

Compliance to iron and folic acid supplements among the pregnant women of the rural field practice area of a medical college in Central Karnataka

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ABSTRACT


Background: According to the World Health Organization anemia in pregnant women is defined as blood hemoglobin <11 gm/dl, which is the important public health problem worldwide. It is estimated that >40% of pregnant women all over the world are anemic, South Asia constituting 49.8% and 50.1% by India. About 20% of maternal deaths are caused by complications secondary to anemia worldwide and Iron deficiency anemia accounts for 85%. Additional iron and folic acid (IFA) are needed for pregnant women to meet their own nutritional needs and that of the developing fetus. Deficiencies in IFA during pregnancy can negatively influence the health of the mother as well as fetal development. The use of IFA supplements is associated with a reduced risk of iron deficiency and anemia. Therefore, Reproductive Child Health Program is supplementing 100–200 IFA supplements to all pregnant women who are registered. **Objectives:** To determine the compliance for IFA tablets and factors influencing it among the pregnant women (2nd and 3rd trimester) residing at Rural Health Training Centre (RHTC) of Shyamanur Shivashankarappa Institute of Medical Sciences and Research Centre (SSIMS and RC), Davangere. **Materials and Methods:** A cross-sectional study was conducted from June 2017 to December 2017 at RHTC of SSIMS and RC, Davangere. All the pregnant women who gave consent were interviewed on their antenatal visits and data was collected using pre-designed, pre-structured questionnaire and other necessary information were taken from their recent medical reports. Analysis was done by using SPSS v10, Chi-square test was applied to find the association among the variables. **Results:** In the present study the compliance to IFA tablets was found to be 85.7% among the total participants. Education, type of family, number of antenatal care (ANC) visits are significantly related to the compliance of IFA tablets. **Conclusion:** Compliance to IFA is higher than the national average which may be attributed to the good awareness and health service provided during the ANC check-ups.

KEY WORDS: Iron and Folic Acid Supplements; Compliance; Pregnant Women; Rural Area

INTRODUCTION

According to the World Health Organization anemia in pregnant women is defined as blood hemoglobin <11 gm/dl,

which is an important public health problems worldwide. The global burden of anemia worldwide is around 40%, South East Asia is 49.8% and in India, it is 50.1%. About 20% of maternal deaths are caused by complications secondary to anemia worldwide and 85% of all cases of anemia are because of Iron deficiency anemia (IDA).^[1] More than half of anemia cases in pregnancy are because of iron deficiency, though it is thought to be the most common cause of anemia worldwide.^[2] Iron is an essential nutrient, required for hemoglobin synthesis, other than normal wellbeing, its demand increases highly during pregnancy and many times

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does not get supplied through the regular diet.^[1] Increased demand during pregnancy and lactation along with menstrual blood loss leads to poor iron stores in women. Conventionally, the Indian housewife eats at the end after all the family male members, and children and in many families, the women eat only what is left. Therefore, women have more chances for developing IDA than other members of the family even though the food prepared for the family is all same.^[3]

According to the National Family Health Survey 5 (NFHS-5) the key indicators in India are as below.^[4,5]

Key Indicators	Karnataka	Davangere
Consumption of iron folic acid for 100 days or more by women when they were pregnant (%)	44.7	25.0
Consumption of iron-folic acid for 180 days or more by women when they were pregnant (%)	26.7	21.0
Pregnant women who are anemic in 15–49 age group (years) (Hb <11.0 g/dl) (%)	45.7	33

Pregnant women need iron requirements as 1.9 mg/1,000 Kcal of dietary energy in the 2nd trimester and 2.7 mg/1,000 Kcal in the 3rd trimester.^[3]

Being conscious about the ground realities the Ministry of Health and Family Welfare (MoH and FW) thought of a policy decision to start the National Iron+ Initiative (iron and folic acid [IFA] supplementation for: pregnant and lactating women and; children of age 6–60 months). To achieve adherence to IFA among adolescents, pregnant and lactating women, Blue tablet (“Iron ki nili goli”) and the Red IFA tablet, respectively, an effort has been made under the Weekly IFA Supplementation program. IFA supplements help in reducing risk of iron deficiency and anemia as documented by several research. Under the Reproductive and Child Health Program, IFA tablets are being distributed to all pregnant women and lactating mothers through sub-centers, primary health centers (PHCs), Community health centers, and district hospitals.^[3]

The MoH and FW have launched Anemia Mukh Bharat (AMB) program with special focus on the health and nutrition needs of children, adolescents, women in the reproductive age group, antenatal women, and lactating women. This will be achieved through six interventions, implementation of which will be facilitated by six robust institutional mechanisms. The AMB program is a universal strategy which focus on the six interventions:

1. Prophylactic IFA supplementation
2. Deworming
3. Intensified year-round Behavior Change Communication Campaign
4. Testing and treatment of anemia, using digital methods and point of care treatment, with a special focus on pregnant women and school-going adolescents

5. Mandatory provision of IFA fortified foods in government-funded public health programs
6. Intensifying awareness, screening, and treatment of non-nutritional causes of anemia in endemic pockets, with a special focus on malaria, hemoglobinopathies, and fluorosis.^[6]

To facilitate seamless implementation of these interventions, a training tool kit has been developed which will be used to orient and train different stakeholders at various levels for effective implementation of AMB strategy. The health workers will explain the important information to the beneficiaries while consuming IFA supplementation.^[6]

IFA supplementation composed of 100 mg elemental iron and 500 mcg of folic acid every day for at least 3 months (100 days), starting from 2nd trimester, at 14–16 weeks of gestation followed by the same dose for another 100 days after delivery. Along with this, all women in the reproductive age group (15–45 years) during the pre-conception period and up to 1st trimester of the pregnancy are advised to take 400 mcg of folic acid tablets to prevent the incidence of neural tube defects in the fetus.^[3]

Things to remember: IFA tablets to be taken preferably about 1 h after major meals to prevent side effects such as nausea. Beneficiaries complaining of side effects are advised to take the IFA supplements after dinner and before sleeping. Such as it should be consumed along with foods rich in Vitamin C such as lemon in the form of nimbu-paani, amla (Indian gooseberry), etc. for improving the absorption of iron. Drinking tea or coffee within an hour of consuming IFA should be discouraged, as it may reduce iron absorption. Iron and calcium tablets should not be consumed together, as calcium interferes in iron absorption. At least 2 h of interval should be there between calcium and iron tablet consumption.^[6]

Thus, as similar studies have not been carried out in the selected study area before, to ensure good nutrient and to explore the determinants which affect optimum compliance of IFA supplements, we took up the present study among antenatal women residing in rural area of Davangere.

Objectives

- To determine the compliance for IFA supplements among the pregnant women in the study area
- To evaluate the factors influencing the compliance in the selected study population.

MATERIALS AND METHODS

The present cross-sectional study was carried out in the rural field practice area of Shyamanur Shivashankarappa Institute of Medical Sciences and Research Centre

(SSIMS and RC), Lokikere under Davangere district, from June 2017 to December 2017 among all the pregnant women of the study area. The pregnant women who were in the 2nd and 3rd trimester were enrolled into the study with informed consent and those antenatal women in the 1st trimester and with other comorbidities were exempted from the study.

The sample size was calculated taking compliance of 77% to IFA supplements from the study conducted at a rural area of Tamil Nadu (Selvaraj *et al.*) with 10% absolute precision and 95% confidence interval, the estimated sample size was 70.^[7] By taking 10% non-response error we arrived at 84 participants. The information was collected using pre-designed, pre-structured questionnaire and other necessary information was taken from their recent medical reports. The information related to sociodemographic characteristics, economic status, pregnancy, diet, awareness regarding intake of IFA supplements, and other required medical reports were collected.

The antenatal women attending the antenatal care clinic at the primary health center during the study period were included as the patients in the study and the information was collected during their antenatal visit.

Operational Definition

Compliance is defined as a total number of tablets consumed to the total number of tablets advised multiplied by 100. Women taking 80% of given tablets are considered as satisfactory compliance. Compliance to IFA tablets is calculated by the formula,^[8]

$$\text{Compliance} = \frac{\text{Number of tablets given} - \text{Number of tablets remaining}}{\text{Number of tablets given}} \times 100$$

Ethical Approval

It was obtained from the institutional ethical review board (IERB) prior to the study. The IERB stated that “Compliance to IFA supplements among the pregnant women of the rural field practice area of a medical college in central Karnataka” has been approved by IERB, SSIMS and RC, at its meeting held on June 1, 2017, and satisfied with the response to queries raised.

Statistical Methods

Data were entered into MS Excel 2007 and analyzed using SPSS version 17.0. Socio-demographic characteristics were presented as percentages, proportions. To find the association among the variables, Chi-square test/Fisher’s exact test was used and *P* < 0.05 was considered statistically significant.

RESULTS

The socio-demographic factors of the study participants are as follows. Among the 84 participants, more than half the participants are in the 2nd trimester (58.3%), 88% were aged between 18 and 27 years, 98% were Hindus, 41.7% belonged to joint family, about 90% were literate, 81% of the participants belonged to below poverty line, 45.2% were primigravida, 78.6% were homemakers, and 74.0% participants had taken tablets in their previous pregnancy [Table 1].

Table 1: Socio-demographic characteristics of the participants (n=84)

Characteristics	Variable	Frequency	Percentage
Trimester	2 nd	49	58.3
	3 rd	35	41.7
Age (years)	18–22	40	47.6
	23–27	35	41.7
	28–32	6	7.1
	33–37	3	3.6
Religion	Hindu	83	98.8
	Muslim	1	1.2
Education	Illiterate	9	10.7
	Primary	7	8.3
	Secondary	43	51.2
	High school	12	14.3
	PUC	13	15.5
Occupation	Home makers	66	78.6
	Labours	12	14.3
	Others	6	7.1
Gravid	Primi	38	45.2
	Second	31	36.9
	Third or more	15	17.9
Spacing (n=46)	<3 years	32	69.6
	>3 years	14	30.4
IFA consumed in previous pregnancy (n=46)	Yes	34	74.0
	No	12	26.0
Type of family	Nuclear	25	29.8
	Joint	35	41.7
	Three generation	24	28.6
Socio economic class (Modified BG Prasad’s)	Class I	25	29.8
	Class II	40	47.6
	Class III	7	8.3
	Class IV	9	10.7
	Class V	3	3.6
Ration card	APL	16	19
	BPL	68	81
Diet	Veg	13	15.5
	Non-veg	71	84.5

IFA: Iron and folic acid

The overall compliance to iron-folic supplements is 85.7% and 12 (14.3%) participants were non-compliant to therapy [Figure 1].

Compliance was almost the same among all the age groups of participants in the rural area i.e, (85.7%), 89.3% of the literate participants were found to be compliant. Only 81.8% of the homemakers were found compliant compared to labors and others which was quite a unique finding. More than 80% of the participants irrespective of gravid status, trimester, and whether before food or after food the participants were found compliant for consumption of IFA supplements [Table 2a].

Type of family, education of the women, poverty line, spacing between the pregnancies, women who had more than four antenatal visits, initiation of IFA tablets, consumption as advised by doctor, and consumption along with calcium supplements were the statistically significant determinants for compliance [Table 2a and b].

The independent factors which were associated with non-compliance are illiteracy, multigravida, joint family, lower socioeconomic classes, forgetfulness, distance from the PHC, less number of antenatal visit, initiation of IFA and not taking according to doctors' advice [Table 2a and b].

DISCUSSION

In the present study, the compliance to IFA supplements was found in 85.7% of the participants. About 88% of the participants were in the age group of 18–27 years, 58.8% in the 2nd trimester, 45.2% were primigravida, the majority belonged to Hindu religion (98%), and literates constituted 90%, 81% belonged to below poverty line. The compliance level was found the same among all the age groups (85.7%), 89% of the literates adhered to daily IFA supplements. Irrespective of the gravid status, trimester, and pattern of consuming IFA, 80% were compliant to IFA supplements.

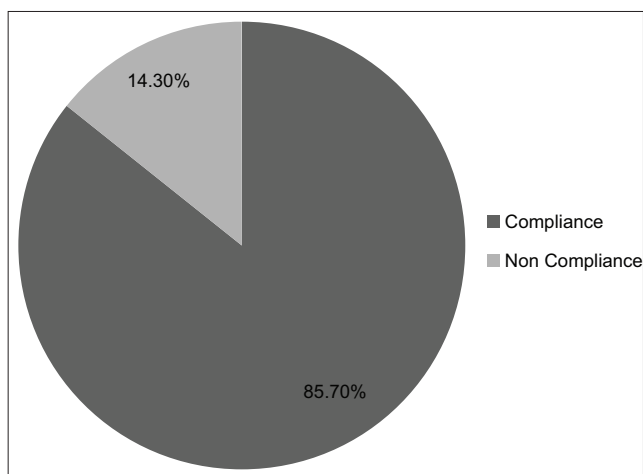


Figure 1: Compliance of iron and folic acid supplements among pregnant women

The significant factors which determined the compliance were the type of family, literacy, economic status, spacing, >4 antenatal care (ANC) checkups, initiation of IFA, and following advice given as per the doctor.

Noncompliance was mainly because of illiteracy, multigravida, joint family, and distance from the PHC, lesser ANC checkups, and initiation of IFA supplements in the later part of pregnancy.

The compliance to IFA supplements was found to be 85.7%. This finding is comparatively higher than the similar studies conducted by Selvaraj *et al.* (77%), Gebremedhin *et al.* (75%), Manasa *et al.* (71%), Mithra *et al.* (64.7%), Dutta *et al.* (61.7), and Seck *et al.* (69%).^[7-12] NFHS-5 data shows that around 45% of the pregnant women in Karnataka have taken minimum of 100 tablets during the antenatal period.^[4] But in our study, it is around 85.7% which is far better compliant status which might be due to the fact that all the participants were selected from primary health centers who had better access to healthcare or might also have been overrated as it is measured based on the history given as compared with tablet counts or biochemical estimation of hemoglobin method. Lower level of education, joint family, spacing, multigravida, poverty, and less health checkups resulted significantly to poor compliance for IFA pills which are similar to the study held by Selvaraj *et al.*, Dutta *et al.*, Pal *et al.*, and Thankachan *et al.*^[7,8,13,14] The poor compliance due to spacing can be attributed to negligence, thinking that women are in better-nourished state due to the long gap. Furthermore, it is obvious that illiterate were poorly compliant because of the lack of awareness. Socioeconomic class plays an important role as it affects affordability, ignorance, limited access to good nutrition, nutrient supplements. The other factors which determined the compliance of IFA tablets are distance from the PHC and less ANC visits which are similar to studies conducted by Manasa *et al.* and Nisar *et al.*^[10,15] The initiation of the IFA supplementation in our study significantly determines the compliance to IFA tablets ($P = 0.010$), which indicates higher compliance among women in 2nd trimester than in 3rd trimester which may be attributed to better tolerability among those who started early which is same as the study held by Selvaraj *et al.*^[7] The other factors such as diet, consumption of IFA along with other food items (milk, citrus fruits, and tea/coffee), pattern of intake and consumption of calcium along with IFA tablet also individually affected the compliance, and these findings are similar to Selvaraj *et al.*^[8] Iron and calcium tablets should not be consumed together, as calcium interferes in iron absorption.^[6] The unique finding in our study was the labors were better compliant than the homemakers which need further evaluation.

The strengths on assessing our study were good health care services provided by the health workers at the center resulted in better compliance. However, as only pregnant women visiting the health center, were assessed, the level of compliance to

Table 2a: Determinants of compliance of IFA among the participants (*n*=84)

Characteristics	Compliance <i>n</i> =72, <i>n</i> (%)	Non-compliance <i>n</i> =12, <i>n</i> (%)	Total	<i>P</i> -value
Age (years)				
<25	54 (85.7)	9 (14.3)	63	1.00
>25	18 (85.7)	3 (14.3)	21	
Religion				
Hindu	71 (85.5)	12 (14.5)	83	0.681
Muslim	1 (100)	0 (0)	01	
Education				
Illiterate	5 (55.6)	4 (44.4)	9	0.021*
Literate	67 (89.3)	8 (10.7)	75	
Occupation				
Home maker	54 (81.8)	12 (18.2)	66	0.193
Labor	12 (100)	0 (0)	12	
Others	6 (100)	0 (0)	06	
Gravid status				
Primi	35 (92.1)	3 (7.9)	38	0.128
Multi	37 (80.4)	9 (19.6)	45	
Trimester				
2 nd	42 (85.7)	7 (14.3)	49	1.000
3 rd	30 (85.7)	5 (14.3)	35	
Spacing (years) <i>n</i> =46				
<3	27 (84.4)	5 (15.6)	32	0.014*
>3	7 (50)	7 (50)	14	
Type of family				
Nuclear	22 (88.0)	3 (12.0)	25	0.018*
Joint	29 (82.9)	6 (17.1)	35	
Three generation	21 (87.5)	3 (12.5)	24	
Socio economic class (Modified BG Prasad's)				
Class I	22 (88)	3 (12)	25	0.147
Class II	36 (90)	4 (10)	40	
Class III	4 (57.1)	3 (42.9)	07	
Class IV	8 (88.9)	1 (11.1)	9	
Class V	2 (66.7)	1 (33.3)	3	
Poverty line				
APL	15 (71.4)	6 (28.6)	21	0.03*
BPL	57 (90.5)	6 (9.5)	63	
Diet				
Veg	13 (100)	0 (0)	13	0.109
Non veg	59 (83.1)	12 (16.9)	71	

IFA: Iron and folic acid

IFA supplements could not be assessed overall, as only those who had better accessibility to the health center visited and the rest could not be surveyed. Further exploration needs to be undertaken among adolescents and all the women either after delivery or pre-conceived state so as to prevent anemia in pregnancy. Furthermore, the level of hemoglobin values was not measured after the initiation of the IFA supplements because of the short duration of the study.

Recommendations

- Adequate availability of IFA supplements at all health centers
- Regular contact of pregnant women for ANC checkups including Hb estimation and completion of treatment
- Creating awareness among pregnant women on common side-effects of IFA supplementation, general misbeliefs

Table 2b: Determinants of compliance of IFA among the participants (*n*=84)

Characteristics	Compliance <i>n</i> =72, <i>n</i> (%)	Non-compliance <i>n</i> =12, <i>n</i> (%)	Total	<i>P</i> -value
Distance from PHC (km)				
1	20 (90.9)	2 (9.1)	22	0.647
2	29 (85.3)	5 (14.7)	34	
3	9 (75)	3 (25.)	12	
4	14 (87.5)	2 (12.5)	16	
No of ANC visits				
<4	32 (78.0)	9 (22.0)	41	0.049*
>4	40 (93.0)	3 (7.0)	43	
Anemia status				
Yes	29 (85.3)	5 (14.7)	34	0.928
No	43 (86)	7 (14)	50	
Initiation of IFA tablets				
2 nd trimester	67 (89.3)	8 (10.7)	75	0.010*
3 rd trimester	5 (55.6)	4 (44.4)	9	
Consumption of IFA				
Taken as per advice	72 (100)	0 (0)	72	0.000*
Taken not as per advice	0 (0)	5 (100)	5	
Non taken	0 (0)	7 (100)	7	
Time of IFA tabs intake				
Morning	9 (90.0)	1 (10.0)	10	0.90
Afternoon	10 (83.3)	2 (16.7)	12	
Night	53 (85.5)	9 (14.5)	62	
Pattern of consuming IFA				
Before food	1 (100)	0 (0)	1	0.68
After food	71 (85.5)	12 (14.5)	83	
Foods consumed with IFA				
Milk	12 (100)	0 (0)	12	0.240
Citrus fruits	5 (83.3)	1 (16.7)	6	
Tea/coffee	1 (50.0)	1 (50.0)	2	
None	54 (84.5)	10 (15.5)	64	
IFA tabs along with Calcium				
Yes	43 (93.5)	3 (6.5)	46	0.025*
No	29 (76.3)	9 (23.7)	38	

IFA: Iron and folic acid, ANC: Antenatal care

associated with consumption of IFA tablets, and risk associated if anemia is left unattended

- Provision of incentives to frontline health workers such as ASHAs for completion of treatment leading to rise of Hb level to normal level
- To follow the instructions given regarding consumption of IFA supplements
- Advice about iron-rich foods.

CONCLUSION

To conclude in our study the pregnant women had better compliance to IFA supplements. Socio-demographic factors

such as education, type of family and economic factors like poverty line, others such as ANC visits, initiation of IFA pills significantly determine the compliance. The reasons for non-compliance to therapy are lack of awareness, illiteracy, lower socio-economic classes, forgetfulness, and lack of visits which ultimately lead to lack of counseling by health care workers.

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