

Original Research Article

A cross-sectional study on factors associated with iron-folic acid supplement adherence among antenatal women of Haringhata block of Nadia district, West Bengal

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Received: 02 June 2024

Revised: 10 July 2024

Accepted: 11 July 2024

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ABSTRACT

Background: Anaemia, lack of can cause health complications across all age groups, particularly among pregnant women. In India, despite various governmental and non-governmental initiatives, the coverage and compliance of iron folic acid (IFA) therapy among pregnant women remain inadequate. This study aimed to estimate the prevalence of non-adherence and its determinants among pregnant mothers in Haringhata block, Nadia district, West Bengal.

Methods: A community-based cross-sectional study was conducted, selecting eligible pregnant mothers through simple random sampling from sub-centre lists. Confidential interviews were conducted using a pre-designed, structured questionnaire, with informed consent obtained from participants. Data were entered in Microsoft excel and analyzed using statistical package for the social sciences (SPSS) 20.0.

Results: Results showed that 37.7% of pregnant women were anaemic, and 19.9% were non-adherent to IFA supplements. Among the non-adherent, 56.5% missed IFA intake due to forgetfulness. Lack of knowledge was a significant barrier, with 53.42% unaware of IFA benefits and none knowing the exact duration of intake. Bivariate analyses indicated higher odds of non-adherence among mothers whose husbands were unemployed/unskilled, who suffered from anaemia, and who lacked knowledge about IFA benefits.

Conclusions: The study findings suggest that addressing forgetfulness, providing accurate knowledge about IFA intake, and targeted interventions for teenage mothers can improve adherence rates, preventing anaemia and enhancing maternal and child health outcomes.

Keywords: Compliance, Conception, Eastern India, Anaemia, Micronutrients, Survey

INTRODUCTION

Anaemia is a condition in which the oxygen-carrying capacity of the red blood cells is insufficient to meet the body's physiological needs. It can cause various health complications in every age group including pregnant women, where it can lead to adverse maternal and foetal

outcomes.¹ It is estimated that as many as 20% of maternal deaths are directly caused by anaemia through its complications and it is an associated cause in as many as 50% of maternal deaths worldwide.^{1,2} The World Health Organization (WHO) defines anaemia as a blood haemoglobin concentration less than 11 gm/dl or haematocrit less than 37% in pregnant women. The WHO

estimates that 58% of the women in developing countries are anaemic.¹

As per NFHS-5, 30.8% of mothers consumed iron folic acid for 180 days or more when they were pregnant.³ Iron, is an essential nutrient, which is required for haemoglobin synthesis, other than normal well-being, whose demand increases highly during pregnancy and many times does not get supplied through the regular diet. This can be worsened by the loss of appetite during pregnancy.⁴ Therefore the most suitable mass intervention for iron supplementation is administering iron along with folic acid in the form of tablets to pregnant women aimed at increasing the haemoglobin concentration so that the level of anaemia at term could be reduced to the best possible extent.^{5,6}

Most Ministries of Health in developing countries have policies to give pregnant women either iron by itself or combined with folic acid in tablet form (IFA tablets). The National protocols in India require the provision of 1 tablet containing 60 mg elemental iron and 0.5 mg folic acid for daily consumption to all women during pregnancy for 180 days. But effectiveness and success of such interventions depend on adherence to the IFA tablets. Many experts believe that one of the main reasons that national iron supplementation programs have failed is women's "non-adherence".^{1,5} There are factors including health- system and patient as well which determine compliance and are not studied extensively.⁵ Though, there is no clear cut-off for non-compliance, missing 2 or more doses consecutively is usually considered as non-adherence and compliance is essential for IFA therapy which in turn is influenced by several social and demographic factors.⁴

Despite various initiatives taken by the government and non-governmental organizations (NGOs), the coverage and compliance of IFA therapy among pregnant women in India are still inadequate. With this backdrop, this cross-sectional study aimed to identify the factors associated with IFA therapy compliance among antenatal women in the Haringhata block of Nadia district, West Bengal.

METHODS

A community-based cross-sectional study was conducted between February and July 2023 among pregnant women in Haringhata Block of Nadia District, West Bengal. All pregnant women during the study period in the study area registered in various sub-centres of Haringhata block catering to both rural and urban areas who were in their gestational age of 2nd and 3rd trimester were included in the study, while those who did not give consent and who were not prescribed IFA during pregnancy due to some contraindications were excluded from the study. Informed written consent had been obtained from every participant before the interview. Ethical clearance had been obtained from the institutional ethics committee, Institute of Health and Family Welfare, Government of West Bengal.

Sample size had been calculated using Cochran's formula assuming $p=23.8\%$ (prevalence of adherence to IFA supplement for more than 180 days among pregnant women in Nadia district), absolute error 5%, 95% confidence level, 10% non-response rate. The final sample size was 292. Haringhata block is chosen purposively for this study for the feasibility of the work. After getting permission from BMOH, out of 1 Municipality and 8 Gram-panchayats were included. The line list of all pregnant women of 2nd and 3rd trimester was obtained from the sub-centres/UPHC. From the line list, the pregnant women were selected randomly. Respective households were visited with the help of ASHAs. If someone was absent or did not give consent, then the next person on the list was approached.

Adherence had been defined as the total number of tablets consumed to the total number of tablets prescribed multiplied by 100, women taking 80% of prescribed tablets were considered adherent to IFA. The eligible pregnant mothers were interviewed confidentially with the help of a pre-designed, structured questionnaire after getting informed consent from each of them. Data were collected related to their age, religion, family type, level of education, per capita income, parity/gravida, number of pregnant women who consume IFA tablets regularly (adherence), consumption status, dietary pattern, and Haemoglobin status during 1st and consecutive ANC visit. For knowledge of IFA tablet intake and its benefits related questions were asked and whatever response was given by the mother was recorded. The questionnaire was first prepared in English. Then it was translated into Bengali by a linguistic expert, ensuring semantic equivalence. To verify the translation, it was retranslated into English by two independent researchers who were unaware of the initial English version. The face validity of each item was checked by previous researchers in the presence of public health experts. They also determined the content validity of each domain. Reliability was checked using the test-retest method. Pretesting and pilot testing were conducted. Necessary corrections and modifications were made to the questionnaire accordingly.

Data were codified and entered in Microsoft excel 2019 and analysed by statistical software (SPSS 20.0 version). Descriptive followed by inferential statistics were applied. All the tests were two-tailed and p value <0.05 had been considered as significant throughout the analyses.

RESULTS

A total of 292 mothers were sampled as study participants. The mean age of the subjects was approximately 23.74 years, with a standard deviation of 5.22 years and the majority belonged to the age group of 20-30 years (63.36%) while approximately one-fourth of the subjects were below 20 years of age (23.63%). Most of the women were Hindu (75.68%), scheduled caste (SC) category (47.95%), belonged to joint families (73.23%), residing in rural areas (61.99%) and were educated up to middle level

(35.96%). Most pregnant women were homemakers (95.55%) while most of the husbands were engaged in skilled work (42.12%). Only 15.07% of study participants belonged to SES class V according to the modified B.G Prasad scale (Table 1).

Table 1: Distribution of the study participants according to their socio-demographic characteristics (n=292).

Characteristics	Frequency	Percentage
Age (in years)		
Below 20	69	23.63
20-30	185	63.36
Above 30	38	13.01
Mean (SD)	23.74 (5.22)	
Religion		
Hindu	221	75.68
Muslim	71	24.32
Caste		
SC	140	47.95
ST	7	2.40
OBC	34	11.64
General	111	38.01
Education		
Illiterate	7	2.40
Just literate	12	4.11
Primary school	15	5.14
Middle school	105	35.96
Secondary school	68	23.29
Higher secondary school	55	18.84
Graduate and above	30	10.27
Occupation		
Homemaker	279	95.55
Student	4	1.37
Teacher	4	1.37
Other occupations	5	1.71
Husband's occupation		
Semi-professional	4	1.37
Clerical, shop-owner or farm-owner	66	22.60
Skilled worker	123	42.12
Unskilled worker	98	33.56
Unemployed	1	0.34
Family type		
Nuclear	78	26.71
Joint	214	73.23
Area of residence		
Rural	181	61.99
Urban	111	38.01
Socio-economic status (modified B.G Prasad socioeconomic scale 2022)		
I-IV	248	84.93
V	44	15.07

Regarding obstetric profile, a majority (65.41%) of pregnant women were in the gestational week range of 12-24 and 34.59% were in gestational weeks above 24 while 51.37% of the subjects were primi-gravida (first pregnancy), and 92.80% were in the category of single parity or no previous births, but a small proportion (7.20%) had multiple births (previous births). Among the 292 mothers included in the study, 116 of them were identified as having anaemia, representing 39.7% of the total sample. In this study, 90.07% of pregnant women had early ANC registration.

Among the 292 mothers in the study, 95 of them (32.53%) reported that they had heard about IFA tablets or supplements, however, the majority of mothers (67.47%) reported not hearing about IFA tablets or supplements. Also, none of them had the correct knowledge of the duration of iron intake during pregnancy. Regarding knowledge of benefits of IFA intake during pregnancy as per mother's language, 156 (53.42%) mothers said they don't know, 54 (18.49%) mothers said IFA intake prevents anaemia, 36 (12.33%) mothers said IFA intake increases blood, 19 (6.51%) mothers said it's good for foetal health, 17 (5.82) mothers said good for maternal health and only 10 (3.42%) mothers said IFA intake helps in blood formation (Table 2).

Table 2: Distribution of pregnant women according to knowledge about IFA supplement (n=292).

Characteristics	Frequency	Percentage
Heard about the IFA tablet/supplement		
Yes	95	32.53
No	197	67.47
Knowledge of benefits of IFA intake during pregnancy*		
Blood formation	10	3.42
Prevent anaemia	54	18.49
Good for maternal health	17	5.82
Good for foetal health	19	6.51
Increases blood	36	12.33
Don't know	156	53.42
Knowledge of the correct duration of iron intake		
Absent	292	100

*Multiple responses

The majority of mothers i.e., 275 (94.18%) availed the IFA from government facilities, while 9 (3.08%) mothers bought IFA from private, and 8 mothers (2.74%) did not consume IFA supplements at all. Most of the mothers i.e., 174 (59.59%) had consumed IFA but missed some days, while 110 (37.67) mothers consumed IFA correctly as per advice. 8 (2.74%) mothers did not consume IFA at all. Among all 292 mothers, 80.1% mothers had an adherence rate above 80%, while 19.9% mothers had an adherence rate below 80%.

A majority (56.50%) of mothers missed IFA because of forgetfulness, followed by travel (14.12%), unavailability of medicine (6.21%), and constipation (2.26%) (Table 3).

Out of all mothers who did not consume IFA at all, 60% of mothers said they did not have any disease so they did not take IFA supplements, while 30% of mothers said they don't like to have medicine and 10% of mothers said had other complications as a reason for not taking IFA at all.

Bivariate analyses revealed that the mothers with the occupation of the husband being unemployed/unskilled, with anaemia and no knowledge of the benefits of intake of IFA had higher odds of non-adherence to IFA (Table 4).

Table 3: Distribution pregnant women according to predominant reason of missing/skipping IFA intake (n=182).

If missed reason for missing	Frequency	Percentage
Forgetfulness	100	56.50
Travel	25	14.12
Unavailability of medicine	11	6.21
Constipation	4	2.26
Suggested by a private doctor	1	0.56
Others	41	22.53

Table 4: Factors contributing to adherence to IFA supplement (n=292): bivariate analyses.

Variables	Adherence, n (%)		Test of significance	OR (95% CI)
	No*	Yes		
Age (in completed years)				
<23	34 (21.3)	126 (78.8)	Chi-square=0.428, df=1, p value=0.513	1.214 (0.678-2.174)
≥23	24 (18.2)	108 (81.8)		
Religion				
Hindu	47 (21.3)	174 (78.7)	Chi-square =1.125, df=1, p value=0.289	1.473 (0.718-2.501)
Muslim	11 (15.5)	60 (84.5)		
Caste				
SC/ST/OBC	40 (22.1)	141 (77.9)	Chi-square=1.496, df=1, p value=0.221	1.466 (0.793-2.711)
General	18 (16.2)	93 (83.8)		
Education				
Up to secondary	45 (21.7)	162 (78.3)	Chi-square=1.572, df=1, p value=0.275	1.538 (0.782-3.027)
Higher secondary and above	13 (15.3)	72 (84.7)		
Occupation				
Employed/student	2 (15.4)	11 (184.6)	Chi-square=0.171, df=1, p value=0.679	0.724 (0.156-3.360)
Homemakers	56 (20.1)	223 (79.9)		
Husband's occupation				
Unskilled worker/unemployed	28 (28.3)	71 (71.7)	Chi-square=6.671, df=1, p value=0.010	2.143 (1.193-3.848)
Semi-professional/clerical, shop-owner or farm-owner/skilled worker	30 (15.5)	163 (84.5)		
Family type				
Nuclear	14 (17.9)	64 (82.1)	Chi-square=0.245, df=1, p value=0.621	0.845 (0.434-1.646)
Joint	44 (20.6)	170 (79.4)		
Residential area				
Rural	33 (18.2)	148 (81.8)	Chi-square=0.796, df=1, p value=0.372	0.767 (0.428-1.375)
Urban	25 (22.5)	86 (77.5)		
Socioeconomic status (as per modified BG Prasad scale 2022)				
I-IV	48 (19.4)	200 (80.6)	Chi-square=0.267, df=1, p value=0.605	0.816 (0.377-1.766)
V	10 (22.7)	34 (77.3)		
Knowledge of benefits of IFA				
No	42 (26.9)	114 (73.1)	Chi-square=10.488, df=1, p value=0.001	2.763 (1.471-5.190)
Yes	16 (11.8)	120 (88.2)		
Parity				
Primi	33 (19.6)	135 (80.4)	Chi-square=0.012, df=1, p value=0.913	0.968 (0.542-1.730)
One or more	25 (20.2)	99 (79.8)		
Gravida				
Primi	31 (20.7)	119 (73.3)	Chi-square=0.125, df=1, p value=0.724	1.110 (0.624-1.974)
Multi	27 (19.0)	115 (81.0)		

Continued.

Variables	Adherence, n (%)		Test of significance	OR (95% CI)
	No*	Yes		
Early registration				
Yes	54 (20.5)	209 (79.5)	Chi-square=0.745, df=1, p value=0.388	1.615 (0.539- 4.837)
No	4 (13.8)	25 (86.2)		
Gestational weeks				
12-24	34 (58.6)	157 (67.1)	Chi-square=1.475, df=1, p value=0.225	0.695 (0.385- 1.253)
Above 24	24 (41.4)	77 (32.9)		
Anaemia				
Yes	32 (27.6)	84 (72.4)	Chi-square=7.212, df=1, p value=0.007	2.198 (1.228- 3.935)
No	26 (14.8)	150 (85.2)		

Df: Degree of freedom.

DISCUSSION

Socio-demographic factors

Regarding age, the majority of the participants fell within the 20-30 age range, comprising 63.36% of the sample. Teenage pregnancy was found in 23.63% of this study, it was higher than the national average (6.8%) according to NFHS-5, India.⁷

Anaemia

Gestational anaemia is a very common phenomenon in India and neighbouring countries, prevalence varies from 65% to 75%.^{8,9}

In this study 39.7% of the total sample suffered from anaemia which was relatively a lower prevalence than found in other studies.

Knowledge about IFA

The study findings highlighted potential gaps in knowledge regarding IFA supplements among the study population. The majority of mothers were not aware of IFA tablets or supplements (67.47%) which was not at all consistent with the findings of a study by Debi et al showing that 73.6% of the study population, knew the duration of IFA tablets intake during pregnancy and 63.9% knew the duration of IFA tablets intake after pregnancy.¹⁰

IFA adherence

Among all 292 mothers, 80.1% of mothers had an adherence rate above 80%, while 19.9% of mothers had an adherence rate below 80% as found in this study. Some other studies conducted in West Bengal and various parts of India showed a similar picture. A study conducted by Devi et al in Hooghly district, West Bengal found that 81.74% of the study participants were adherent to IFA.¹⁰

A study conducted in a rural area of West Bengal in 2010 found the adherence to be 62%.¹¹ Another study conducted by Mithra et al. in an urban area of South India, found that overall adherence to IFA tablets among study participants was 64.7%.¹²

Predictors of non-adherence

Bivariate analyses revealed that the mothers with occupation of the husband being unemployed/unskilled, anaemia and no knowledge of benefits of intake of IFA had higher odds of non-adherence to IFA while there were no statistically significant associations found with age, religion, caste, education, occupation of the mother, family type, residential area, parity, socioeconomic status, gravida or gestational week. Consistent with the current study result a study conducted at Ballabgarh also stated that compliance with IFA tablets was better among non-anaemic pregnant women and those with good compliance to IFA tablets had better haemoglobin levels.^{13,14} Various studies have found socio-demographic factors to be a significant association with Adherence with IFA in similar studies, such as in a study conducted by Birhanu et al the compliance with IFA was significantly more in participants from the urban region, though the same was not established in the current study.¹⁵ Previous studies suggested adherence with IFA was found to be significantly more with the increase in age, but this study did not find such association with age.^{12,13} A study conducted at the Sub-district hospital of Ballabgarh, found that the pregnant women belonging to a joint family had less chance of being adherent compared to those belonging to a nuclear family.¹³ But in this study type of family (nuclear or joint) did not show a significant association with adherence. The same study at Ballabgarh found 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%).¹³ But the current study did not find such an association.

The reasons for non-adherence as stated by the study population in the study included forgetfulness (56.50%) which was very similar to a previous study.¹⁰

Limitations

The study relied on self-reported data, which might be subjected to recall bias. Participants might also have responded in a socially desirable manner, providing answers they thought to be expected from them rather than their true experiences or behaviours. Also, since the study had been conducted in a block only, the result found in this

study ideally could not be generalized to the population outside this block.

CONCLUSION

This study aimed to estimate the prevalence of non-adherence and its determinants among pregnant mothers of Haringhata block. Overall significant proportion of pregnant women were found to be anaemic and nearly one-fourth of study subjects were non-adherent to IFA supplements, while a majority of pregnant women skipped/missed IFA intake due to forgetfulness. Lack of knowledge was found to be a great barrier in this study.

Though the overall adherence to IFA supplementation was relatively good among pregnant women in the Haringhata block, still there were areas for improvement. Addressing forgetfulness, providing accurate knowledge about IFA intake, and targeted interventions for teenage pregnancies can contribute to better adherence rates, thereby preventing anaemia and overall improvement in maternal and child survival and health.

ACKNOWLEDGEMENTS

The authors sincerely acknowledge the technical support provided by the Director, Dean, and other faculties of the Institute of Public Health, Kalyani throughout the study. The authors also acknowledge the support provided by the concerned health personnel of the district.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Mandal M, Pal J, Ghosh M, Das H, Das D. A cross-sectional study on factors associated with iron-folic acid supplement adherence among antenatal women of Haringhata block of Nadia district, West Bengal. *Int J Community Med Public Health* 2024;11:3150-5.