

Compliance to iron-folic-acid supplementation and associated factors among pregnant women: A cross-sectional survey in a district of West Bengal, India

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ABSTRACT

Background: Iron-deficiency anemia is considered to be a major health problem in India. This can complicate a normal pregnancy resulting in poor maternal and fetal outcomes. Iron-folic-acid (IFA) supplementation to antenatal and postnatal mothers given through the National Health Mission (NHM) serves as a major tool to combat this problem. **Aim:** This study aimed to assess compliance to IFA supplement and associated factors among antenatal mothers in a district of West Bengal, India. **Methods:** A cross-sectional observational study was conducted among 208 pregnant mothers attending different subcenters, using multistage sampling technique. Data were collected on their demographic, obstetric profile, compliance to IFA tablets, and knowledge on various health care-related factors through direct interviews. Data were analyzed using SPSS 22.0 (licensed) considering the confidence interval to be 95%. **Results:** Compliance rate was 81.74%. The most common cause of noncompliance was forgetfulness (73.7%). On multivariate regression analysis, age, history of deworming, and education became the significant predictors for noncompliance to IFA. **Conclusions:** Compliance to IFA supplementation was better than the national average, although deworming and education can lead to a better outcome. Health workers played a pivotal role for the success of this national program.

Keywords: Antenatal mother, compliance, cross-sectional survey, IFA tablet

Introduction

Anemia is considered to be a major micronutrient deficiency in developing countries with higher incidence in south Asia and sub-Saharan Africa.^[1] Iron deficiency is considered to be the most

common nutritional deficiency causing anemia in the antenatal period and has an important impact on maternal and fetal morbidity and mortality.^[2] In India, 52.1% of pregnant women are anemic, whereas the proportion is 53.3% in West Bengal. In Hooghly district of West Bengal, the compliance of iron-folic-acid (IFA) tablets among pregnant women is 33.1% as per National Family Health Survey-4 (NFHS-4).^[3] Globally, the prevalence of anemia in 2010 was 32.9%, resulting in 68.4 million years lived with disability (YLD). As per World Health Organization (WHO) analysis in 2008, anemia affected 24.8% of the world's population,

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including 42% of pregnant women and 30% of nonpregnant women.^[4] In a study among 653 pregnant women from Burdwan district of West Bengal reported the prevalence of anemia and compliance to IFA tablets was 80% and 67%, respectively. The habit of IFA tablets consumption improved with increasing duration of pregnancy.^[5] A hospital-based cross-sectional study in Nepal reported 58% IFA compliance rate.^[6] Anemia was 24 times more likely to occur in IFA noncompliant women during pregnancy than their counterparts and three times less likely to be found in those taking foods rich in hem-iron than their counterparts.^[6] Reported literature revealed higher incidence rate of IFA supplementation among women receiving health education, privately employed, had secondary education, reported a side effect, from families with better monthly income, timing of antenatal registration, and number of antenatal care visits.^[7,8] Age, residence, nonuse of contraceptive, parental divorce were found to have a statistically significant association in the earlier study.^[9] Despite intense IEC activities in the district under this study, only 33.1% of pregnant women took IFA tablets as per the NFHS-4 survey.^[3] There are scarcity of studies on compliance to IFA tablets among pregnant women and its associated factors related to noncompliance in the study zone. Therefore, this study was conducted to estimate the proportion of compliance to IFA tablets among ANC attendant mothers and also to find out the factors related to noncompliance among the respondents.

Materials and Methods

After obtaining Institutional ethical clearance, an observational, epidemiological study using cross-sectional survey was conducted in the rural area of Hooghly district, West Bengal. The study population was pregnant women of the second and third trimesters, attending antenatal clinic in the subcenters and who were advised IFA supplementation at least 15 days before. The study was conducted between March 2019 and June 2019. Study district was chosen purposefully. Multistage sampling was used for the selection of subcenters from the study district. [Figure 1] There were total four subdivisions under the district, of which two subdivisions were selected randomly and from each two selected subdivision, four blocks had been selected by simple random sampling. Thereby, a total of eight blocks were selected. Then, from each block, two subcenters were selected randomly and accordingly, a total of 16 subcenters were included in study. The sample size was calculated by applying the formula of $Z_{\alpha}^2 \times pq/d^2$. According to NFHS-4 data, the compliance to the IFA supplementation (p) among pregnant women in the Hooghly district of West Bengal was 33.1%.^[3] Now, considering $Z_{\alpha} = 1.96$, $q = 1-p$, absolute precision $d = 10\%$, confidence interval of 95%, nonresponsive rate of 10% and multiplied with design effect of two, the final sample size obtained was 194. From each of 16 selected subcenters, 13 pregnant women were chosen. Every consecutive pregnant woman compliant to the inclusion criteria included as study participants after getting consent. If the desired number of sample could not be obtained from a subcenter, then rest has been covered from the adjacent subcenters. In this study area, 14 more willing participants than the required final sample size were present during

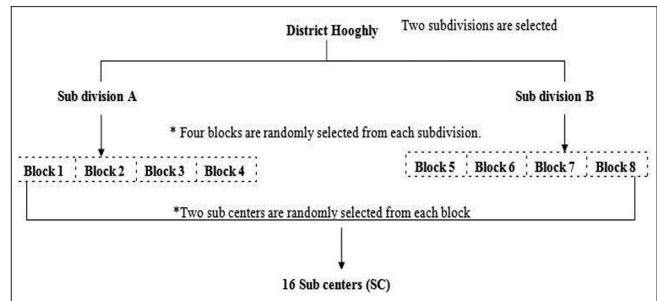


Figure 1: Multistage sampling technique for selection of study sites

the period of data collection; all of them were included in the study. Therefore, the final number of participants under the study was 208. Prior to the actual fieldwork, contact numbers of all Auxiliary Nurse Midwives (ANM) were taken from district program management unit and district statistical manager. Tracking of individuals was facilitated by ANM at Antenatal clinics. The eligible pregnant women were interviewed with the help of a pre-designed, structured proforma, after getting informed consent from them. Information was collected regarding sociodemographic and selected obstetric variables, health-care-related factors (knowledge about anemia, IFA supplementation), and side effects related to IFA tablets. Pallor was observed clinically and outpatient card was checked for hemoglobin status (present visit and previous visit) of the respondents. Mother and child protection card was used as an important information tool. Modified Prasad scale 2018 was used for socioeconomic classification. The outcome variable for this study, compliance to IFA supplement, was assessed based on the reported number of IFA tablets taken by the pregnant women as prescribed. Pregnant mothers, who took at least 80% of the expected dose of the IFA tablets in the last 15 days, were considered as compliant with iron-folic-acid supplement.^[10] Confidentiality and anonymity regarding the respondent identity was strictly maintained. Data were analyzed by using SPSS 22.0 (licensed). For quantitative variables, mean, median, and standard error (SE) were calculated, whereas proportions were used for the categorical parameters. The degree of association was determined by Chi-square test. P value less than 0.05 was considered as significant. Multivariate logistic regression was done for the factors associated with noncompliance.

Results

The study had 208 pregnant women. Mean (\pm SE) age of the respondents was 23.49 (\pm .291) years [Table 1]. The youngest mother was of 15 years and the highest age of mother was 35 years. Median (IQR) age was 23 (22.92-24.06) years. Most of the mothers (72.6%) were aged between 20-29 years and 17.8% were aged between 15-19 years [Table 2]. In this study, nearly half (47.6%) of the study respondents did not have below poverty line (BPL) card, whereas 40.4% had BPL card. As per Prasad's scale, two-thirds of study population belonged to upper social class [Table 2]. Among the pregnant mothers, 7.2% did not have formal schooling. It was seen that, husbands of one-fifth (20.2%) women were labor, 18.3% had business, whereas 18.7% involved with agricultural sector.

Table 1: Descriptive statistics of study population (n=208)

Variables	Mean (±SE)	Median
Age (years) (n=208)	23.49 (±.291)	23.00
P.C.I (n=208)	1901.88 (±55.87)	1800.00
Hemoglobin level (g%) at previous visit (n=208)	10.91 (±.071)	11.00
Hemoglobin level (g%) at current visit (n=189)	11.12 (±0.072)	11.00
Mean weight gain (kg) between two visit (n=189)	1.37 (±0.211)	2

Table 2: Sociodemographic profile of the respondents (n=208)

Variables	Category	Frequency (%)
Age group (years)	15-19	37 (17.8)
	20-29	151 (72.6)
	>30	20 (9.6)
Religion	Hindu	184 (88.5)
	Muslim	24 (11.5)
Type of family	Nuclear	39 (18.8)
	Joint	169 (81.2)
Number of family member	≥4	130 (62.5)
	<4	78 (37.5)
Social class (Prasad's scale)	Upper	136 (65.4)
	Upper middle	61 (29.3)
	Middle class	11 (5.3)
Literacy status	Illiterate	15 (7.2)
	Primary and middle	76 (36.5)
	Secondary and above	117 (56.3)

Table 3: IFA tablets consumption profile of the study population

Variables	Category	Frequency (%)
IFA tablets intake per day (n=208)	One tablet	119 (57.2)
	Two tablets	87 (41.8)
	More than two tablets	2 (1.0)
No of days advised for IFA tablets (n=208)	One month	90 (43.3)
	Two month	46 (22.1)
	Three month	72 (34.6)
Time of IFA tablets intake (n=208)	Morning	50 (24.0)
	Afternoon	67 (32.3)
	Night	4 (1.9)
	Both (morning and night)	87 (41.8)
Reason for skipping IFA tablets (n=38)	Forgetfulness	28 (73.7)
	Vomiting and gastritis	9 (23.7)
	Travel	1 (2.6)

On analyzing the obstetric profile, it was seen that more than half of women were primigravida and 35.1% had one child. Majority (71.2%) was in the second trimester and 28.8% were in the third trimester of gestation during the study period. Most (90.9%) of the study participants got registered at ANC clinic in the first trimester and 64.42% of them visited antenatal clinic two times. Of 208 women, 170 (81.74%) mothers found to be compliant, that is, consumed ≥80% of expected dose of IFA

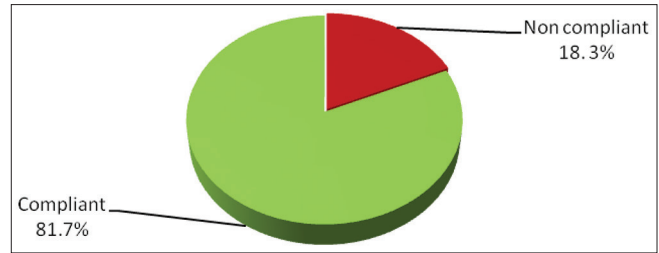


Figure 2: Compliance status of study population to IFA supplementation

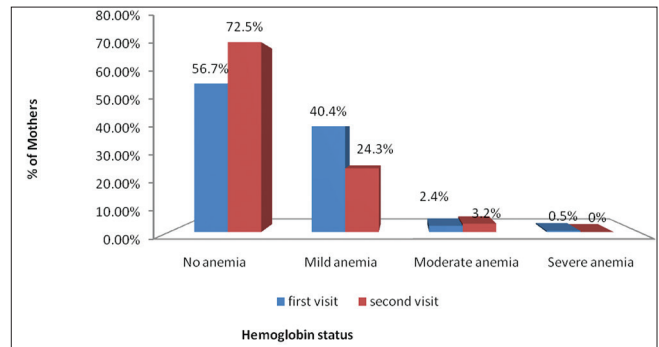


Figure 3: Comparison of hemoglobin status among the participants in first trimester vs. second trimester

tablets in last 15 days [Table 3]. More than half (57.2%) women took one IFA tablet a day and 41.8% were advised two tablets per day. It was also seen that 72 (34.6%) mothers were given IFA tablets for 3 months in a single visit, whereas 90 (40.3%) women were issued tablets for 1 month. All respondents took IFA tablets after meal. On eliciting the skipping history of IFA tablets, 38 participants were found to skip IFA tablets in last 15 days. The reason of skipping of IFA tablets by most of the mothers was forgetfulness (73.7%) [Table 3]. The proportion of noncompliant respondents was 18.26% [Figure 2]. In second visit, there was improvement in the anemia status, as the number of mothers not having anemia was raised from 118 (56.7%) to 137 (72.5%) and no one suffered from “severe anemia”, though there was a little rise in moderate anemia cases from five (2.4%) to six (3.2%) [Figure 3].

On assessment of knowledge profile of the respondents, it was seen that, in all cases, health workers explained about IFA supplementation, correct dose, and timing except in explaining the benefits of IFA consumption (97.6%) and importance of deworming (78.8%). The term “Anemia” was heard by more than half of mothers, whereas 73.6% and 63.9% mothers had the correct knowledge regarding duration of IFA tablets intake during and after pregnancy, respectively. It was seen that the differences between mean hemoglobin level (g%) of previous visit and current visit was significant ($t = 2.548, P = 0.008$). In the study, deworming, age, and education were significantly associated ($P < 0.05$) with noncompliance to IFA consumption [Table 4]. On multivariate regression analysis between dependent variables with other independent factors, age, deworming, education again became the significant predictors for noncompliance to IFA intake [Table 5].

Table 4: Factors associated with noncompliance to IFA tablets among study population (n=208)

Related factors		Compliant (n=170)	Noncompliant (n=38)	Statistics χ^2 , CI, df	P
Age	≤ Median	94 (45.2%)	29 (14.0%)	5.68 (22.92-24.06), 1	.017 *
	>Median	76 (36.5%)	9 (4.3%)		
Religion	Hindu	147 (70.7%)	37 (17.8%)	3.61 (1.07-1.16), 1	.057
	Muslim	23 (11.0%)	1 (0.5%)		
Type of family	Joint	33 (13.9%)	6 (2.9%)	.267 (1.76-1.87), 1	.605
	Nuclear	137 (65.9%)	32 (15.3%)		
No. of family members	≥4	103 (49.5%)	27 (13.0%)	1.45 (4.47-4.74), 1	.228
	<4	67 (32.2%)	11 (5.29%)		
Social status	Upper class	110 (52.8%)	27 (13.0%)	.556 (1791.72-2012.03), 1	.456
	Upper middle and middle class	60 (28.8%)	11 (5.29%)		
Gravida	Primi	98 (47.2%)	18 (8.7%)	1.33 (1.37-1.57), 1	.249
	Multi	72 (34.6%)	20 (9.5%)		
First ANC registration	First trimester	152 (73.1%)	37 (17.8%)	2.37 (2.09-2.25), 1	.124
	Second trimester	18 (8.7%)	1 (0.5%)		
Hemoglobin status in previous visit	Anemia	76 (36.5%)	14 (6.73%)	.782 (10.77-11.05), 1	.376
	No anemia	94 (45.2%)	24 (11.5%)		
Hemoglobin status in present visit	Anemia	47 (22.6%)	5 (2.40%)	.441 (10.95 -11.25), 1	.507
	No anemia	112 (53.8%)	17 (8.2%)		
Tablets per day	1	93 (44.7%)	24 (11.5%)	.902 (1.37-1.51), 1	.342
	≥2	77 (37.0%)	14 (6.73%)		
Education (up to)	Primary	28 (13.5%)	13 (6.25%)	10.3 (4.49-4.88), 2	.006*
	Secondary	95 (45.7%)	11 (5.29%)		
	Graduate	47 (22.6%)	14 (6.73%)		
Deworming	Yes	128 (61.5%)	36 (17.3%)	7.04 (1.16-1.27), 1	.008*
	No	42 (20.2%)	2 (1.0%)		

Table 5: Multivariate regression analysis between dependent variable and related factors

Variable	Beta coefficient	Std. error	Adjusted odds ratio	95% CI	P
Age	1.270	.443	3.562	(1.496, 8.481)	.004**
Deworming	1.937	.766	6.940	(1.547-31.125)	.011*
Education	-1.124	.462	.325	(.131-.804)	.015*

Discussion

This was a subcenter-based cross-sectional study among pregnant women in Hooghly district, West Bengal. Among the total 208 study subjects all the pregnant women were married and homemaker. Most of the study subjects were 20–29 years of age group (72.6%) with Hindu predominance (88.5%), and Schedule caste predominance (41.3%). Teenage pregnancy was found 17.8% in this study and it is higher than the national average (8%) according to NFHS-4, India.^[11] Among the total (208) study population, 55.8% were Primi Gravida. Most of the study participants were registered at ANC clinic at the first trimester (90.9%). This study showed that 170 (81.74%) of the study participants were compliant to IFA. Some other studies conducted in various parts of India showed a similar picture. A study conducted by Mithra P, *et al.* in an urban area of South India, found that overall compliance to IFA tablets among study participant was 64.7%.^[12] Another study conducted in rural area of West Bengal in 2010 found the compliance to be 62%.^[13] The reasons for noncompliance as stated by the study population in our study include forgetfulness (73.7%) followed by fear of side

effects, which were very similar to the previous study.^[13] The studies conducted by K Manasa in Mysuru,^[14] India, and Brazil^[15] indicated that the main reasons for noncompliance to therapy were inadequate counseling by health care workers but this study showed that in all cases health workers explained about IFA supplementation and correct dose. This study findings showed that 73.6% of the study population, had knowledge on duration of IFA tablets intake during pregnancy and 63.9% knew duration of IFA tablets intake after pregnancy. Significant association was found between knowledge of IFA supplements and compliance in a study conducted in Nepal (2014)^[16] but our study could not find such significant association. Here, age, deworming, education were the significant predictors for noncompliance to IFA intake. The other study from West Bengal showed that the consumption rate was more among the mother who were explained properly about the IFA supplementation.^[13] Forgetfulness and both perceived as well as experienced side effects of IFA therapy were the important factors for noncompliance in the other study.^[12] Knowledge of anemia, counseling on IFA supplementation was found to be the predictor of compliance in a study conducted in Ethiopia.^[17]

A systematic review and meta-analysis conducted this year found that educational status, early antenatal registration and follow-up, anemia during present pregnancy, good knowledge of IFA supplementation, counseling on advantage of IFA were the risk factors associated IFA supplementation adherence.^[18] In A cross-sectional survey among antenatal mothers attending a Govt. health institution of Ethiopia revealed that only 40.9% of respondents were adherent to four or more IFA tablets per week. It was noted that mothers in the

age group between 25 and 29 years had higher odds of adherence in comparison to mothers in the age group more than 35 years. Satisfactory knowledge of IFA supplementation also had increased odds of adherence in comparison to their counterparts.^[19]

The prevalence of teenage pregnancy and anemia at first visit among antenatal mothers was 17.8% and 43.3%, respectively, in this study. It was also seen that among the IFA compliant participants, the proportion of deworming was 61.5%. In context with aforementioned parameters, the primary-care physicians can play an important role by organizing awareness campaigns at health centers, motivating grass root level workers for house-to-house visits in reinforcing compliance to awareness time to time.

This study had few limitations. Being a cross-sectional study design, it did not extend to the information on complete iron intake during pregnancy period. The chance of recall bias among the study population regarding skipping of IFA tablets might had an impact on the outcome.

The overall compliance in this study rate was 81.74% and forgetfulness was the most common cause of noncompliance. Teenage pregnancy, history of deworming, and less education were found to be risk factors related with IFA noncompliance.

A sustained programmed effort through the active involvement of health-care providers is of utmost need to maintain and betterment of the compliance. This study revealed that the overall compliance rate to IFA supplement among pregnant women had been increased to 81.74%, in comparison with 33.1% as reflected in NFHS-4 (2015–16) survey. The increase can be considered due to the successful implementation of different programs such as Janani Suraksha Yojana (JSY), Janani Sishu Suraksha Karyakram (JSSK), and increase use of IEC materials by Government of India particularly in the study area.

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Conflicts of interest

There are no conflicts of interest.

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