sup>16</sup> and Jawad *et al.*<sup>17</sup>. Imparting knowledge on anemia and supplementation programs through health education or through formal or informal education beyond the health sector, especially in education sectors can help mobilize

community and raise awareness not only among pregnant women but also women of reproductive age group to utilize and uptake the various existing interventions<sup>17</sup>.

#### **LIMITATIONS**

The results of our study might not very accurate due to chances of recall bias from the participants regarding IFA intake. Some other factors such as small sample size might affect generalizability.

#### **CONCLUSION**

Overall, almost two-thirds of the participants were compliant to IFA supplementation. Lower compliance was seen with employed mother, multigravida and self-purchased method of availing IFA and higher compliance was seen among mothers having good knowledge of IFA. Therefore, the study findings suggest that proper and timely counseling and awareness regarding health benefits and possible side-effects related to IFA, improvement in the method of IFA distribution system according to existing national guidelines and training and sensitization of health-care workers are necessary.

#### **CONFLICTS OF INTEREST**

The authors declare no conflicts of interest.

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#### **DISCLAIMERS**

The opinions expressed in this article are the authors' personal views and do not represent that of their affiliated organizations, employers or associations.

#### **DATA AVAILABILITY STATEMENT**

Not Applicable

#### **HIGHLIGHTS OF THE STUDY**

- In India, the Ministry of Health and Family Welfare has launched Intensified-National Iron Plus Initiative Strategy (I-NIPI), prophylactic dose for Iron Folic Acid Supplementation (IFAS) to all pregnant women
- Success of the program is dependent on compliance
- Needed to determine factors associated with compliance among pregnant women
- 68% of pregnant Muslim women were found to be compliant to IFAS

- Being employee, multigravida and having purchased IFA by self were negatively associated with compliance IFAS. There is a need to scale up health awareness on IFAS and Ante Natal Care Coverage of Antenatal IFAS supply through community level workers

#### AUTHOR CONTRIBUTIONS

NA conceived the review idea. UDT conducted the literature search. HKS prepared the 1st draft of the manuscript. HKS reviewed, edited and revised the manuscript substantially on the key intellectual content. NA finalized and approved the current version agreed to be accountable for accuracy and integrity and decided to submit the manuscript to Trends in Medical Research.

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