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Knowledge and compliance of iron folic acid (IFA) supplement among pregnant women in a selected primary health center of east Khasi Hills, Meghalaya

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Abstract
Iron and Folic Acid (IFA) supplementation during pregnancy is a critical public health intervention aimed at preventing iron deficiency anaemia, a condition that endangers both maternal and fetal well-being. The World Health Organization (WHO) advises intermittent IFA supplementation for menstruating women in regions where anaemia prevalence is ≥20%, and daily supplementation throughout pregnancy to mitigate risks such as antenatal anaemia, iron deficiency, and low birth weight. In India, the Intensified National Iron Plus Initiative (I-NIPI) recommends a daily prophylactic dose of one IFA tablet containing 60 mg of elemental iron and 500 mcg of folic acid from the fourth month of pregnancy through 180 days postpartum.

Despite these national guidelines, adherence remains a challenge. In Meghalaya, coverage under the Anaemia Mukt Bharat strategy improved from 78% to 90% between 2017 and 2020, yet actual compliance lags behind, with studies indicating adherence rates between 47% and 55%. This study evaluated the knowledge and compliance of IFA supplementation among pregnant women attending Mawroh Primary Health Centre and Mawtawar Sub-centre in East Khasi Hills, Meghalaya. Using a descriptive cross-sectional design, 120 pregnant women were recruited consecutively. Data were gathered through a structured questionnaire and the Morisky 8-item medication adherence scale, and analysed using SPSS version 27.0 with both descriptive and inferential statistics, including Chi-square and Fisher's exact tests.

Results revealed that 80% of participants had adequate knowledge of IFA supplementation. However, adherence levels varied: 30% reported high adherence, 48.3% moderate, and 21.6% low. Knowledge was significantly associated with the place of care ($P< 0.05$), while compliance was influenced by gestational age, healthcare facility visited, and distance to the health center ($P< 0.05$).

In conclusion, while awareness of IFA supplementation was relatively high, actual compliance remained moderate. Key factors affecting adherence included accessibility to health services and the stage of pregnancy. These findings highlight the urgent need for strengthened community health education, better distribution mechanisms, and consistent antenatal follow-up to improve compliance and promote healthier maternal outcomes.

Keywords: Knowledge, compliance, iron folic acid (IFA) and pregnant women

1. Introduction

Iron and Folic Acid (IFA) deficiency remains a significant global public health challenge, particularly during pregnancy, where it contributes to the high prevalence of anaemia. According to the World Health Organization (WHO), over 40% of pregnant women worldwide experience folic acid deficiency, placing them at increased risk due to heightened nutritional demands during gestation. Despite widespread implementation of Iron and Folic Acid Supplementation (IFAS) programs, actual compliance among pregnant women remains low.

Iron deficiency anaemia during pregnancy has serious implications for both maternal and perinatal health outcomes. In response, WHO advocates for universal IFA supplementation for all pregnant women to mitigate risks such as maternal anaemia, puerperal sepsis, low birth weight, and preterm birth. This study aimed to evaluate the level of compliance with IFA supplementation and identify key factors influencing adherence among pregnant women.

As per WHO guidelines (2012), daily oral supplementation with 30–60 mg of elemental iron and 400 µg (0.4 mg) of folic acid is recommended during pregnancy. The equivalent of 60 mg elemental iron can be administered as 300 mg ferrous sulphate heptahydrate, 180 mg ferrous fumarate, or 500 mg ferrous gluconate. Importantly, folic acid intake should begin as early as possible ideally before conception to prevent neural tube defects and support optimal fetal development [11, 6].

2. Need of the study

Globally, anaemia affects over half a billion women of reproductive age, with an estimated prevalence of 29% among non-pregnant women and 38% among pregnant women. In India, the burden is even higher, with 50.4% of pregnant women affected by anaemia. Recent studies in India (Agarwal *et al*., 2006) have reaffirmed the significant prevalence of anaemia among pregnant and lactating women, underscoring the need for more aggressive and comprehensive interventions. These efforts are crucial to achieving the World Health Assembly's target of a 50% reduction in anaemia among women of reproductive age by 2025 (WHO, 2008) [3].

According to NFHS-5 Report 2021, 84.7% pregnant women are given IFA tablet, 43.3% and 20.6% pregnant women took IFA tablet for at least 100 days and 180 days respectively and only 8.3% took intestinal parasite drug during pregnancy. The reported LBW (<2.5 kg) cases were 11.7% with still birth cases of 1% according to NFHS-5 (2019 – 2021) [4].

There are limited studies done on Knowledge and Compliance of IFA in Meghalaya. Therefore, taking into consideration of the above stated facts, the study would provide the effectiveness of distribution channels to enhance uptake of Iron Folic Acid (IFA) among the pregnant women in selected Healthcare setting of Meghalaya.

3. Objective of the study

1. To assess the knowledge regarding Iron Folic Acid (IFA) Supplement among the pregnant women in a selected Primary health centre Meghalaya.
2. To assess the compliance regarding and Iron Folic Acid (IFA) Supplement among the pregnant women in a selected Primary health centre Meghalaya.
3. To find the association between knowledge and compliance regarding Iron Folic Acid (IFA) Supplement among the pregnant women with selected demographic variables.

4. Methodology

Following institutional ethical clearance and administrative approval, a descriptive cross-sectional study employing a quantitative approach was conducted from 2nd to 30th November 2024. The study aimed to assess the knowledge and compliance regarding Iron and Folic Acid (IFA) supplementation among pregnant women attending a selected Primary Health Centre in East Khasi Hills, Meghalaya. A total of 120 pregnant women were recruited using a consecutive sampling technique based on their outpatient department (OPD) sequence.

Research instruments including a structured self-administered questionnaire and the Morisky 8-item adherence scale were validated by subject matter experts from the departments of Obstetrics & Gynaecology and Community Medicine. A pilot study and pre-testing of the tools confirmed their feasibility for use in the main study setting.

The sample size was calculated based on a 64.1% compliance rate reported in a previous study conducted by Ngamba Akham *et al*. in Imphal, Manipur, with a 7% margin of error, yielding a required sample size of 119. To ensure robustness, 120 participants were ultimately enrolled.

5. Study procedure

Purpose of the study was explained confidentiality was assured and informed consent was taken from the pregnant women who met the inclusion criteria (pregnant women who have registered for ANC in the Health Care Centre. Quantitative data was collected first by using structures self-administered questionnaire and morisky adherence questionnaire interview which assessed demographic and obstetric characteristics, knowledge and compliance regarding IFA Supplement among pregnant women.

6. Result

The quantitative data were analysed using descriptive statistics (Mean, Standard Deviation, Percentage) and inferential statistics (chi square test and fisher exact test).

Table 1 (A): Frequency and percentage distribution of participants according to socio-demographic characteristics. n=120

Socio Demographic Variables	Frequency (f)	Percentage (%)
Age in years		
18 – 25	42	35.00
26 – 33	53	44.20
≥ 34	25	20.80
Educational status		
Primary	28	23.30, 51
Secondary	62	51.70
Hr. Secondary	17	14.20
Graduation	11	9.20
Post Graduation	02	1.70
Occupation		
House-wife	80	66.70
Laborer	27	22.50
Shop keeper	06	5.00
Private job	06	5.00
Govt. servant	01	0.80
Monthly Income (in Rupees)		
Below 10,000/-	47	39.20
10,001 – 20,000	70	58.30
20,001 & above	03	2.50
Family type		
Nuclear	99	82.50
Joint	21	17.50
Religion		
Christian	120	100.00

Table 1(A) summarizes the socio-demographic and obstetrical characteristics of the 120 study participants. The largest age group was 26–33 years, comprising 53 women (44.2%), followed by 42 women (35.0%) aged 18–25 years, and 25 women (20.8%) aged 34 years and above. The participants' ages ranged from 18 to 34 years, with a mean age of 28.43 years and a standard deviation of 5.42 years.

In terms of educational attainment, the majority 62 participants (51.7%) had completed secondary education. Others included 28 (23.3%) with primary education, 17 (14.2%) with higher secondary, 11 (9.2%) graduates, and

only 2 (1.7%) postgraduates. Regarding occupation, most participants 80 women (66.7%) were housewives.
Income-wise, 70 participants (58.3%) reported a monthly household income between ₹10,001 and ₹20,000. Family structure data revealed that 99 women (82.5%) belonged to nuclear families. All participants (100%) identified as Christians.

Table 1 (B): Frequency and percentage distribution of participants according to obstetrical variables. n=120

Obstetrical Variables	Frequency (f)	Percentage (%)
Gravida		
Primi	36	30.00
Multi	84	70.00
Parity		
Primi	71	59.20
Multi	49	40.80
Gestation		
Second trimester	84	70.00
Third trimester	36	30.00
No. of ANC visit		
≤3	48	40.00
≥4	72	60.00
Contact with the healthcare worker		
Yes	120	100.00
Place of visit		
PHC	35	29.20
SC	85	70.80
Distance (in km)		
Within 1 Km	76	63.30
1 – 4	21	17.50
≥ 5	23	19.20

Table 1(B) outlines the frequency and percentage distribution of obstetrical variables among the study participants. Of the 120 pregnant women surveyed, 84 (70.0%) were multigravida, while 36 (30.0%) were experiencing their first pregnancy (primigravida). A majority 71 participants (59.2%) were classified as primipara. Most women, 84 (70.0%), were in their second trimester at the time of data collection. Regarding antenatal care (ANC), 72 participants (60.0%) had attended more than four ANC visits, with a mean visit count of 4.08 and a standard deviation of 1.64. All respondents (100.0%) had interacted with healthcare workers during their pregnancy. In terms of healthcare access, 85 women (70.8%) received care at Sub-Centers (SC), while 35 (29.2%) visited Primary Health Centres (PHC). Additionally, 76 participants (63.3%) resided within one kilometre of a healthcare facility.

Table 2: Frequency and percentage distribution of knowledge on Iron Folic Acid (IFA) among pregnant women. n=120

Level of knowledge score	Range of reference score	Frequency (f)	Percentage (%)	Mean	Standard deviation
Adequate	≥11	96	80.00	13.10	2.84
Inadequate	≤ 10	24	20.00		

Table 2 shows the range of reference score for knowledge obtained by the pregnant women. From the above table it reveals that about 80.00% of the participants had adequate knowledge between mean score of 13.10 ± 2.84.

Table 3: Frequency and Percentage of distribution of knowledge regarding IFA supplement among the pregnant women according to the different domains. n=120

Domain	Maximum score	Frequency	Mean	Percentage (%)
Frequency of use	02	214	107.00	89.16
General awareness	06	526	87.66	73.05
Side effect	03	253	84.33	70.27
Concept of IFA	03	216	72.00	60.00
Benefit of IFA	03	192	64.00	53.33
Duration of use	03	178	59.33	49.44

Table 3 presents the distribution of correct responses among the 120 participants regarding their knowledge of Iron and Folic Acid (IFA) supplementation. Nearly half (49.44%) correctly identified the recommended duration of IFA use, while 53.33% accurately understood its benefits. A higher proportion, 60%, demonstrated correct knowledge of the general concept of IFA. Awareness of side effects was correctly reported by 70.27% of participants, and 73.05% showed general awareness of IFA supplementation. Notably, the highest correct response rate 89.16% was observed in knowledge about the recommended frequency of IFA intake.

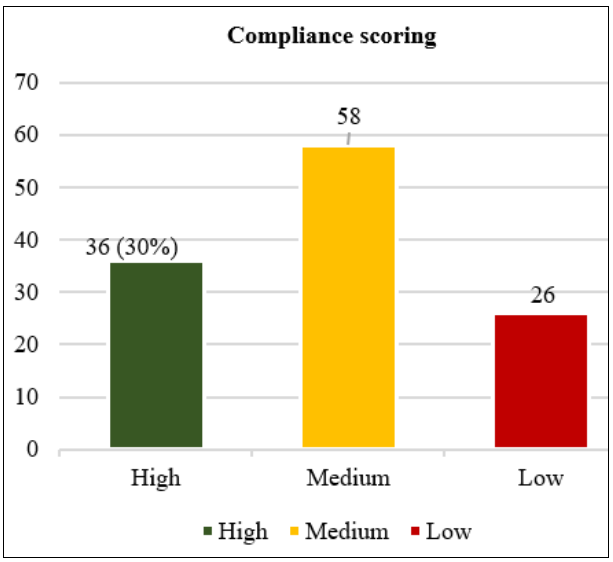

Fig 1: A Bar diagram displaying the frequency and percentage of distribution of compliance on Iron Folic Acid (IFA) among pregnant women using Morisky 8-item adherence scale, n=120

Figure 1 shows the range of adherence score for compliance obtained by the pregnant women. It reveals that majority of the participants 58 (48.30%) had the medium adherence whereas 36 (30%) is high adherence and 26 (21.6%) is low adherence. The data suggest that nearly half of the participants showed medium adherence while a smaller proportion demonstrated high or low adherence.

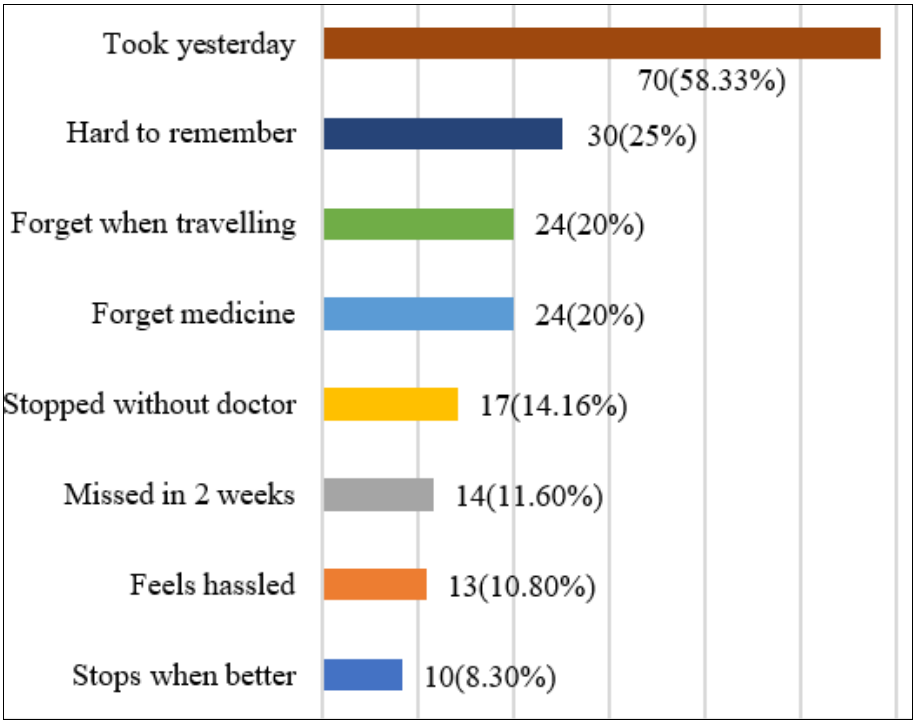

Fig 2: A bar diagram displaying the frequency and percentage of distribution of compliance regarding IFA supplement among the pregnant women according to the individuals' components and according to Morisky 8-items adherence scale

Figure 2 shows that out of 120 participants 70 (58.33%) took yesterday all the medications, 30 (25%) hard to remember medication, 24 (20%) forget while travelling, 24 (20%) forget medicine to take, 17 (14.16%) stopped medication without telling doctor, 14 (11.60%) missed in 2 weeks, 13 (10.80%) feels hassled to take medication regularly, 10 (8.30%) stops when better. These findings indicate that while more than half of the participants adhere to taking their supplement the previous day, a significant proportion still face challenges with consistent adherence due to forgetfulness, travel or lack of motivation.

6.1 Finding related to association between knowledge and compliance of iron folic acid supplement among pregnant women with selected demographic variables

The study results showed significant associations between knowledge and place of visit ($p = 0.000$, $p < 0.05$) and between compliance with gestational age ($p = 0.037$), place of visit ($p = 0.016$), and distance to the health facility ($p = 0.027$).

7. Discussion

Iron deficiency anaemia is the most prevalent nutritional disorder worldwide, affecting an estimated two billion individuals. Evidence from iron supplementation trials suggests that iron deficiency accounts for nearly 50% of anaemia cases globally. Pregnant women are particularly susceptible due to increased iron requirements during gestation. Globally, approximately 41.8% of pregnant women are anaemic, with the highest prevalence observed in developing countries (56%), compared to just 18% in developed regions.

In the present study, the majority of participants (44.2%) were aged between 26 and 33 years, with an age range of 18–34 years and a mean age of 28.43±5.42 years. These findings align with those of Bikila Lencha *et al*. (2023) [2], who reported a mean age of 28.68±5.89 years among participants aged 16–43 years. Similarly, Meron Berhe Tsegai *et al*. (2023) [8] found that 65.9% of respondents were aged 25–34 years, while Moushim Pradhan *et al*. (2024) and Paramita Choudhuri reported 69% and 56.3% of participants, respectively, within comparable age brackets.

Educationally, 51.7% of participants in the current study had completed secondary education, comparable to findings by Saha Debi *et al*. (59.9%) and Paramita Choudhuri (34.6%). Most participants (66.7%) were housewives, a trend echoed in Paramita Choudhuri's study, where 92.1% were homemakers. Additionally, 82.5% of participants belonged to nuclear families, consistent with Ngamba Akham *et al*. (59.2%). A majority (70%) were multigravida, similar to findings by Ngamba Akham (73.2%) and Trideep J. Deori (61.6%).

Regarding knowledge of Iron and Folic Acid (IFA) supplementation, 80% of respondents demonstrated adequate awareness, while 20% had inadequate knowledge. These results are in line with Rupesh Kumar Mishra and Kalpana Tiwari (2020) [12] in Kathmandu, where 85.6% had adequate knowledge. Comparable findings were reported by Chaieren Thengi *et al*. (2017) in Kuala Terengganu, where 58.3% had high knowledge, 22.5% moderate, and 19.2% low.

Compliance with IFA supplementation in the current study showed that 48.3% of participants had medium adherence. Common barriers to compliance included forgetfulness, travel, and lack of motivation. These findings are consistent with those of Mishra and Tiwari (2020) [12], who reported a 78.6% compliance rate in Kathmandu, with forgetfulness being the primary reason for non-adherence. Similar trends were observed in studies by Paramita Choudhury in Agartala (52.5% compliance) and Ngamba Akham (2021) [7] in Manipur (68% compliance among pregnant Muslim women). These results underscore the importance of strengthening health education and ensuring consistent antenatal care and IFA distribution through community-

level health workers.Notably, the study identified significant associations between IFA knowledge and place of healthcare visit (p = 0.000, $p< 0.05$), supporting findings by Mary Wajra Kaman *et al*. (2019) in rural Kenya, where 40.9% of pregnant women had substantial knowledge of IFA supplementation. Compliance was also significantly associated with gestational age (p = 0.037), place of visit (p = 0.016), and proximity to healthcare facilities (p = 0.027). These findings align with those of Bikila Lencha *et al*. (2023) [2] in Ethiopia, where timing of ANC visits and distance to health facilities were influential ($p< 0.25$), and with results from Saha Devi *et al*. (2020) in West Bengal, India.

8. Conclusion

Although knowledge regarding IFA supplementation was generally high, adherence levels remain moderate among pregnant women. Accessibility to health services and timing during gestation significantly influenced compliance. The findings highlight the need for strengthened community-level health education, improved IFA distribution strategies, and consistent antenatal follow-up to enhance adherence and maternal health outcomes.

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10. Conflict of Interest: Not available

11. Financial Support: Not available

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