Original Article

Compliance with iron folic acid (IFA) tablets and associated factors among pregnant women attending ante-natal care clinic at Sub District Hospital, Ballabgarh

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Abstract

Introduction: Anemia is a common public health problem among children, adolescent girls, women in reproductive age groups, pregnant and lactating women, with an estimated prevalence of 50.3% among pregnant women according to National Family Health Survey (NFHS) 4. Iron deficiency is regarded as the most common cause of anemia among pregnant women globally and in India. This study was aimed to estimate the prevalence of compliance to iron folic acid (IFA) tablets among pregnant mothers attending ante-natal care (ANC) clinic in a Sub-district hospital (SDH) situated in north India and the various factors associated with non-compliance to IFA tablets. **Methodology:** A cross-sectional facility-based study was conducted among pregnant women attending the ANC clinic at SDH, Ballabgarh. A pretested, semi-structured interview schedule was used to obtain socio-demographic data, information related to IFA therapy that they receive, their compliance and the factors that are related to missing of the doses. Data were entered using Epicollect 5 software and Stata version 13.0 was used for statistical analysis. **Results:** A total of 484 pregnant women were enrolled in our study. More than 3/4th (77.1%) of the pregnant women were compliant to IFA tablet supplement given to them. The compliance was more in the study participants belonging to older age groups, lower socio-economic status and those with hemoglobin levels >11 gm/dl. The most common reason for non-compliance was found to be "forgetfulness" (63.0%) followed by "side effects" (49.5%). **Conclusion:** Compliance with IFA tablets was better among pregnant women who were non anemic and those with good compliance to IFA tablets had better hemoglobin levels.

Keywords: Compliance, IFA, iron folic acid, pregnant women

Introduction

Anemia is a condition which causes reduced oxygen carrying capacity of the red blood cells thereby causing insufficiency in meeting the body's physiological needs.[1] It is a common public health problem among children, adolescent girls, women in reproductive age group, pregnant and lactating women, with an estimated prevalence of 50.3% among pregnant women according to National Family Health Survey (NFHS) 4, which is amongst the highest in the world.[2,3] According to the World Health Organization, anemia is defined as blood hemoglobin concentration of less than 11 gm/dl for pregnant women.[4] It causes a number of adverse antenatal, intra-natal, post-natal and fetal complications such as maternal deaths, post-partum hemorrhage, fetal deaths, prematurity, poor

Access this article online

Quick Response Code:

Website:
www.jfmpc.com

DOI:
10.4103/jfmpc.jfmpc_1742_20

How to cite this article: Deori TJ, Ramaswamy G, Jaiswal A, Loganathan V, Kumar R, Mahey R, *et al*. Compliance with iron folic acid (IFA) tablets and associated factors among pregnant women attending ante-natal care clinic at Sub District Hospital, Ballabgarh. J Family Med Prim Care 2021;10:2006-11.

cognitive development, low birth weight, etc.[5] Iron deficiency is regarded as the most common cause of anemia among pregnant women globally and in India.[6] Hence, repeated efforts have been taken to supplement pregnant women with iron and folic acid tablets (IFA tablets) starting from 1970 when National Nutritional Anemia Prophylaxis Program was launched to the most recent Anemia Mukt Bharat (AMB) in 2018.[7]

Current AMB program guidelines recommend prophylactic supplementation of one IFA tablet with 60 mg of elemental iron and 500 microgram of folic acid, every day for 180 days from the second trimester onwards and to continue six months postpartum. For mild and moderately anemic pregnant women, two IFA tablets are given as therapeutic dose. However, according to NFHS 4, the proportion of antenatal mothers who consumed IFA tablets for 100 days or more was only 30.3% (Rural – 25.9% and Urban – 40.8%)[2] in India.

Reasons for low consumption of IFA by pregnant women include factors both from the demand (women) as well as the supply (health system challenges in providing adequate supply).[8] Pregnant women's compliance to IFA tablets is one of the important factors that affects IFA consumption. Compliance may be defined as the dose taken in relation to what was prescribed. Studies conducted in rural, urban and tertiary healthcare contexts shows different amount of compliance to IFA tablets by pregnant women.[9-12]

In view of the above, we aimed at estimating the compliance to IFA tablets among pregnant mothers attending ANC clinic in a sub-district hospital situated in north India. We also aimed to study the various factors that are associated with non-compliance to IFA tablets and to evaluate the trend of hemoglobin (Hb) levels among those who are compliant to taking IFA tablets.

Methodology

We conducted a cross-sectional facility-based study in sub-district hospital, Ballabgarh which is a 50-bedded secondary care hospital. The hospital is part of the Comprehensive Rural Health Services Project, Ballabgarh and is the Rural Health Centre under the Centre for Community Medicine, All India Institute of Medical Sciences (AIIMS) New Delhi, India. It is located 35 km from AIIMS, New Delhi. The hospital provides health services including antenatal care and confinement services including caesarean section to women from Ballabgarh block of district Faridabad (population of around 190,000) and nearby areas of district of Palwal, Haryana State, India.

The study was conducted among pregnant women attending the antenatal care (ANC) clinic at aforesaid hospital during the period January to March 2020. Pregnant women who had at least one prior ANC visit (one month before the date of interview) and those with gestational age more than 16 weeks (as determined from last menstrual period) were included in the study. Pregnant women who had iron sucrose infusion 1 month

prior to the interview were excluded. Taking the prevalence of non-compliance of IFA tablets among pregnant women to be 35.3% with 20% relative precision, 95% confidence interval, the minimum sample size was calculated to be 176. A total of 484 pregnant women who attended the ANC clinic during the month of February 2020 were finally enrolled in the present study. As part of the routine ANC care, all pregnant women after registration undergo anthropometry measurement, urine analysis (sugar and albumin), hemoglobin measurement using point of care digital hemoglobinometer and then consultation with a doctor.

As part of the study, pregnant women were screened at the registration counter and those eligible for the study were interviewed before their consultation with doctor. A pretested, semi-structured interview schedule was used to obtain socio-demographic data, information related to IFA therapy that they receive, their compliance and the factors related to missing of the doses. The socio-economic status of the study participants was determined according to the Modified BG Prasad socio-economic status classification. Compliance, defined as total number of tablets consumed to the total number of tablets prescribed multiplied by 100. Women taking 80% of prescribed tablets were considered compliant to IFA. Compliance percentage was calculated by the formula: Compliance = {(Number of tablets given - Number of tablets remaining)/ Number of tablets given} × 100.

Data was collected using Epicollect 5 mobile application and data analysis was performed using Stata version 13.0. Means with standard deviation and proportions were calculated for descriptive statistics.

Ethical clearance was obtained from the AIIMS Institute Ethics Committee (IEC) and permission from the hospital authorities were obtained before the commencement of the study. The study participants were explained about the purpose and objectives of the study in Hindi and made sure that it was understood by them. They were provided with participant information sheet and written informed consent were obtained from them.

Results

More than half (56.0%) of the pregnant women in our study were in the age group of 21-25 years of age and majority (26.4%) of them had education up to high school followed by up to senior/higher secondary level (22.7%). About a third (30.8%) of the pregnant women belonged to lower middle class socio economic status according to the modified B G Prasad Socio economic scale and maximum (81.0%) of them were from joint families. Majority (61.6%) of the pregnant women in our study had a gravida of ≥2 and more than one-third (37.9%) were on their 2nd ANC clinic visit during the study. The proportion of the study participants with anemia (57.2%) was observed to be more than non-anemics (42.8%) [Table 1].

Out of the total 484 pregnant women that took part in the present study, more than 3/4ths (77.1%) were found to be compliant to the IFA tablets prescribed to them (>80% compliance percentage) [Figure 1].

Mean number of IFA tablets received by the pregnant women in their last ANC clinic visit was observed to be 49.96 (±15.28) tablets and the mean number of IFA tablets consumed in the last 30 days was found to be 43.16 (±17.86) tablets. The mean (SD) hemoglobin of the study participants was found to be 10.69 (1.31) gm%. The most common reason for non-compliance to IFA tablets was found to be "forgetfulness" followed by side effects [Table 2].

Compliance was seen to be higher in older age groups with the highest (88.9%) being in the age groups of >30 years of age. In univariate logistic regression, it was observed that the study participants aged >30 years were 2.3 times more chance of being compliant compared to those aged 20 years or less. It was seen that compliance was lower in upper socio-economic status (67.6%) and highest among the study participants that belonged to lower socio-economic status (82.1%) while on logistic regression it was found that those belonging to upper socio-economic status had 2.2 times more chances of being compliant as compared to those belonging to lower socio-economic status. Compliance was noted to be similar among different family types, gravida, and number of ANC clinic visit. In logistic regression it was observed that the pregnant women belonging to joint family had less chance of being compliant compared to those belonging to nuclear family and multi para pregnant women had less chances of being compliant compared to primi para. It was also observed that the chances of being compliant to IFA supplements increased with increased number of ANC visits with those with >4 ANC visits had 1.4 times more chance of being compliant compared to those who have had only 2 ANC visits. It was also noted that the compliance was better among non-anemics (81.6%) than anemics (73.6%) and a statistically significant difference (p-value = 0.04) was observed between anemia status and compliance to IFA tablets. Non anemics had 1.6 times more chance of being compliant to IFA tablet supplements compared to anemics on univariate logistic regression [Table 3].

It was also observed in the present study that for every percent increase in compliance to IFA tablets among the pregnant women, there was an increase in hemoglobin levels by 0.006 gm/dl [Figure 2].

Discussions

Compliance with IFA tablets is vital for prevention as well as treatment of iron deficiency anemia especially in pregnant women in whom iron requirement usually starts increasing in the second trimester. In the present study, the pregnant women who had a compliance rate of more than 80% were considered to be compliant. The overall compliance among the pregnant women was found to be 77.1%. Previous studies done by Selvaraj *et al*.[13] and Godara *et al*.[10] observed a similar compliance rate of 77.0% and 80.5%, respectively, while studies by Mithra P, *et al*.[12] and Dutta AJ, *et al*.[11] showed slightly less compliance rate of 64.7% and 61.7%, respectively.

Manifestations of anemia vary by its severity and range from weakness, dizziness, fatigue, and drowsiness to impaired cognitive development in children and increased morbidity. Anemia in pregnancy is associated with post-partum hemorrhage, neural tube defects, low birth weight, premature births, stillbirths, and maternal deaths. Despite numerous preventive and promotive efforts from the Government, anemia in pregnancy still stands as a major health problem in India. Among the total pregnant women in the present study, majority (57.2%) were found to anemics (hemoglobin <11 gm/dl) which was higher than the national prevalence of anemia among pregnant women which stands at 50%.[2]

In the present study, the most common reason given by the pregnant women for non-compliance was "forgetfulness" (63.0%) followed by "side effects" (49.5%).
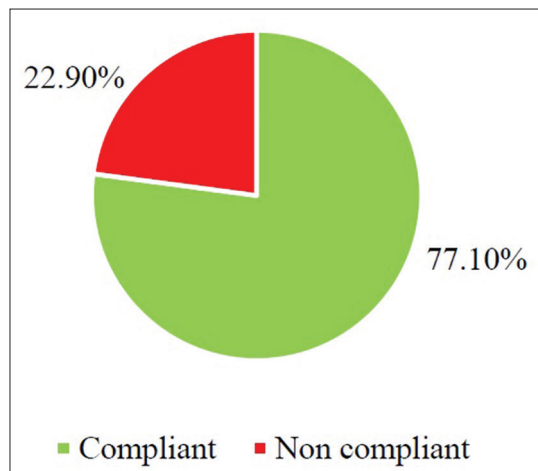

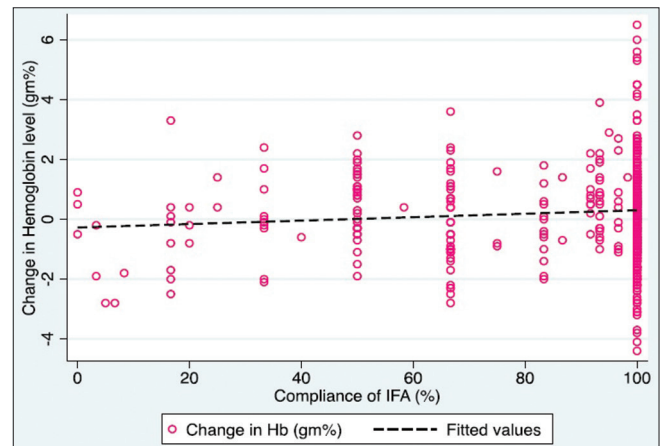**Figure 1:** Compliance of IFA tablets among the study participants

Figure 2: Relation between change in hemoglobin levels and compliance to IFA tablets

Table 1: Socio-demographic characteristic and pregnancy history of the study participants (*n*=484)

Variables	Frequency (Percentage)
Age (in completed years)	
≤20 years	80 (16.5)
21-25 years	271 (56.0)
26-30 years	115 (23.8)
>30 years	18 (3.7)
Education	
No formal education	32 (6.6)
Primary and middle school	88 (18.2)
High school	128 (26.4)
Senior/Higher secondary	110 (22.7)
Graduate	95 (19.6)
Post graduate	31 (6.4)
Socio-economic status	
Upper	37 (7.6)
Upper middle	119 (24.6)
Middle	140 (28.9)
Lower middle	149 (30.8)
Lower	39 (8.1)
Type of family	
Nuclear	92 (19.0)
Joint	392 (81.0)
Gravida	
Primi	186 (38.4)
Multi	298 (61.6)
Number of ANC clinic visits	
2	182 (37.6)
3	140 (28.9)
4	79 (16.3)
>4	83 (17.1)
Anemia status	
Anemic	277 (57.2)
Non anemic	207 (42.8)
Co morbidities	
GDM	2 (0.4)
Hypertension	1 (0.2)
Others	2 (0.4)

Table 2: IFA Compliance history of the study participants

Variable	Mean	SD
Mean IFA tablets received in the last ANC clinic visit	49.96	15.28
Mean IFA tablets consumed in the last 30 days	43.16	17.86
Mean Hb of the study participants	10.69	1.31
Reasons for non-compliance (Multiple answers) (*n*=111)	**Frequency**	**Percentage**
Side effects	55	49.5
Forgetfulness	70	63.0
Others	6	5.4

Mithra P, *et al.*[12] and Dutta AJ, *et al.*[11] in previous studies showed similar observations with forgetfulness being the major reason for missing IFA doses. Support from the husband and other family members by reminding to take the tablets on time could play a vital role in increasing the compliance.

Alternatively, reminders could be placed on mobile phones, as well for the same.

Compliance was observed to be better among women in older age groups. The reason for this may be due to the fact that the study participants in the older age groups were more concerned about their pregnancy than those in younger age group owing to previous experiences or because of the pregnancy being a precious one. This observation was accordance of findings shown by a study done by Godara *et al.*[10]

It was noted in the present study that the pregnant women belonging to lower socio-economic status (82.1%) had better compliance than those who belonged to upper class (67.6%). The reason for poor compliance among women from higher socio-economic status needs more exploration and is up for interpretation. Similar observation was seen in a study by Selvaraj *et al.*[13] where they showed that the compliance was better among women from lower socio-economic status. Godara *et al.*[10] on the contrary reported that compliance was better in women belonging to higher economic status.

In our study it was also observed that the compliance was better among the non-anemics (81.6%) study participants compare to the anemics (73.6%) and a statistically significant difference was observed between the anemia status of the pregnant women and their compliance to IFA tablets. Higher compliance with IFA tablets among the pregnant women in our study could be attributed to the reason that hemoglobin of all pregnant women coming to ANC clinic are measured on each visit and they are counselled regarding their hemoglobin levels with extra emphasis put upon consumption of the prescribed IFA tablets. It was also noted in our study that for every percentage increase in compliance, there was a increase in hemoglobin levels by 0.006%. This indicates that a better compliance to IFA tablets leads to an increase in hemoglobin levels in pregnant women.

Conclusion

The present study observed that the more than 3/4th of the pregnant women were compliant to IFA tablet supplement given to them. The compliance was more in the study participants belonging to older age groups, lower socio-economic status and those who had hemoglobin levels more than 11 gm/dl. The most common reason for non-compliance was found to be "forgetfulness" followed by "side effects".

Limitations

The present study was an interview-based study which mainly relied on the recall capacity of the pregnant women. There is a high possibility of the participants giving incorrect or erroneous answers (recall bias) which might have affected the results of our study, ultimately. We did not carry out pill counting or other objective methods for checking the compliance and compliance was measured as per the self-reported by the pregnant women.

Variables	Compliance		Chi-square *P*	Odds Ratio (95% C.I.)	*P*
	Compliant *n*=373	Non-compliant *n*=111			
Age (in completed years)					
≤20 years	62 (77.5)	18 (22.5)	0.22	-	-
21-25 years	201 (74.2)	70 (25.8)		0.83 (0.46-1.50)	0.55
26-30 years	94 (81.7)	21 (18.3)		1.30 (0.64-2.63)	0.47
>30 years	16 (88.9)	2 (11.1)		2.32 (0.49-11.06)	1.06
Education					
No formal education	25 (78.1)	7 (21.9)	0.64	-	-
Primary and middle school	64 (72.7)	24 (27.3)		0.75 (0.29-1.95)	0.55
High school	97 (75.8)	31 (24.2)		0.88 (0.34-2.22)	0.78
Senior/Higher secondary	87 (79.1)	23 (20.9)		1.06 (0.41-2.75)	0.91
Graduate	78 (82.1)	17 (17.9)		1.28 (0.48-3.45)	0.62
Post graduate	22 (71.0)	9 (29.0)		0.68 (0.22-2.14)	0.52
Socio-economic status					
Upper	25 (67.6)	12 (32.4)	0.44	2.19 (0.75-6.39)	0.15
Upper middle	91 (76.5)	28 (23.5)		1.45 (0.66-3.18)	0.35
Middle	113 (80.7)	27 (19.3)		2.01 (0.90-4.50)	0.09
Lower middle	112 (75.2)	37 (24.8)		1.56 (0.69-3.50)	0.28
Lower	32 (82.1)	7 (17.9)		-	
Type of family					
Nuclear	71 (77.2)	21 (22.8)	0.98	-	-
Joint	302 (77.0)	90 (23.0)		0.99 (0.58-1.70)	0.98
Gravida					
Primi	147 (79.0)	39 (21.0)	0.41	-	-
Multi	226 (75.8)	72 (24.2)		0.83 (0.53-1.29)	0.42
Number of ANC clinic visits					
2	139 (76.4)	43 (23.6)	0.67	-	-
3	105 (75.0)	35 (25.0)		0.93 (0.56-1.55)	0.78
4	61 (77.2)	18 (22.8)		1.05 (0.56-1.96)	0.88
>4	68 (81.9)	15 (18.1)		1.40 (0.73-2.70)	0.31
Anemia status					
Anemic	204 (73.6)	73 (26.4)	0.04*	-	-
Non anemic	169 (81.6)	38 (18.4)		1.59 (1.02-2.48)	0.04*

No dietary history of the pregnant women was taken into account. Type of diet affects the iron absorption capability of an individual and also the hemoglobin levels. Dietary history could have given us a better insight into the association between compliance and anemia in pregnant women.

Comparability was difficult as the definition of compliance varies across different studies.

This was a hospital-based study and cannot be generalized for the general population. Community based study is required on the same subject matter to get a better evidence and understanding in the population.

Strengths

There are very limited studies in India exploring the compliance with IFA tablets in pregnant women and none in North India. The present study is an attempt to address the lacunae in research regarding the same.

Financial support and sponsorship

Conflicts of interest

There are no conflicts of interest.

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