

A Cross-Sectional Study on Consumption of Iron and Folic Acid Supplements and its Determinants among Women During Pregnancy in Rural Punjab, India

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Abstract:

Introduction: Anaemia in pregnancy remains a public health problem and is an important indirect cause of maternal mortality. Iron deficiency is regarded as the most common cause of anaemia during pregnancy. World Health Organization recommends daily oral iron and folic acid (IFA) supplementation as part of antenatal care. Despite this recommendation, the use of IFA supplements is still very low in several developing countries. **Objectives:** To determine the prevalence of consumption of IFA supplements and to identify its determinants among women while pregnant. **Methods:** It was a population based cross sectional study done in rural field practice area of community medicine. Total of 370 mothers of two months to two years old children were selected by PPS sampling. Data so collected was analysed by SPSS using descriptive inferential and chi square test. **Results:** Prevalence of IFA consumption for 180 days or more was 56.7%. Factors like caste, socioeconomic status of family, education of respondent as well as husband, parity and knowledge about antenatal care, anaemia and IFA consumption were significantly associated with consumption of IFA supplements. Side effects, forgetfulness and lack of knowledge about duration of intake were main reasons for discontinuation. **Conclusion:** There is a need to generate awareness regarding importance and correct duration of IFA consumption during pregnancy and constant mobilisation and support by health workers is required to increase the compliance

Keywords: Determinants, IFA supplementation, Maternal Anaemia, Punjab

Introduction:

Anaemia is a common public health problem and is defined by WHO as a Hb concentration of less than 11gm/dl for pregnant women.^[1] Globally prevalence of anaemia as estimated by WHO in 2019 was 36.5%.^[2] According to NFHS 5 in India at least 52.2% pregnant women of age group 15-49 years were found to be anaemic, whereas in Punjab this figure approached 51.7% and situation was further grave in rural as compared to urban area.^[3,4]

Anaemia is one of the important indirect causes of maternal mortality accounting for 20% of maternal deaths.^[5,6] Anaemia is also an aggravating factor in haemorrhage, sepsis and toxemia and also increases susceptibility to communicable diseases such as tuberculosis and malaria. Anaemic women face the further risk of falling into a cycle of multiple pregnancies in their efforts to have children that survive, since nutritional deficiencies during pregnancy notably reduce the chances of infant survival. Increased workload,

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decreased consumption and increase expenditure of energy, all lead to anaemia in women and the condition further worsens during pregnancy due to haemodilution.^[7-10]

Many nutritional and non nutritional aspects are responsible for anaemia during pregnancy. Most common cause of nutritional anaemia is iron deficiency which can be very easily tackled by consuming iron folic acid tablets which are provided free of cost to pregnant women for 180 days under Intensified national iron plus initiative.^[11-15] However consumption is far below recommended as evident from the fact that only 44.1% and 26.0% women when pregnant consumed Iron and folic acid tablets for 100 days or more and for 180 days or more respectively in India and this figure in Punjab was 55.4% and 40.5% respectively.^[3,4] Several studies have shown various factors responsible for low consumption of supplements across India varying from low demand by pregnant women to low supply of IFA tablets at health centres.^[16-18] Very few studies have been done in study area especially after the implementation of Intensified national iron plus initiative (INIPI) /Anaemia Mukh Bharat (AMB) which was launched in 2018 under POSHAN Abhiyaan to bring down anaemia prevalence from 50% to 32% by 2022 among pregnant women^[15] therefore the study aimed to determine prevalence and determinants of IFA consumption among women when pregnant residing in rural area of Punjab

Methods:

A cross-sectional study was carried out in rural field practice area (including 11 villages with total population of 31842) attached to one of the medical colleges of Amritsar in the month of May-June 2025 after obtaining ethical clearance from institutional ethical committee.

Study population: Mothers of two months to two-year-old children were interviewed by house to house visit after taking informed consent. Participants not willing to give consent were excluded from study.

Sample size: The sample was calculated by considering the proportion of women taking IFA for 180 days during pregnancy as 40.5% in Punjab with absolute error of margin as 5% and it was estimated to be 370 by using the

formula $N = Z^2 pq / e^2$, where N is sample size, Z is 1.96 at 95% confidence limit, P is presumed proportion, q is (1-p) and e is absolute error of margin (0.05).

Sampling Technique: The study subjects were selected by probability proportional to size (PPS) sampling technique from 11 villages to reach the requisite sample of 370.

Data collection: Study participants were personally interviewed by the researchers after taking informed consent. Purpose of study was explained to them and confidentiality was assured. Interview was done in local language and information so obtained was recorded on a predesigned, pretested, semi structured questionnaire.

Statistical analysis: All the information so collected were compiled in Microsoft excel and analysed statistically with the help of SPSS version 23. Simple percentages and Chi-square test was used to evaluate different variables and valid conclusions were drawn.

Knowledge of participants was assessed by asking 8 questions each regarding basic antenatal care (TT, IFA, antenatal checkups, supplementary diet, BP and weight monitoring and avoidance of self medication), and knowledge about anaemia and IFA consumption (symptoms and effect of anaemia on pregnant women and foetus, benefits of IFA consumption, number of IFA tablets taken during pregnancy, way of consuming IFA, side effects of IFA intake and how to reduce its side effects). Participants giving more than four correct answers in each section were labelled to have good knowledge. Modified Kuppaswamy scale was used for assessing socioeconomic status of family.

Results:

Among 370 study participants 342, (87%) belonged to the age group of 18-29 years as shown in Table 1. Mean age at marriage among study participants was 21.02 ± 2.57 years while the mean age at first pregnancy was 22.32 ± 2.63 years. 352 (95.1%) participants were Sikh by religion and 236 (63.8%) belonged to scheduled caste. 252 (71.4%) lived in joint family. According to Modified Kuppaswamy scale 216 (58.4%) belonged to upper lower socioeconomic class. 54 (14.6%) participants were illiterates and 250 (67.6%) were

educated till high or above. More than two third study participants 298 (80.5%) registered in first trimester, 182 (49.2%) had parity one and 194 (52.4%) were anaemic while pregnant.

Table 1: Socio demographic profile of study participants (N=370)

Characteristic	Frequency, n (%)
Age (Years)	
18-24	180 (48.6%)
25-29	142 (38.4%)
>30	48 (13%)
Religion	
Sikh	352 (95.1%)
Hindu	18 (4.9%)
Caste	
General	102 (27.6%)
OBC	32 (8.6%)
SC/ST	236 (63.8%)
Type of Family	
Joint	264 (71.4%)
Nuclear	106 (28.6%)
Socioeconomic status	
Upper middle	87 (23.5%)
Lower middle	59 (15.9%)
Upper lower	216 (58.4%)
Lower lower	8 (2.2%)
Education	
Illiterate	54 (14.6%)
Below High	66 (17.8%)
High and above	250 (67.6%)
Parity	
1	182 (49.2%)
2	134 (36.2%)
≥3	54 (14.6%)
Trimester of registration	
First	298 (80.5%)
Second	72 (19.5%)
No.of antenatal visits	
≤2	78 (21.1%)
≥3	292 (78.9%)
Whether anaemic during pregnancy	
Anaemic	194 (52.4%)
Non anaemic	146 (39.5%)
Status not known	30 (8.1%)

As shown in Table 2, 297 (80.2%) and 240 (64.8%) study participants had correct knowledge about benefits of taking IFA tablets and symptoms of anaemia respectively. 174 (47%) study participants could respond correctly when inquired on ways of consuming IFA tablets and 149 (40.3%) had correct knowledge about number/ duration of IFA tablets to be taken during pregnancy. Only 88 (23.7%) and 52 (14.1%) study participants could tell correctly when asked about effects of anaemia on pregnant woman and foetus respectively. Correct understanding on side effects of IFA tablets and on ways to reduce it was present in 127 (34%) and 46 (12.4%) participants respectively.

Total 143 (38.6%) study participants had good knowledge about anaemia and IFA supplement consumption. As shown in Figure 1, 210 (56.7%) consumed iron and folic acid for 180 days or more and 160 (43.3%) for less than 180 days. Out of 160 participants 98 (26.4%) consumed even for less than 100 days.

Table 2: Knowledge of study participants on anaemia and iron folic acid consumption (N=370)

Knowledge about anaemia and IFA consumption	Response	
	Correct	Incorrect
Symptoms of anaemia	240 (64.8%)	130 (35.2%)
Effects of anaemia on pregnant woman	88 (23.7%)	282 (76.3%)
Effects of anaemia on foetus/foetal outcome	52 (14.1%)	318 (85.9%)
Benefits of taking IFA Tablets	297 (80.2%)	73 (19.8%)
No./duration of IFA Tablets to be taken during pregnancy	149(40.3)%	221(59.7%)
Way of consuming IFA tablets	174 (47%)	196 (53%)
Common Side effects of IFA tablets	127 (34.3%)	243 (65.7%)
How to reduce side effects of IFA tablets	46 (12.4%)	324 (87.6%)

Table 3: Socio demographic determinants of IFA consumption during pregnancy (N=370)

Factors	>180 days n=210 (56.7%)	<180 days n=160 (43.3%)	Total n=370	Chi Square, p value
Caste				
General	86 (84.3%)	16 (15.7%)	102 (27.6%)	50.35, <0.001
OBC	20 (62.5%)	12 (37.5%)	32 (8.6%)	
SC/ST	104 (44.1%)	132 (55.9%)	236 (63.8%)	
Type of Family				
Joint	156 (59.1%)	108 (40.9%)	264 (71.4%)	2.17, 0.14
Nuclear	54 (50.9%)	52 (49.1%)	106 (28.6%)	
Education Status of Participant				
Illiterate	22 (40.7%)	32 (59.3%)	54 (14.6%)	14.83, <0.001
Below high school	29 (43.9%)	37 (56.1%)	66 (17.8%)	
High school and Above	159 (63.6%)	91 (36.4%)	250 (67.6%)	
Education status of Husband				
Illiterate	13 (39.4%)	20 (60.6%)	33 (8.9%)	14.63, <0.001
Below High school	25 (40.3%)	37 (59.7%)	62 (16.8%)	
High school and Above	172 (62.5%)	103 (37.5%)	275 (74.3%)	
Socio-economic status				
Upper middle	71 (81.6%)	16 (18.4%)	87 (23.5%)	37.56, <0.001
Lower middle	39 (66.1%)	20 (33.9%)	59 (15.9%)	
Upper lower and lower	100 (44.6%)	124 (55.4%)	224 (58.4%)	

Table 4: Obstetric care related determinants of IFA consumption during pregnancy (N=370)

Factors	>180 days, n=210(58.5%)	<180 days, n=160 (41.5%)	Total, n=370	Chi Square, p value
Parity				
Parity 1	121 (66.5%)	61 (33.5)	182 (49.2%)	14.5, <0.001
Parity 2	66 (49.3%)	68 (50.7%)	134 (36.2%)	
Parity 3	23 (42.5%)	31 (57.4%)	54 (14.6%)	
Knowledge of Antenatal care				
Good	187 (60.9%)	120 (39.1%)	307 (83.0%)	24.2, <0.001
Poor	13 (20.6%)	40 (63.4%)	63 (17.0%)	
Knowledge of anaemia and IFA Consumption				
Good	89 (62.2%)	54 (37.8%)	143 (38.6%)	15.22, <0.001
Poor	94 (41.5%)	133 (58.5%)	227 (61.4%)	
Source of IFA Tablet				
Private	49 (75.4%)	16 (24.6%)	65 (17.6%)	11.5, <0.01
Government	118 (51.8%)	110 (48.2%)	228 (61.6%)	
Both	43 (55.8%)	34 (44.2%)	77 (20.8%)	
Place of Antenatal care				
Private	77 (71.3%)	31 (28.7%)	108 (29.2%)	15.32, <0.001
Government	108 (53.2%)	95 (46.8%)	203 (54.9%)	
Both	25 (42.4%)	34 (57.6%)	59 (15.9%)	
Trimester of registration				
First	175 (58.7%)	123 (41.3%)	298 (80.5%)	2.4, 0.120
Second	35 (48.6%)	37 (51.4%)	72 (19.5%)	
No. of Antenatal visits				
≤2	22 (31.9%)	56 (68.1%)	78 (21.1%)	32.8, <0.001
≥3	188 (64.8%)	104 (35.2%)	292 (78.9%)	
Whether Anaemic during pregnancy				
Yes	131 (67.5%)	63 (32.5%)	194 (52.4%)	22.63, <0.001
No	61 (41.8%)	85 (58.2%)	146 (39.5%)	
Don't know	18 (60%)	12 (40%)	30 (8.1%)	

Figure 1: Consumption of IFA supplements by study participants (N=370)

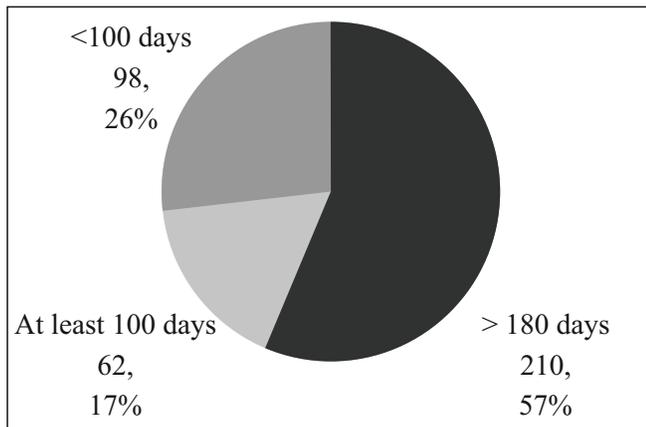


Figure 2: Distribution of study participants according to the reasons* given for consuming Iron Folic Acid Tablets for less than 180 days (N= 160)

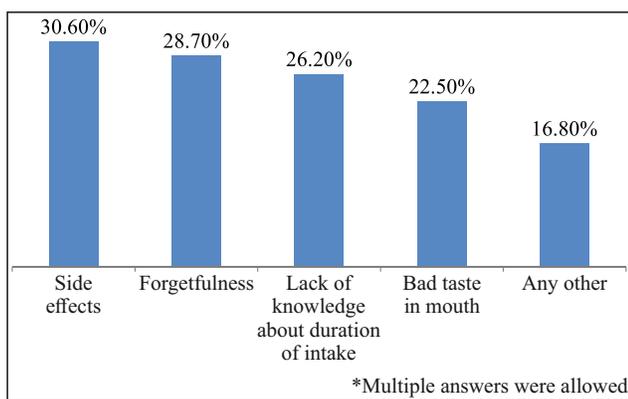


Figure 2 shows that among 160 mothers who took Iron folic tablets for less than 180 days, most common reason cited were side effects like nausea, vomiting, diarrhoea and pain in abdomen etc. in 49 (30.6 %) followed by forgetfulness in 46 (28.7%), lack of knowledge about exact duration of intake in 42 (26.2%), bad taste in 36 (22.5%) and 27 (16.8%) gave other reasons like tablets not available at centre, no need to take etc.

Table 3 shows higher consumption of IFA tablets in participants belonging to General caste, upper middle socioeconomic status and having higher education and difference was found to be highly significant ($p < 0.01$). Type of family was not significantly associated with consumption of IFA supplements. ($p = 0.14$).

Table 4 shows parity, knowledge of antenatal care, anaemia and IFA consumption, place of antenatal care, source of IFA supplements, number of antenatal visits and anaemia during pregnancy were significantly associated with consumption of IFA supplements. However trimester of registration had no significant association. ($p = 0.12$)

Discussion:

Current study showed majority of study participants were Sikhs, lived in joint family, belonged to upper lower socioeconomic status and were educated till high or above. Majority registered in first trimester and almost half were anaemic during pregnancy.

Majority of study participants had correct knowledge about benefits of taking IFA tablets and symptoms of anaemia whereas less than half could tell correct ways of consuming IFA tablets and number or duration of IFA tablets to be taken during pregnancy. Nivedita K et al^[16] revealed that 39.8% were aware of term anaemia. Debbarma et al^[17] reported knowledge about no. of tablets to be taken during pregnancy in 74.4%. which was higher than our study. Study showed knowledge about effects of anaemia on pregnant woman and foetus was quite less. Even correct understanding on ways to reduce its side effects was present only in few study participants. Similar to our study Suputri et al.^[18] in Ethiopia reported side effects of IFA tablets and its management was known to 50% and 21.7% participants respectively.

Consumption of IFA supplements in our study population was found to be more (56.7%) . according to NFHS 5 survey in Punjab only 55.4% and 40.5% mothers consumed iron and folic acid tablets for 100 and 180 days respectively.^[4] Vashisht et al^[19] in Haryana found consumption of IFA for more than 100 days only in 38.2%. Saimaa et al^[20] in Puducherry found 64.4% adherence to IFA during pregnancy. Similar to our study Singh et al^[21], Mishra et al^[22], Debbarma et al^[17] found main reasons for low consumption of supplements as side effects, bad taste, forgetfulness and inadequate supply whereas Saimaa et al reported unawareness (26.9%) and inadequate counselling (23.1%) as one of

the main reason for non-adherence apart from forgetfulness (62.8%) and side effects.^[20]

In this study, the probability of consuming Iron and folic acid was higher among those who belonged to General category, higher socioeconomic status and were having higher education. Similar association with education was shown by study conducted in Haryana.^[19] Saimaa et al^[20] reported higher adherence to IFA among women with graduation and post graduation and with higher income. Education of husband also impacts in a great way on utilization of maternal health services as in our study 172 (62.5%) study participants with husband having higher education consumed IFA for more than 180 days compared to 13(39.4%) with illiterate husbands. A study conducted by Godara et al^[23] found better compliance in women belonging to higher socioeconomic status similar to our findings. On the contrary Deori et al^[24] showed better compliance in women belonging to low socioeconomic status.

Current study showed more consumption of IFA in primipara similar to study conducted by Deori et al^[24]. Participants having knowledge about care required during pregnancy and anaemia were more likely to consume IFA for 180 days or more. This is in line with the findings of study done in Indonesia who found positive correlation between knowledge and consumption of IFA.^[18] whereas study conducted in Kathmandu by Mishra et al^[22] showed no significant association. Participants getting care from private institution or purchasing IFA from pharmacy shop showed significantly higher consumption however early registration had no significant association with consumption of IFA for 180 days or more as 175 (58.7%) and 35 (48.6%) consumed IFA for 180 days or more getting registered in 1st and 2nd trimester respectively whereas study conducted by Asres et al^[25] in Ethiopia found that women who started taking antenatal care in first trimester were 1.2 times more likely to comply with IFA consumption. Participants having three or more antenatal visits were more likely to consume IFA for 180 days or more. Similar results were shown by study done in Ballabgarh, Haryana where increased compliance to IFA in mothers having more than 4 antenatal visits was

observed.^[19] Study shows that participants with anaemia during pregnancy 131 (67.5%) were more likely to consume IFA for more than 180 days as compared to nonanemic 61 (41.8%) . On the contrary Deori et al^[24], Saimaa et al^[20] found higher adherence to IFA in women with no anaemia. Higher consumption could be due to the reason that women with anaemia were repeatedly counselled to take IFA by health care providers.

Limitations:

It was an observational interview-based study so recall bias might be there. Further self reported IFA intake was considered so there are possibility participants who did not take supplements were reported. Despite the limitation this study provides better evidence and understanding of population as study is community based and findings can be generalised for general population.

Conclusion:

Consumption of IFA tablets during pregnancy for 180 days or more was found only in 56.7% participants. Moreover less than half were aware about correct number of IFA tablets to be taken during pregnancy and less than one third could tell ill effects of anaemia on pregnant women and foetus and knowledge about ways to reduce side effects was very poor. Side effects followed by forgetfulness and lack of knowledge about exact duration of IFA supplements to be taken were main reasons given for low consumption. So there is dire need to educate women about exact number of IFA tablets to be taken during pregnancy and risk associated with non utilization. Health care providers should also explain the associated side effects of IFA supplements and its management strategies so as to increase its acceptance. Strategies of behaviour change communication as mentioned in Anaemia Mukht Bharat can be utilized involving community leaders, health workers and health care providers.

Declaration

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Conflict of Interest: Nil

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