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Compliance to Oral Iron and Folic ACID Supplementation and Its Determinants Among Pregnant Women in Rural Central India: A Community-based Mixed-method Study

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Abstract

Background

Anaemia in pregnancy is a continuing public health challenge in low and middle-income country (LMIC), most importantly, India. National initiatives such as Anaemia Mukt Bharat have been implemented since 2018; nevertheless, there has always been suboptimal adherence to oral iron and folic acid supplementation (IFAS) among pregnant women. This study evaluated the adherence to IFAS and identified factors associated with compliance among pregnant women in rural central India.

Methods

A community-based mixed-method cross-sectional study was conducted among 97 third-trimester pregnant women registered at a randomly selected primary health centre in Wardha district, Maharashtra, India. Quantitative data were collected using a structured interviewer-administered questionnaire. Compliance was defined as consumption of ≥ 80% of prescribed IFAS tablets during the preceding 14 days. Descriptive statistics, univariable logistic regression, and multivariable logistic regression analyses were performed using R software version 4.1.2. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were estimated. Qualitative data were obtained through 12 in-depth interviews with pregnant women, caregivers, and healthcare stakeholders and analysed using Braun and Clarke's thematic approach.

Results

Overall compliance with IFAS was 67.0% (65/97). The most frequently reported barriers to regular intake were forgetfulness (63.9%), busy schedules (27.8%), and fear of side effects (26.8%). Univariable analysis demonstrated significant associations between compliance and maternal education, caste, type of ration card, husband's education, healthcare provider interaction, myths and taboos, awareness regarding iron absorption, dietary practices, and systemic illness ($p < 0.05$). In multivariable analysis, missing IFAS doses (AOR = 0.006; 95% CI: 0.00008–0.081; $p = 0.002$) and experiencing side effects (AOR = 0.10; 95% CI: 0.014–0.49; $p = 0.009$) remained independent predictors of non-compliance. Qualitative findings highlighted forgetfulness, gastrointestinal side effects, misconceptions, poor dietary diversity, financial constraints, and health system challenges as key barriers, while counselling, family support, and community health worker follow-up facilitated adherence.

Conclusions

Among rural Indian pregnant women, Compliance of IFAS was moderate and influenced by behavioural, sociocultural, dietary and health system factors. Focusing on counselling, tackling side effects,

misperceptions of supplementation among beneficiaries and families along with ensuring continuous availability of supplements in the health systems may help improve adherence as well as ultimately reducing maternal anaemia.

BACKGROUND

Anemia is defined as a condition in which the hemoglobin level in the blood is below normal values and that leads to decreases oxygen carrying capacity of blood. According to World Health Organization (WHO), anemia in pregnant women is defined as hemoglobin concentration less than 11.0gm/dl [2]. These are classified as mild (10.9–10 g/dl), moderate (9.9–7 g/dl) and severe (< 7.0 g/dl) anemia respectively (1). Pregnancy-related anaemia remains a significant global public health challenge, particularly in low- and middle-income countries. Iron deficiency is the most common reason of anemia which affects nearly 37percent of pregnant women worldwide, according to estimates from WHO (World Health Organization) (2). Anaemia in pregnancy is one of the leading contributors to maternal morbidity, poor perinatal outcomes such as preterm delivery and low birth weight, fetal growth retardation and maternal mortality. Despite the global efforts under way towards the prevention and control of anaemia among women of reproductive age globally, its burden almost seems unabated (3).

Pregnancy is associated with a rapid increase in iron requirements due to increased metabolic demands, fetal growth, placental development, and increase blood plasma volume. Low nutritional intake, low bioavailability of dietary sources of iron, frequent illness history, short birth spacing and poor socio-economic status aggravate iron deficiency in pregnant women (4). IFA supplementation is one of the most cost-effective and evidence based approaches for preventing and controlling iron deficiency anemia during pregnancy (5). Routine iron and folic acid supplementation reduces maternal and newborn adverse outcomes, increases mother hemoglobin level, and restores iron store (6).

India has the highest burden of anaemia in pregnancy among high-burden regions. To overcome this hurdle, the Government of India has initiated various programs i.e., National Iron Plus Initiative and Anaemia Mukt Bharat (AMB) strategy (under National health mission) which are aimed to reduce anaemia in country (7). According to the AMB guidelines, all pregnant women should take iron and folic acid supplements starting from the second trimester through pregnancy. It also lays stress on deworming, behaviour change communication and testing and treatment of anaemia along with strengthening supply chain mechanisms (8).

Despite the availability of national programmes and free supplementation services, adherence to oral IFA supplementation among pregnant women in India remains suboptimal. Compliance is influenced by multiple factors including gastrointestinal side effects, forgetfulness, inadequate counselling, misconceptions regarding IFA tablets, irregular supply, poor family support, low educational status, and cultural food practices. Studies conducted across different regions of India have reported considerable regional variation in compliance rates. According to NFHS-5, only 44.1% of pregnant women in India consumed iron and folic acid tablets for 100 days or more during pregnancy (9). According to Wardha

district's NFHS-5, 50% of pregnant women took IFAS for at least 100 days (10). The percentage of individuals who take their iron and folic acid orally is 48.2% in Maharashtra, the highest percentage in Tamil Nadu (82.5%) and Puducherry (84%), and the lowest in Uttar Pradesh (22.3%) (11).

Wardha district, located in central rural India, continues to face challenges related to maternal nutrition and anaemia prevention. NFHS-5 data indicate that nearly half of pregnant women in Wardha district consumed iron and folic acid tablets for 100 days or longer during pregnancy (9). Although several studies from northern and southern India have explored compliance to IFA supplementation, community-based mixed method studies assessing determinants of compliance, sociocultural barriers, and dietary practices in rural Maharashtra are limited. Understanding the factors affecting compliance and intake of iron-rich foods is essential for strengthening existing maternal health programmes and improving maternal and fetal health outcomes in rural populations (11).

Hence, the current study was conducted on pregnant women in the Wardha district, to evaluate their compliance with oral iron and folic acid supplements and to investigate the factors influencing compliance, non-compliance, and consumption of iron-rich foods in a rural community setting.

METHODS

Aim

Assessment of compliance of oral iron and folic acid supplementation and their determinants in pregnant women of central rural India.

Study Setting

The study was conducted in a primary health facility in the Seloo block of the Wardha district of Maharashtra.

Study Design

This community-based cross-sectional study employed a mixed-methods approach using both quantitative and qualitative techniques.

Study Participants: Quantitative phase - Cross-Sectional Study: All pregnant women registered at a randomly chosen primary health center in the study area.

Qualitative phase- Pregnant women and their direct caregivers, as well as numerous stakeholders such as medical officers, Auxillary Nurse Midwives, Anganwadi workers, ASHA workers, Community Health Officers at PHCs and Sub-Centres, Taluka Health Officer, and District Health Officer, participated in the qualitative phase.

Inclusion Criteria

This study included all pregnant women who were registered with PHC, were in their third trimester, had begun taking iron and folic acid tablets, and provided written informed consent.

Exclusion Criteria

The study excluded those who had Sickle cell anemia or Thalassemia.

Sample Size Estimation

The sample size for the quantitative component of the study was calculated using the following procedure for estimating a single population proportion

$$N = \frac{Z^2_{1-\alpha\ /2} \times\ p \times\ (1-p)}{d^2}$$

Where, N represents the required sample size, $Z_{1-\alpha\ /2}$ denotes the standard normal variate corresponding to a 95% confidence interval with a value of 1.96, $p$indicates the expected prevalence of compliance to oral iron and folic acid supplementation, and d represents the absolute precision or allowable error.

The prevalence of compliance to iron and folic acid supplementation among pregnant women was considered as 50% based on the NFHS-5 District Fact Sheet for Wardha district (10). Taking a 95% confidence level and an absolute precision of 10%, the sample size was calculated as follows:

$$N = \frac{\left(1.96\right)^2 \times\ 0.50 \times\ \left(1-0.50\right)}{\left(0.10\right)^2} = 96.04$$

The minimal sample size was calculated to be 97 people.

Data collection instruments

A structured interviewer-administered questionnaire and a semi-structured in-depth interview (IDI) guide were developed by the investigators specifically for this study after an extensive review of the relevant literature and national guidelines on antenatal care and iron–folic acid supplementation. The tools were reviewed by experts for content validity and pretested before data collection. The English versions of the questionnaire and IDI guide are provided as Supplementary Files 1 and 2, respectively.

Sampling Procedure

To collect quantitative data, an interview-based structured questionnaire was used. Questions about their sociodemographic profile, current pregnancy and health, consumption of oral iron and folic acid supplements, and foods rich in iron were all included in the questionnaire used to obtain quantitative

data. On the days of their individual ANC clinics, several visits were made to the chosen PHCs. To get quantitative data, third-trimester pregnant women were interviewed.

Qualitative Procedure

Our in-depth interviews were conducted using a semi-structured interview guide. Our study is based on the pragmatism paradigm, which aids in the definition and advancement of the knowledge-building process. Our research study question was taken into consideration when choosing the paradigm. The pragmatic paradigm is a method that focuses on a real-world problem and may use several paradigms to achieve the objective (12).

The data saturation method was used to calculate the sample size. We continued to recruit participants after doing the first 10 interviews until no more came forward (data saturation) (13). The qualitative findings were reported using the "Consolidated Criteria for Reporting Qualitative Research" (COREQ) (14). A total of 12 in-depth interviews were conducted as part of the qualitative component of the study. The participants included one Medical Officer (MO), one Community Health Officer (CHO), one Lady Health Visitor (LHV), two Auxiliary Nurse Midwives (ANMs), two Accredited Social Health Activists (ASHAs), three pregnant women, and two caregivers/family members.

The schematic representation of study procedure is depicted in the flow chart in Fig. 1.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using R Statistical Software version 4.1.2 (R Foundation for Statistical Computing, Vienna, Austria). Prior to analysis, data cleaning, validation, and appropriate coding of variables were performed. While continuous variables were expressed as mean ± standard deviation for normally distributed data and median with interquartile range for skewed data, categorical variables were summarized using frequency and percentage. Appropriate tables and graphical representations were used to present the results.

The main outcome variable was adherence to oral iron and folic acid supplementation, which was defined as taking ≥ 80% of the schedule-dose irons and folic acid tablets in the previous 14 days. The compliance was coded as compliant or non-compliant. Socio-demographic Characteristics, Husband Related Factors, Health System and Behavioural Variables Dietary Factors Clinical and Obstetric Variables were taken as Independent variables. Suitable inferential statistical tests were performed to evaluate association between the explanatory variables and compliance status. Multivariable logistic regression analysis included variables that were statistically significant in univariable analyses, in order to identify independent predictors of compliance. Multivariable-adjusted odds ratios (AOR) with 95% confidence intervals (CI) were calculated, and $p < 0.05$ was considered statistically significant.

For the qualitative component, thematic analysis was performed using Braun and Clarke's approach (15). A hybrid deductive-inductive method was adopted to allow both predefined and emerging themes to be explored in relation to the study objectives. Audio-recorded interviews were transcribed verbatim, and

each transcript was coded line-by-line using a descriptive coding approach. Codes were subsequently grouped into categories and themes to identify major patterns related to compliance and non-compliance with iron and folic acid supplementation.

Operational Definitions:

Prophylactic Dosage of Iron and Folic Acid Supplementation

As per the Ministry of Health and Family Welfare (India, 2019), pregnant women should take one IFA tablet daily from the second trimester (4th month) onwards for at least 180 days during pregnancy. Each red sugar-coated tablet contains 60 mg elemental iron and 500 µg folic acid. (16). Oral iron tablets have a bioavailability of only 5–10%, while pregnant women normally need 1,040 mg of iron overall (not including blood lost after birth) (17).

Compliance with Iron and Folic Acid Tablets

The total number of iron and folic acid tablets consumed over the previous two weeks divided by the total number of required (given) tablets taken over the same period multiplied by 100 is the definition of compliance with iron and folic acid tablets (18).

The study was conducted according to a previously published protocol describing the study rationale, methodology, and analysis plan (11). The present manuscript reports the quantitative and qualitative findings arising from the completed study.

Ethical Considerations

The Institutional Ethics Committee DMIHER (DU) received the study protocol, which was authorized under Ref No. DMIHER(DU)/IEC/2024/131. Additionally, it was submitted to Central Trial Registry India (CTRI), where it was registered under the number CTRI/2024/06/069262 dated 20-06-2024. DHO, Wardha, granted permission to conduct the study. Prior to their enrolment in the trial, the patients provided written informed consent.

RESULTS

Table 1
Sociodemographic Characteristics of Study Participants (N = 97)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	**Mean ± SD**	**25.9 ± 4.1**	—
	Median (IQR)	**25** (23–28)	—
Age group (years)	**< 20**	**2**	**2.1**
	20–24	**40**	**41.2**
	25–29	**34**	**35.1**
	30–34	**14**	**14.4**
	≥ 35	**7**	**7.2**
Religion	**Hindu**	**94**	**96.9**
	Muslim	**3**	**3.1**
Caste	**OBC**	**52**	**53.6**
	Open	**29**	**29.9**
	SC	**8**	**8.2**
	ST	**8**	**8.2**
Educational status	**Graduate/Postgraduate**	**20**	**20.6**
	High school	**35**	**36.1**
	Intermediate/Diploma	**21**	**21.6**
	Primary/Middle	**21**	**21.6**
Occupation	**Homemaker**	**53**	**54.6**
	Semi-skilled	**18**	**18.6**
	Skilled	**15**	**15.5**
	Unemployed	**1**	**1.0**
	Unskilled	**10**	**10.3**
Type of ration card	**Orange**	**47**	**48.5**
	White	**10**	**10.3**
	Yellow	**40**	**41.2**
Educational status of husband	**Graduate/Postgraduate**	**19**	**19.6**

Variable	Category	Frequency (n)	Percentage (%)
	High school	**44**	**45.4**
	Intermediate/Diploma	**26**	**26.8**
	Primary/Middle	**8**	**8.2**
Occupation of husband	**Elementary occupation**	**9**	**9.3**
	Professionals	**27**	**27.8**
	Skilled Agricultural & Fishery Workers	**33**	**34.0**
	Skilled manual & trade	**28**	**28.9**
Socioeconomic status (BG Prasad 2026)	**Class I–II**	**62**	**63.9**
	Class III	**25**	**25.8**
	Class IV–V	**10**	**10.3**

As depicted in the Table 1, The mean age of the study participants was 25.9 ± 4.1 years, with a median age of 25 years and an interquartile range of 23–28 years. Most of the participants belonged to the 20–24 years age group (41.2%), followed by 25–29 years (35.1%). The majority of the participants were Hindu (96.9%) and belonged to the Other Backward Class (OBC) category (53.6%). Regarding educational status, 36.1% of the participants had completed high school education, while 20.6% were graduates or postgraduates.

The study found that, more than half of the participants were homemakers (54.6%). Nearly half of the participants possessed orange ration cards (48.5%). Among husbands, 45.4% had completed high school education, and the majority were engaged in skilled agricultural and fishery work (34.0%). According to the modified BG Prasad socioeconomic classification 2026, 63.9% of the participants belonged to Class I–II socioeconomic status.

Table 2
Compliance to Oral Iron and Folic Acid Supplementation and Factors Influencing Irregular Intake Among Study Participants (N = 97)

Variable	Category	Frequency (n)	Percentage (%)
Compliance status	**Compliant**	**65**	**67.0**
	Non-compliant	**32**	**33.0**
Factors influencing irregular intake*	**Forgetfulness**	**62**	**63.9**
	Busy schedule	**27**	**27.8**
	Fear of side effects	**26**	**26.8**
	Acidity-like symptoms	**12**	**12.4**
	Constipation	**8**	**8.3**
	Presuming IFA not helpful	**3**	**3.1**
	Financial constraints	**2**	**2.1**
	Running out of supplements at PHC	**1**	**1.0**

***Multiple responses were recorded. Percentages may not total 100%.**

As shown in Table 2 and Fig. 2, among the 97 study participants, 67.0% were compliant with oral iron and folic acid supplementation, while 33.0% were non-compliant. The factors influencing irregular intake of IFA supplements are illustrated in Fig. 3. Forgetfulness was the most commonly reported factor affecting compliance (63.9%), followed by busy schedule (27.8%) and fear of side effects (26.8%). Acidity-like symptoms and constipation were reported by 12.4% and 8.3% of participants, respectively. A small proportion of participants perceived IFA tablets as not beneficial (3.1%), reported financial constraints (2.1%), or experienced non-availability of supplements at the primary health centre (1.0%).

Table 3
Association of Compliance to Oral Iron and Folic Acid Supplementation with Sociodemographic and Socioeconomic Characteristics Among Study Participants (N = 97)

Variable	Category	OR (95% CI)	p-value
Age (years)	**> 25 vs ≤ 25**	**1.06 (0.45–2.46)**	**0.901**
Caste	**Open vs OBC**	**0.60 (0.23–1.56)**	**0.306**
	SC vs OBC	**0.12 (0.02–0.62)**	**0.017***
	ST vs OBC	**1.11 (0.20–6.10)**	**0.909**
Educational status	**High school vs Graduate/Postgraduate**	**0.15 (0.03–0.70)**	**0.020***
	Intermediate/Diploma vs Graduate/Postgraduate	**0.47 (0.08–2.74)**	**0.420**
	Primary/Middle vs Graduate/Postgraduate	**0.08 (0.02–0.40)**	**0.004***
Occupation	**Semi-skilled vs Homemaker**	**2.12 (0.61–7.35)**	**0.236**
	Skilled vs Homemaker	**3.94 (0.80–19.41)**	**0.091**
	Unskilled vs Homemaker	**0.26 (0.06–1.19)**	**0.071**
Type of ration card	**White vs Orange**	**2.13 (0.24–18.77)**	**0.498**
	Yellow vs Orange	**0.18 (0.07–0.45)**	**< 0.001***
Husband's educational status	**High school vs Graduate/Postgraduate**	**0.19 (0.04–0.87)**	**0.038***
	Intermediate/Diploma vs Graduate/Postgraduate	**0.19 (0.04–0.88)**	**0.049***
	Primary/Middle vs Graduate/Postgraduate	**0.12 (0.02–0.76)**	**0.038***
Husband's occupation	**Professionals vs Elementary occupation**	**0.44 (0.05–3.80)**	**0.475**

Footnote: *OR = Odds Ratio; CI = Confidence Interval. Reference categories: Age ≤ 25 years, OBC caste, Graduate/Postgraduate education, Homemaker occupation, Orange ration card, Graduate/Postgraduate husband education, Elementary occupation of husband, and BG Prasad Class I–II. Statistical significance considered at p < 0.05.*

Variable	Category	OR (95% CI)	p-value
	Skilled Agricultural & Fishery Workers vs Elementary occupation	**0.10 (0.01–0.93)**	**0.043***
	Skilled manual & trade vs Elementary occupation	**0.31 (0.03–2.73)**	**0.308**
Socioeconomic status	**Class III vs Class I–II**	**0.88 (0.34–2.28)**	**0.801**
	Class IV–V vs Class I–II	**Not estimable**	**0.989**

Footnote: *OR = Odds Ratio; CI = Confidence Interval. Reference categories: Age ≤ 25 years, OBC caste, Graduate/Postgraduate education, Homemaker occupation, Orange ration card, Graduate/Postgraduate husband education, Elementary occupation of husband, and BG Prasad Class I–II. Statistical significance considered at p < 0.05.*

Table 3 demonstrates the association between sociodemographic and socioeconomic factors and compliance to oral iron and folic acid supplementation. Significantly lower compliance was observed among women belonging to the Scheduled Caste category (OR = 0.12; 95% CI: 0.02–0.62; p = 0.017), those with primary/middle school education (OR = 0.08; 95% CI: 0.02–0.40; p = 0.004), high school education (OR = 0.15; 95% CI: 0.03–0.70; p = 0.020), and those possessing yellow ration cards (OR = 0.18; 95% CI: 0.07–0.45; p < 0.001). Lower husband educational status and husband occupation as skilled agricultural and fishery workers were also significantly associated with reduced compliance. No significant associations were observed for age, occupation, or socioeconomic status.

Table 4
Association of Compliance to Oral Iron and Folic Acid Supplementation with Health System, Behavioral, Dietary, and Clinical Factors Among Study Participants (N = 97)

Variable	Category	OR (95% CI)	p-value
Discussion with healthcare provider	**Yes vs No**	**4.00 (1.43–11.19)**	**0.008***
Received health education regarding IFA	**Yes vs No**	**1.31 (0.21–8.35)**	**0.773**
Satisfied with provider support/guidance	**Yes vs No**	**5.54 (1.04–29.52)**	**0.048***
Myths and taboos	**Yes vs No**	**0.09 (0.02–0.43)**	**0.003***
Taken Albendazole in past 6 months	**Yes vs No**	**0.69 (0.30–1.58)**	**0.390**
IFA available at PHC	**Yes vs No**	**0.45 (0.09–2.37)**	**0.333**
Advised to take IFA twice daily	**Twice vs Once**	**1.45 (0.61–3.44)**	**0.399**
Missed taking IFA tablets	**Yes vs No**	**0.03 (0.003–0.20)**	**< 0.001***
Experienced side effects	**Yes vs No**	**0.17 (0.07–0.42)**	**< 0.001***
Knowledge of iron-rich foods	**Yes vs No**	**0.36 (0.10–1.35)**	**0.128**
Aware tea/coffee affects iron absorption	**Yes vs No**	**4.23 (1.54–11.65)**	**0.016***
Taking calcium supplements with IFA	**Yes vs No**	**1.12 (0.30–4.16)**	**0.862**
Aware avoiding calcium improves absorption	**Yes vs No**	**3.28 (1.24–8.63)**	**0.016***
Consumption of non-vegetarian food	**Yes vs No**	**3.69 (1.48–9.21)**	**0.005***
Systemic illness	**Yes vs No**	**0.18 (0.04–0.83)**	**0.020***
Adequacy of ANC visits	**> 4 vs < 4 visits**	**0.07 (0.009–0.58)**	**0.013***

Footnote: *OR = Odds Ratio; CI = Confidence Interval. Statistical significance considered at p < 0.05. Reference categories were: No discussion with healthcare provider, no provider satisfaction, absence of dietary awareness, absence of side effects, husband's place of delivery, < 32 weeks gestation, weight gain < 9 kg, and other respective baseline categories.*

Variable	Category	OR (95% CI)	p-value
Planned place of delivery	**Maternal place vs Husband's place**	**0.25 (0.10–0.61)**	**0.004***
Gestational age category	**> 37 weeks vs < 32 weeks**	**0.30 (0.06–1.49)**	**0.147**
	32–36 weeks vs < 32 weeks	**0.38 (0.13–1.11)**	**0.082**
Weight gain (kg)	**> 11 vs < 9**	**0.52 (0.14–1.95)**	**0.328**
	9–11 vs < 9	**0.45 (0.18–1.12)**	**0.093**
Hemoglobin status	**Increase vs Decreased/Same**	**0.86 (0.36–2.05)**	**0.739**
History of abortion	**Yes vs No**	**0.46 (0.15–1.43)**	**0.179**
History of anemia	**Yes vs No**	**0.54 (0.21–1.34)**	**0.181**

Footnote: *OR = Odds Ratio; CI = Confidence Interval. Statistical significance considered at p < 0.05. Reference categories were: No discussion with healthcare provider, no provider satisfaction, absence of dietary awareness, absence of side effects, husband's place of delivery, < 32 weeks gestation, weight gain < 9 kg, and other respective baseline categories.*

Table 4 shows the association between health system, behavioral, dietary, and clinical factors and compliance to oral iron and folic acid supplementation. Women who discussed IFA supplementation with healthcare providers (OR = 4.00; 95% CI: 1.43–11.19; p = 0.008), were satisfied with provider support (OR = 5.54; 95% CI: 1.04–29.52; p = 0.048), were aware that tea/coffee affects iron absorption (OR = 4.23; 95% CI: 1.54–11.65; p = 0.016), were aware of calcium–iron interaction (OR = 3.28; 95% CI: 1.24–8.63; p = 0.016), and consumed non-vegetarian food (OR = 3.69; 95% CI: 1.48–9.21; p = 0.005) demonstrated significantly higher compliance. Conversely, myths and taboos, missed IFA doses, side effects, systemic illness, inadequate ANC utilization, and planning delivery at the maternal home were significantly associated with lower compliance. Other factors did not demonstrate statistically significant associations.

Table 5
Multivariate Logistic Regression Analysis various determinants with Compliance of IFAS

Variable	Category	Adjusted OR	95% CI	p-value
Educational status	**Illiterate**	**1 (Ref)**	**—**	**—**
	High school	**0.40**	**0.02–5.79**	**0.512**
	Intermediate/Diploma	**0.38**	**0.01–9.08**	**0.557**
	Primary/Middle school	**1.15**	**0.04–33.52**	**0.933**
Type of ration card	**Reference category**	**1 (Ref)**	**—**	**—**
	White	**17.96**	**0.41–2807.79**	**0.187**
	Yellow	**0.32**	**0.04–2.34**	**0.267**
Place of delivery planned	**Health facility**	**1 (Ref)**	**—**	**—**
	Maternal place	**0.34**	**0.06–1.68**	**0.187**
Weight gain	**Reference category**	**1 (Ref)**	**—**	**—**
	> 11 kg	**0.60**	**0.05–7.70**	**0.684**
	9–11 kg	**0.37**	**0.04–2.68**	**0.337**
Adequacy of ANC	**≤ 4 visits**	**1 (Ref)**	**—**	**—**
	> 4 visits	**0.25**	**0.007–4.36**	**0.365**
Discussion with provider	**No**	**1 (Ref)**	**—**	**—**
	Yes	**12.89**	**1.09–271.01**	**0.061**
Missed IFA tablets	**No**	**1 (Ref)**	**—**	**—**
	Yes	**0.006**	**0.00008–0.081**	**0.002***
Side effects	**No**	**1 (Ref)**	**—**	**—**
	Yes	**0.10**	**0.014–0.49**	**0.009***
History of anemia	**No**	**1 (Ref)**	**—**	**—**
	Yes	**0.36**	**0.05–1.98**	**0.264**

As given in Table 5, Multivariable logistic regression analysis demonstrated that missing IFA tablets and experiencing side effects were independent predictors of non-compliance to oral iron and folic acid supplementation. Participants who missed taking IFA tablets had significantly lower odds of compliance (AOR = 0.006; 95% CI: 0.00008–0.081; p = 0.002). Similarly, participants who experienced side effects from IFA supplementation were significantly less likely to be compliant (AOR = 0.10; 95% CI: 0.014–0.49; p = 0.009).

Other variables including educational status, type of ration card, planned place of delivery, weight gain, adequacy of ANC visits, discussion with healthcare provider, and history of anemia did not show statistically significant association with compliance after adjustment in the multivariable model.

From the qualitative phase of our study, we obtained the following themes by thematic analysis, as depicted in Fig. 4.

Determinants of Compliance

Participants identified multiple determinants influencing compliance with IFA supplementation. Physiological barriers such as nausea, vomiting, and constipation were commonly reported reasons for discontinuation. Behavioral factors, particularly forgetfulness, also affected adherence. One caregiver stated, *“Forget’s sometimes but I remind her daily after dinner.”*

Structural and Economic Constraints to Dietary Iron Intake

Stakeholders frequently cited limited dietary diversity and economic constraints. Irregular consumption of iron-rich foods was reported by many participants due to cost issues as well as household food practices. “A proportion of women had inadequate dietary diversity, infrequented green leafy vegetables and meat,” a Medical Officer explained.

Facilitators of Compliance

ASHAs and ANMs counselling at periodic intervals, reminders by family members about benefits of health care compliance. Family members and frontline workers were associated with better compliance for the participants. A pregnant woman said, *“ASHA didi told me to take it after food with plenty of water and it got better.”*

Health System Challenges

Intermittent stock-outs of IFA tablets, late reporting, insufficient IEC materials and heavy workload among healthcare workers were cited as barriers to effective service delivery. As one ANM said, *"There is some delay in stock; the reporting portals don't work sometimes.”*

Magnitude and Perceived Burden of Anemia: Healthcare workers have always reported a high burden of anemia in pregnant women at the time of ANC registration. Anemia was established as a significant maternal health problem that needed regular follow-ups and counseling. One providers cited this: *"60% of pregnant women have anemia when they register.”*

Role of Community Health Workers and Service Delivery: ASHAs and ANMs also have the capability to help improve compliance by home visits, counselling, reminders for attendance as well as directly distribute IFA tablets. There was greater adherence and trust from beneficiaries which derived from more frequent interactions with them. As one ASHA worker put it to us: *"I would go every month and ask the pregnant women why they are taking IFA tablets."*

Knowledge, Awareness, and Perceived Benefits: Knowledge on the need for IFA supplementation was associated with better compliance. It was seen that the percentage of the female who had knowledge regarding anemia prevention and maternal health benefits after receiving counseling. As one participant put it: *"I was told that these iron tablets improve the blood and give a healthy baby."*

Dietary Practices, Preferences, and Nutrition Awareness

Moat participants reported cereal-based diets with poor intake of iron-rich foods. Poor dietary diversity was also due to low knowledge about a balanced diet and household dietary practices. Health workers stressed on the availability of alternatives such as jaggery, green leafy vegetables, sprouts and pulses available locally.

Strategies and Recommendations for Improvement

The strategies and recommendations for improving adherence included systematic counselling, enhancing family involvement, community motivation and regular IFA supply without interruption. One of the caregivers stated,*"Families should remind women daily regarding the tablets and not believe in myths and taboos."*

DISCUSSION

The present community-based mixed-method study assessed compliance with IFA supplementation among pregnant women in central rural India. Overall compliance was 67.0%, comparable to **Mithra P et al.** (2013) (64.7%) and **Lavanya P et al.** (2020) (63.8%), lower than **Deori TJ et al.** (2020) (77.1%) and **Debi S et al.** (2020) (81.74%), but higher than **Choudhuri P et al.** (2022) (52.5%). **Mithra P et al.** reported significantly better compliance with single daily dosage schedules ($p < 0.05$), while **Debi S et al.** identified maternal education, deworming status, and ANC utilization as significant determinants. Variations may reflect differences in literacy, ANC accessibility, cultural beliefs, and counseling practices. Despite initiatives like Anaemia Mukt Bharat, compliance remains suboptimal.

Forgetfulness was the most common reason for irregular IFA intake in the present study (63.9%), followed by busy schedule (27.8%) and fear of side effects (26.8%). Similar findings were reported by **Debi S et al.** (forgetfulness 73.7%)(19), **Choudhuri P et al.** (side effects 35.09%, forgetfulness 28.07%) (20), and **Athira S et al.** (forgetfulness 46%, gastrointestinal side effects 28%) (21). Women missing IFA tablets had significantly lower compliance (OR = 0.03; 95% CI: 0.003–0.20; $p < 0.001$; AOR = 0.006; 95% CI: 0.00008–0.081; $p = 0.002$). Side effects were also significantly associated with lower compliance (OR = 0.17; 95% CI: 0.07–0.42; $p < 0.001$; AOR = 0.10; 95% CI: 0.014–0.49; $p = 0.009$). Similar findings were reported by **Kassa ZY et al.** (AOR = 8.5; 95% CI: 4.65–15.35) (22). Qualitative findings further identified nausea, vomiting, constipation, and forgetfulness as major barriers to adherence.

Maternal educational status showed significant association with compliance in the present study. Women educated up to high school (OR = 0.15; 95% CI: 0.03–0.70; $p = 0.020$) and primary/middle school

level (OR = 0.08; 95% CI: 0.02–0.40; p = 0.004) had significantly lower odds of compliance compared to graduates/postgraduates, while intermediate/diploma education was not significantly associated (OR = 0.47; 95% CI: 0.08–2.74; p = 0.420). Similar findings were reported by **Debi S et al.** (23) and **Lavanya P et al**.(24), who identified maternal literacy as a significant predictor of adherence. **Sendaku et al.** (25) from Ethiopia also reported higher adherence among formally educated women (AOR:2.68,95%CI:1.25, 5.74). These findings may reflect better awareness, understanding of counseling, and healthcare-seeking behavior among educated women.

Husband-related characteristics showed significant associations with compliance in the present study. Women whose husbands had education up to high school (OR = 0.19; 95% CI: 0.04–0.87; p = 0.038), intermediate/diploma (OR = 0.19; 95% CI: 0.04–0.88; p = 0.049), and primary/middle school level (OR = 0.12; 95% CI: 0.02–0.76; p = 0.038) had significantly lower compliance compared to graduates/postgraduates. Husband's occupation as skilled agricultural and fishery workers was also associated with lower adherence (OR = 0.10; 95% CI: 0.01–0.93; p = 0.043). Similar findings were reported by **Mengistu T et al**. (26), where husband's education significantly improved adherence (AOR = 3.60; 95% CI: 2.07–6.25). Qualitative findings further highlighted caregivers and husbands as important sources of reminders and support for regular tablet intake.

Caste and socioeconomic vulnerability significantly influenced adherence in the present study. Scheduled Caste participants had significantly lower compliance compared to OBC women (OR = 0.12; 95% CI: 0.02–0.62; p = 0.017). Women with yellow ration cards also had lower compliance compared to orange card holders (OR = 0.18; 95% CI: 0.07–0.45; p < 0.001), while white ration card holders showed no significant association (OR = 2.13; 95% CI: 0.24–18.77; p = 0.498). Although BG Prasad socioeconomic status was not statistically significant, qualitative findings indicated that financial constraints affected dietary diversity and iron-rich food intake. Similar findings were reported by **Rai RK et al.** (27), highlighting the role of socioeconomic deprivation and poor dietary diversity in anemia burden.

Health system and behavioral factors showed strong associations with compliance in the present study. Women who discussed with healthcare providers had significantly higher compliance (OR = 4.00; 95% CI: 1.43–11.19; p = 0.008), and satisfaction with provider support also improved adherence (OR = 5.54; 95% CI: 1.04–29.52; p = 0.048). Health education regarding IFA showed no significant association (OR = 1.31; 95% CI: 0.21–8.35; p = 0.773). **Deori TJ et al.** (28) reported that women with > 4 ANC visits had 1.4 times higher compliance, while **Lavanya P et al.**(24) highlighted the role of supportive counseling. Qualitative findings identified ASHAs and ANMs as key facilitators through counseling, reminders, and home visits, emphasizing the importance of interpersonal counseling and community follow-up.

Sociocultural beliefs and myths significantly influenced adherence in the present study. Women reporting myths and taboos regarding IFA supplementation had significantly lower compliance (OR = 0.09; 95% CI: 0.02–0.43; p = 0.003). Qualitative findings revealed misconceptions such as abdominal discomfort and darker complexion in newborns. Similar findings were reported by **Lavanya P et al.**(24) and **Debi S et al.**,(19) who identified myths, side effects, and poor knowledge as major barriers (p < 0.05).

Wendt A et al.(29) also reported negative beliefs as significant predictors of inadequate IFA intake (AOR < 1; p < 0.05). Internationally, **Gebremariam AD et al.**(30) found that women with good knowledge had higher adherence (AOR 2.37; 95% CI: 1.33–4.21).

Dietary awareness and nutrition-related factors showed significant association with compliance. Women aware that tea/coffee affects iron absorption had higher compliance (OR = 4.23; 95% CI: 1.54–11.65; p = 0.016), and knowledge regarding avoidance of calcium with IFA also improved adherence (OR = 3.28; 95% CI: 1.24–8.63; p = 0.016). Non-vegetarian participants showed significantly higher compliance (OR = 3.69; 95% CI: 1.48–9.21; p = 0.005), while knowledge of iron-rich foods was not significant (OR = 0.36; 95% CI: 0.10–1.35; p = 0.128). Similar findings were reported by **Mengistu T et al.** (26) (AOR = 4.40; 95% CI: 2.65–7.30). Indian studies by **Varghese JS et al.** (31), **Chourasia A et al.** (32), and **Debi S et al**.(19) also linked better dietary diversity and nutritional awareness with improved IFA compliance (p < 0.05). Qualitative findings revealed cereal-dominated diets with limited intake of green leafy vegetables and animal-source foods due to financial and accessibility constraints.

Among clinical factors, women with systemic illness had significantly lower compliance (OR = 0.18; 95% CI: 0.04–0.83; p = 0.020). Adequate ANC visits showed significant association in univariable analysis (OR = 0.07; 95% CI: 0.009–0.58; p = 0.013), but not after adjustment (AOR = 0.25; 95% CI: 0.007–4.36; p = 0.365). Women planning delivery at maternal homes also had lower compliance (OR = 0.25; 95% CI: 0.10–0.61; p = 0.004), though not significant after adjustment (AOR = 0.34; 95% CI: 0.06–1.68; p = 0.187). Moderate-late preterm gestation (OR = 0.38; 95% CI: 0.13–1.11; p = 0.082) and weight gain of 9–11 kg (OR = 0.45; 95% CI: 0.18–1.12; p = 0.093) showed lower compliance trends without statistical significance. Similar associations between ANC utilization and adherence were reported by **Dutta AJ et al.** (18)

The qualitative component provided contextual understanding of persistent anemia burden and barriers to IFA adherence. Healthcare workers perceived anemia as highly prevalent despite ongoing national programs and reported challenges such as intermittent stock-outs, inadequate IEC materials, reporting delays, and heavy frontline workload. Community health workers emphasized repeated counseling, household involvement, and continuous reinforcement to improve adherence. Overall, the mixed-method findings suggest that IFA compliance is influenced by educational, behavioral, sociocultural, dietary, and health system-related factors, highlighting the need for strengthened counseling, side-effect management, dietary awareness, misconception reduction, uninterrupted IFA supply, and greater family involvement to reduce maternal anemia in rural India.

STRENGTHS AND LIMITATIONS

This study employed a community-based mixed-method design, enabling triangulation of quantitative and qualitative findings. The inclusion of pregnant women, caregivers, and healthcare providers provided a comprehensive understanding of factors influencing IFAS compliance. However, the cross-sectional design limits causal inference, and self-reported compliance may be subject to recall and social

desirability bias. As the study was conducted in a single rural block of Wardha district, generalizability may be limited.

RECOMMENDATIONS

Integrated interventions will need to address both behavioral and sociocultural, nutritional and health system barriers for improving adherence with IFA. They are critical to ensure uninterrupted IFA supply, enhance culturally appropriate counselings, effective management of side effects and addressing the myths. Involvement of family members and weekly counselling and followup by ASHAs, ANMs and Anganwadi may improve adherence. Focus of promotion should also be on affordable, iron rich diets promoting nutrition knowledge, reminders-based interventions and advanced monitoring systems should also be promoted. This study highlights the importance of integrating maternal health, nutritional and social welfare services to address the persistent challenge of maternal anemia in rural India.

CONCLUSION

The current study found compliance among 66.0% of pregnant women with IFA supplementation, suggesting moderate compliance in a similar setting. Behavioral, sociocultural, dietary, economic and health system-related factors positively influenced adherence whereas systemic illness negatively influenced compliance. Lack of memory, side effects from the drug, myths/misconceptions related to adherence, poor dietary diversity and health system constraints were major barriers to adherence as identified in qualitative findings; counseling, family support and perceived Health benefits promoted adherence. Maternal adherence to IFA is multifactorial, and this study highlights that integrated interventions are needed to address behavior change alongside nutritional education, counseling support, supply assurance and health systems strengthening.

Abbreviations

LMIC
low and middle-income country
AOR
Adjusted Odds Ratio
AMB
Anaemia Mukt Bharat
ANC
Antenatal Care
ANM
Auxiliary Nurse Midwife
ASHA
Accredited Social Health Activist

BG Prasad
B.G. Prasad Socioeconomic Classification
CHO
Community Health Officer
CI
Confidence Interval
COREQ
Consolidated Criteria for Reporting Qualitative Research
CTRI
Clinical Trials Registry–India
DHO
District Health Officer
Hb
Hemoglobin
IEC
Information, Education and Communication
IDI
In-Depth Interview
IFA
Iron and Folic Acid
IFAS
Iron and Folic Acid Supplementation
IQR
Interquartile Range
LHV
Lady Health Visitor
MO
Medical Officer
NFHS
National Family Health Survey
OBC
Other Backward Class
OR
Odds Ratio
PHC
Primary Health Centre
SC
Scheduled Caste
SD
Standard Deviation

ST
Scheduled Tribe
WHO
World Health Organization.

Declarations

Ethics approval and consent to participate

The study protocol was reviewed and approved by the Institutional Ethics Committee of Datta Meghe Institute of Higher Education and Research (DMIHER), Wardha, India (Ref. No. DMIHER(DU)/IEC/2024/131). The study was prospectively registered with the Clinical Trials Registry–India (CTRI) under registration number CTRI/2024/06/069262 dated 20-06-2024. Administrative permission to conduct the study was obtained from the District Health Officer, Wardha. Written informed consent was obtained from all participants prior to enrolment in the study. All methods were carried out in accordance with the relevant guidelines and regulations and the ethical principles of the Declaration of Helsinki.

Consent for publication

Not applicable. No identifiable personal information, images, or individual-level data are included in this manuscript.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AA: Conceived and designed the study, collected data, literature search, performed the statistical analysis, interpreted the findings & manuscript drafting.

JR: Critically reviewed the manuscript, contributed to the intellectual content, and approved the final version for publication.

AJ: Critically reviewed the manuscript, contributed to the intellectual content, and approved the final version for publication.

DP: Critically reviewed the manuscript, contributed to the intellectual content, and approved the final version for publication.

AM: Critically reviewed the manuscript, contributed to the intellectual content, and approved the final version for publication.

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References

1. Khanam A, Vohra K, Mg TA, Ranjith A, Bharti H, Rupam, et al. A Systematic review of factors affecting compliance toward oral iron-folic acid supplementation among pregnant women in India. Indian J Community Health. 2022;34(4):456–63. 10.47203/IJCH.2022.v34i04.002.
2. Anaemia [Internet]. [cited 2026 May 9]. Available from: https://www.who.int/news-room/fact-sheets/detail/anaemia
3. Anaemia in women. and children [Internet]. [cited 2026 May 9]. Available from: https://www.who.int/data/gho/data/themes/topics/anaemia_in_women_and_children

4. Ubom AE, Begum F, Ramasauskaite D, Nieto-Calvache AJ, Oguttu M, Nunes I, et al. FIGO good practice recommendations on anemia in pregnancy, to reduce the incidence and impact of postpartum hemorrhage (PPH). Int J Gynaecol Obstet. 2025;171(3):993–1007. 10.1002/ijgo.70529 . PubMed PMID: 41031541; PubMed Central PMCID: PMC12640178.
5. Aldakhil LO, Alobaid S, Almogbel AT, Alfouzan SM. Anemia in Pregnancy: Incidence, Risk Factors, and Outcomes. Cureus 17(10):e93807. 10.7759/cureus.93807 PubMed PMID: 41054433; PubMed Central PMCID: PMC12497419.
6. Kebede SS, Asmelash D, Duguma T, Wudineh D, Alemayehu E, Gedefie A, et al. Global prevalence of iron deficiency anemia and its variation with different gestational age systematic review and meta-analysis. Clin Nutr Open Sci. 2025;59:68–86. 10.1016/j.nutos.2024.12.002.
7. Rizvi ZA, Singh J, Mishra P, Kumar A, Saini A, Patel N, et al. Anemia Mukt Bharat Index: Methodology and State Rankings of Iron and Folic Acid Supplementation Coverage in India, 2018–2019 to 2022–2023. Glob Health Sci Pract. 2025;13(2). 10.9745. /GHSP-D-24-00077 PubMed PMID: 41371944.
8. Anaemia Mukt Bharat:. National Health Mission [Internet]. [cited 2026 May 9]. Available from: https://nhm.gov.in/index1.php?lang=1&level=3&lid=797&sublinkid=1448
9. Ministry of Health and Family Welfare. NFHS 5 India report [Internet]. New Delhi. 2019. Available from: https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf
10. Ministry of Health and Family Welfare. NFHS-5-Maharashtra District Fact Sheet [Internet]. 2019. Available from: https://dhsprogram.com/pubs/pdf/FR374/FR374_Maharashtra.pdf
11. Ahamed VPA, Mudey A, Joshi A, Raut JM. Assessment of Compliance to Oral Iron and Folic Acid Supplementation among Pregnant Women in Wardha District: A Protocol for Community-based Mixed Method Study. J Datta Meghe Inst Med Sci Univ. 2024;19(4):799. 10.4103/jdmimsu.jdmimsu_555_24.
12. Creswell JW, Clark VLP. Designing and conducting mixed methods research. Thousand Oaks, CA, US: Sage Publications, Inc; 2007. xviii, 275 p. (Designing and conducting mixed methods research).
13. Guest G, Bunce A, Johnson L. How Many Interviews Are Enough? An Experiment with Data Saturation and Variability. Field Methods. 2006;18(1):59–82. 10.1177/1525822X05279903.
14. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19(6):349–57. 10.1093/intqhc/mzm042.
15. Braun V, Clarke V. Using thematic analysis in psychology. Qual Res Psychol. 2006;3(2):77–101. 10.1191/1478088706qp063oa.
16. Anemia Mukt Bharat [Internet]. [cited 2024 Jan 2]. Available from: https://anemiamuktbharat.info/programme/interventions#link-1
17. Institute of Medicine (US) Committee on Nutritional Status During Pregnancy and Lactation. Nutrition During Pregnancy: Part I Weight Gain: Part II Nutrient Supplements [Internet]. Washington (DC): National Academies Press (US); 1990 [cited 2024 Jan 2]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK235228/ PubMed PMID: 25144018.

18. Dutta AJ, Patel P, Bansal RK. Compliance To Iron Supplementation Among Pregnant Women: A Cross Sectional Study in Urban Slum. Natl J Community Med. 2014;5(04):04.
19. Debi S, Basu G, Mondal R, Chakrabarti S, Roy SK, Ghosh S. Compliance to iron-folic-acid supplementation and associated factors among pregnant women: A cross-sectional survey in a district of West Bengal, India. J Fam Med Prim Care. 2020;9(7):3613–8. 10.4103/jfmpc.jfmpc_392_20 . PubMed PMID: 33102338; PubMed Central PMCID: PMC7567271.
20. Choudhuri P, Debbarma A, Debbarma S, Reang T. Compliance to iron and folic acid tablets among pregnant women attending antenatal clinic in Agartala Government Medical College. J Fam Med Prim Care. 2022;11(6):2763–7. 10.4103/jfmpc.jfmpc_1914_21 . PubMed PMID: 36119349; PubMed Central PMCID: PMC9480726.
21. Rai BA, Kalyani P, Verma CV. Compliance to iron and folic acid supplementation and associated factors among antenatal mothers attending OPD in a tertiary care institute in India. Int J Community Med Public Health. 2024;11(6):2344–8. 10.18203/2394-6040.ijcmph20241496.
22. Kassa ZY, Awraris T, Daba AK, Tenaw Z. Compliance with iron folic acid and associated factors among pregnant women through pill count in Hawassa city, South Ethiopia: a community based cross-sectional study. Reprod Health. 2019;16(1):14. 10.1186/s12978-019-0679-8 . PubMed PMID: 30736812; PubMed Central PMCID: PMC6367743.
23. Debi S, Basu G, Mondal R, Chakrabarti S, Roy SK, Ghosh S. Compliance to iron-folic-acid supplementation and associated factors among pregnant women: A cross-sectional survey in a district of West Bengal, India. J Fam Med Prim Care. 2020;9(7):3613–8. 10.4103/jfmpc.jfmpc_392_20 . PubMed PMID: 33102338; PubMed Central PMCID: PMC7567271.
24. Lavanya P, Jayalakshmy R, Rajaa S, Mahalakshmy T. Adherence to iron and folic acid supplementation among antenatal mothers attending a tertiary care center, Puducherry: A mixed-methods study. J Fam Med Prim Care. 2020;9(10):5205–11. 10.4103/jfmpc.jfmpc_721_20 . PubMed PMID: 33409189; PubMed Central PMCID: PMC7773120.
25. Sendeku FW, Azeze GG, Fenta SL. Adherence to iron-folic acid supplementation among pregnant women in Ethiopia: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2020;20:138. 10.1186/s12884-020-2835-0 . PubMed PMID: 32131751; PubMed Central PMCID: PMC7057669.
26. Mengistu T, Lencha B, Mekonnen A, Degno S, Yohannis D, Beressa G. Compliance to iron folic acid supplementation and its associated factors among pregnant women attending Antenatal clinic in Wondo district: a cross-sectional study. Sci Rep. 2023;13(1):17468. 10.1038/s41598-023-44577-7 . PubMed PMID: 37838766; PubMed Central PMCID: PMC10576767.
27. Rai RK, Fawzi WW, Barik A, Chowdhury A. The burden of iron-deficiency anaemia among women in India: how have iron and folic acid interventions fared? WHO South-East Asia. J Public Health. 2018;7(1):18–23. 10.4103/2224-3151.228423 . PubMed PMID: 29582845.
28. 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 Fam Med Prim Care. 2021;10(5):2006–11. .jfmpc_1742_20 PubMed PMID: 34195139; PubMed Central PMCID: PMC8208205.

29. Wendt A, Stephenson R, Young M, Webb-Girard A, Hogue C, Ramakrishnan U, et al. Individual and Facility-Level Determinants of Iron and Folic Acid Receipt and Adequate Consumption among Pregnant Women in Rural Bihar, India. PLoS ONE. 2015;10(3):e0120404. 10.1371/journal.pone.0120404 . PubMed PMID: 25793866; PubMed Central PMCID: PMC4368810.
30. Gebremariam AD, Tiruneh SA, Abate BA, Engidaw MT, Asnakew DT. Adherence to iron with folic acid supplementation and its associated factors among pregnant women attending antenatal care follow up at Debre Tabor General Hospital, Ethiopia, 2017. PLoS ONE. 2019;14(1):e0210086. 10.1371/journal.pone.0210086 . PubMed PMID: 30615646; PubMed Central PMCID: PMC6322725.
31. Varghese JS, Swaminathan S, Kurpad AV, Thomas T. Demand and supply factors of iron-folic acid supplementation and its association with anaemia in North Indian pregnant women. PLoS ONE. 2019;14(1):e0210634. 10.1371/journal.pone.0210634 . PubMed PMID: 30699167; PubMed Central PMCID: PMC6353128.
32. Chourasia A, Pandey CM, Awasthi A. Factors influencing the consumption of iron and folic acid supplementations in high focus states of India. Clin Epidemiol Glob Health. 2017;5(4):180–4. 10.1016/j.cegh.2017.04.004.

Figures

Figure: Schematic Representation of Mixed Method Study Design

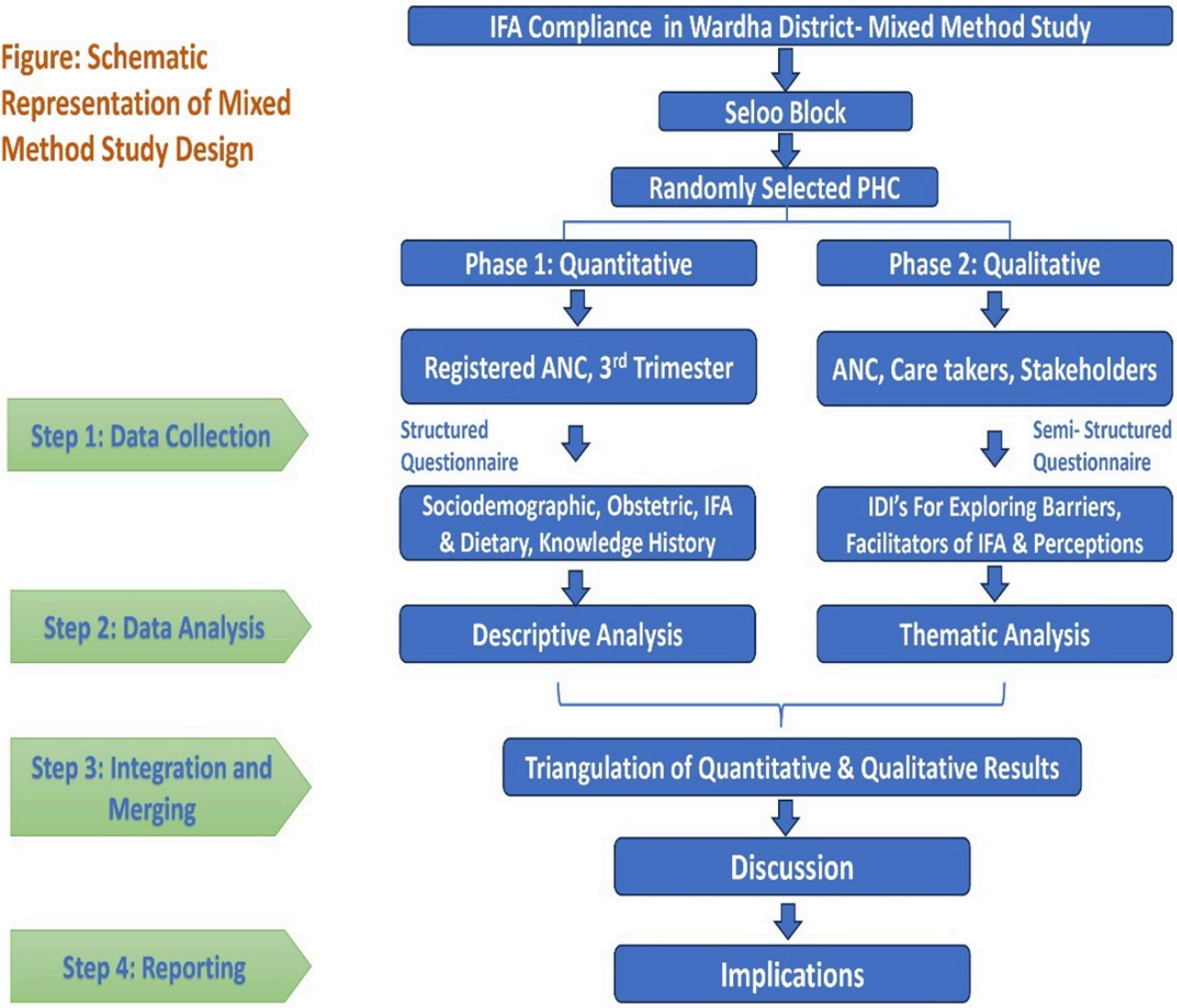


Figure 1

The flow chart depicts all the steps and phases of the study

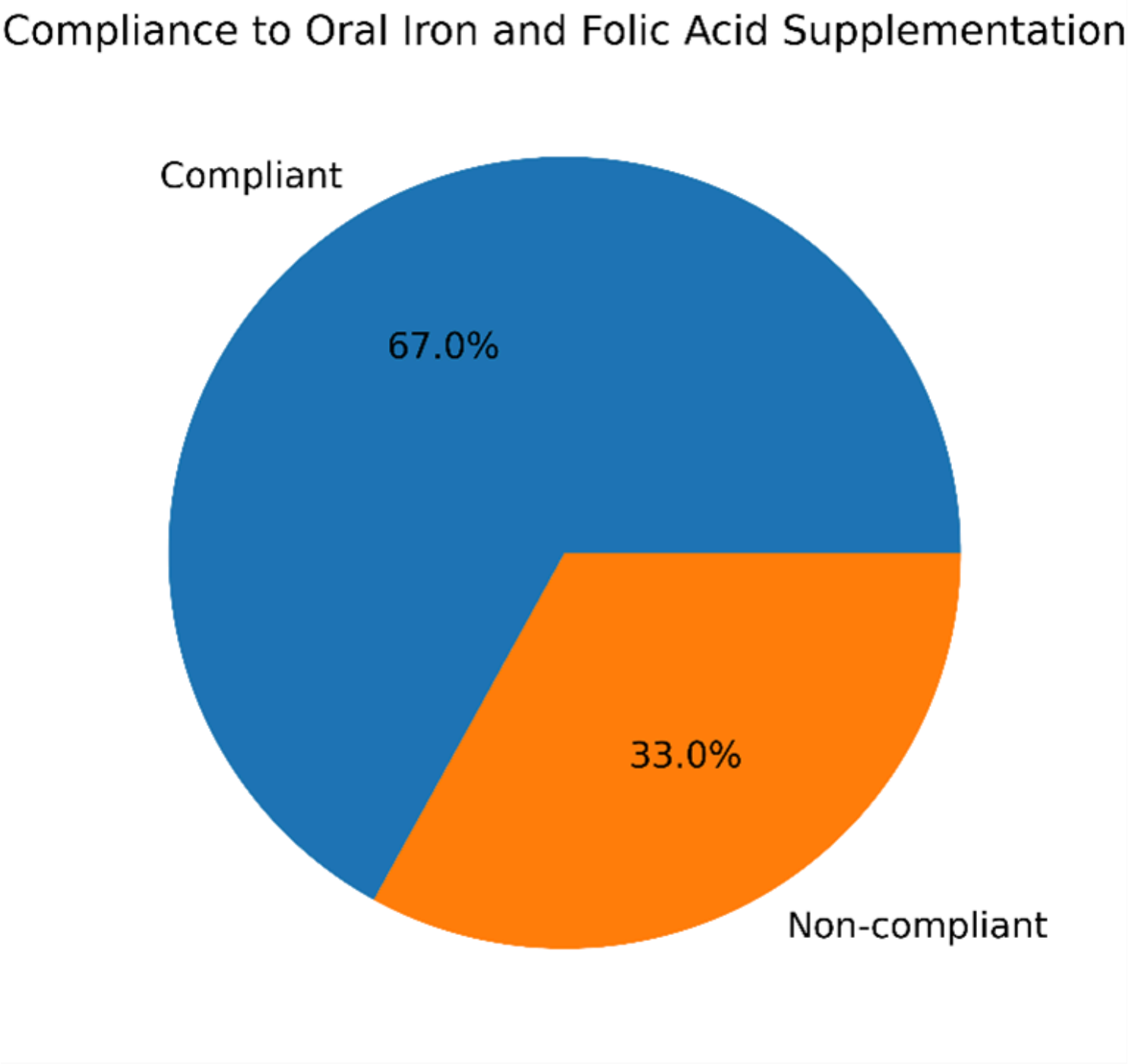


Figure 2

Distribution of study participants according to compliance status with oral iron and folic acid supplementation among pregnant women in Wardha district (N = 97).

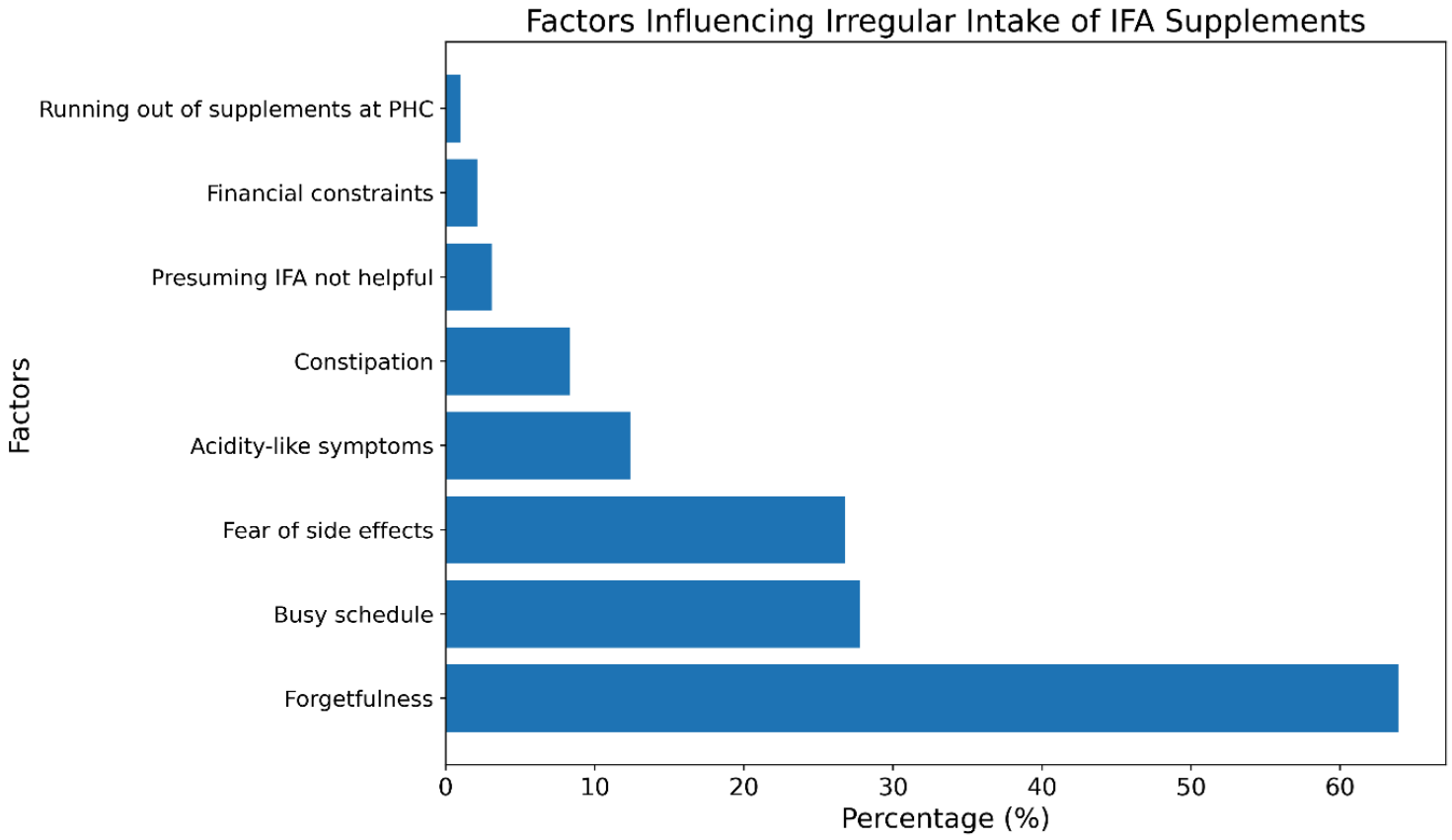


Figure 3

Distribution of factors influencing irregular intake of oral iron and folic acid supplementation among study participants. *Multiple responses were recorded.*

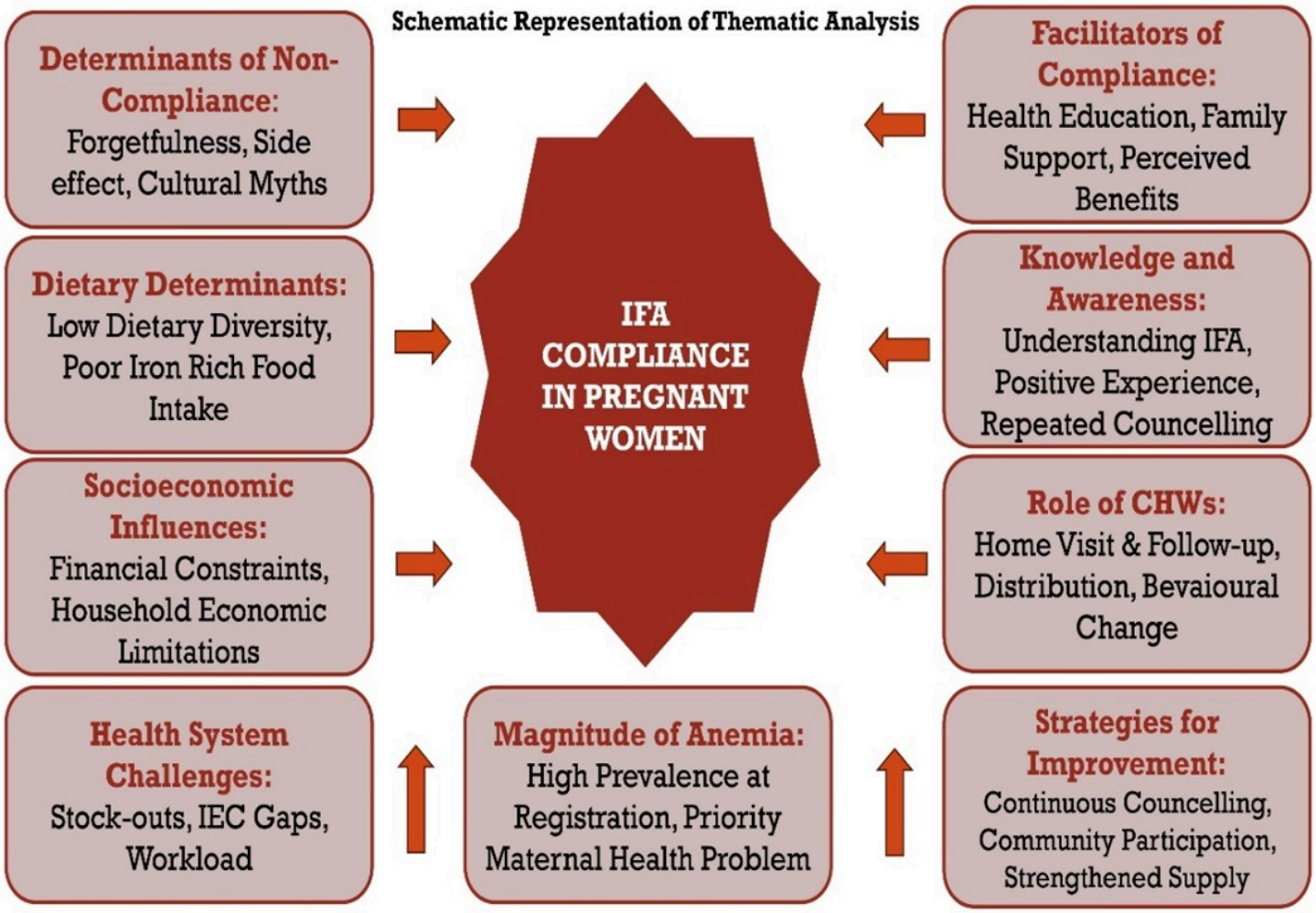


Figure 4

Shows the schematic representation of Thematic Analysis

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Supplemtaryfile1EnglishQuestionnaire.docx
- SupplementaryFile2IDIGUIDEEnglish.docx