Journal of Chitwan Medical College 2022;12(40):59-63
Available online at: www.jcmc.com.np

ORIGINAL RESEARCH ARTICLE

ADHERENCE TO IRON AND FOLIC ACID SUPPLEMENTATION AND PREVALENCE OF ANAEMIA AMONG PREGNANT WOMEN AT A TERTIARY CARE HOSPITAL

Anjan Palikhey[1,*], Pravash Prajapati[2], Anita Yadav[2], Jharana Shrestha[3], Jigyasa Subedi[4], Laxmi Shrestha[1], Amit Kumar Shrivastava[1], Chandrajeet Kumar Yadav[1]

[1]Department of Pharmacology, Universal College of Medical Sciences, Ranigaon, Bhairahawa, Rupandehi, Nepal
[2]Department of Pharmacy, Universal College of Medical Sciences, Ranigaon, Bhairahawa, Rupandehi, Nepal
[3]Department of Biochemistry, Universal College of Medical Sciences, Ranigaon, Bhairahawa, Rupandehi, Nepal
[4]Department of Gynaecology and Obstetrics, Universal College of Medical Sciences, Ranigaon, Bhairahawa, Rupandehi, Nepal

Received: 15 Apr, 2022

Accepted: 16 Jun, 2022

Published: 30 Jun, 2022

Key words: Adherence; Anaemia; Iron and Folic acid Supplementation; Pregnancy.

***Correspondence to:** Anjan Palikhey, Department of Pharmacology, Universal College of Medical Sciences, Ranigaon, Bhairahawa, Rupandehi, Nepal.*
Email: anjanpalikhey@gmail.com
*DOI:*https://doi.org/10.54530/jcmc.703

Citation

Palikhey A, Prajapati P, Yadav A, Shrestha J, Subedi J, Shrestha L, Shrivastava AK, Yadav CK. Adherence to iron and folic acid supplementation and prevalence of anaemia among pregnant women at a tertiary care hospital. Journal of Chitwan Medical College.2022;12(40):59-63.

Peer Reviewed

ABSTRACT

Background: Anaemia is characterized by a reduced oxygen-carrying capacity of blood and causes various health problems in people of all ages, including pregnant women. The most common cause of anemia is a lack of iron in the diet. Prevention of anaemia requires strict adherence to iron and folic acid supplementation during pregnancy. The main objective of this study was to gather information on adherence to iron and folic acid supplementation and anaemia prevalence among pregnant women.

Methods: The cross-sectional study was conducted among 200 postpartum mothers in the obstetrics ward of Universal College of Medical Sciences. Eligible participants were interviewed using a questionnaire to measure their adherence to iron and folic acid supplementation during pregnancy. Haemoglobin levels were recorded to check the presence of anaemia. Multivariable regression analysis was used to find the relationship between independent and dependent variables.

Results: Total 164 (82%) participants had good adherence to iron and folic acid supplementation. Participants who started their antenatal care visit in first trimester were more adherent to iron and folic acid supplementation (AOR = 0.13, 95% CI (0.05–0.39)). The prevalence of anaemia was 24%. Anaemic participants were less likely to adhere to their iron and folic acid supplements (AOR = 0.26, 95% CI (0.11–0.63)).

Conclusions: The adherence of participants to iron and folic acid supplementation was good and significantly associated with gestational age when antenatal care visit was started, child birth weight and anaemia. By strengthening the national level awareness campaign, we can further improve the adherence rate and prevent anaemia.

INTRODUCTION

Anaemia is a medical disorder in which the oxygen-carrying capacity of red blood cells is reduced.[1] World Health Organization (WHO) defines anaemia as a blood haemoglobin concentration of less than 11 gm/dl in pregnant women.[2] Inadequate dietary intake of iron is the leading cause of anaemia. The physiological need of iron rises considerably during pregnancy, and it is often not met by the regular diet.[3]

Anaemia affects around 29.4% of women of reproductive age around the world and according to prior studies, anaemia affects about 40% of pregnant women.[4, 5]To address this public health concern, WHO recommends daily iron and folic acid supplementation (IFAS) beginning in the second trimester and continuing throughout the pregnancy.[6] Adherence to IFAS during pregnancy is important for preventing and controlling iron deficiency anaemia (IDA); however, it is a major challenge in developing countries like Nepal.[2,7] Several factors like age, religion, occupation, literacy, parity, fear of side effects, and gestational age of starting antenatal care visit (ANCV) play a major role in adherence to the recommended IFAS.[8, 9]

Though Ministry of Health & Population has been delivering free IFAS and anti-helminthic medication to pregnant mothers at the community level through the iron intensification program, only 42% of women took the necessary iron intake (at least 180 pills).[10] Therefore, this study was meant to gather local data on IFAS compliance, anaemia prevalence, and associated variables among pregnant women, which might be an important step to improve IFAS compliance and prevent related complications.

METHODS

The present study was a hospital-based, cross-sectional study conducted among postpartum mothers in the obstetrics ward of Universal College of Medical Sciences-Teaching Hospital (UCMS-TH) from January 2022 to March 2022 for 3 months, after taking approval from the Institutional Review Committee of UCMS-TH (IRC No. UCMS/IRC/009/22).

Post-partum women who had live births in an obstetrics unit and had no chronic ailments or mental illness were chosen with purposive sampling until the required sample size was

reached. Participants having premature delivery and still births were excluded.

The sample size was calculated by applying the formula, $N = Z^2 \times P(1-P)/\delta^2$ with Z value taken as 1.96 at 95% confidence interval, 5% margin of error(δ), and the proportion(p) of IFAS adherence among pregnant women as 86% from a study done in Kathmandu.[11] The computed minimum sample size was 185. Finally, the study enlisted the participation of 200 women.
The data were gathered through face-to-face interviews using a semi-structured questionnaire. For a better understanding of the participants, the questionnaire was written in Nepali. The questionnaire was further validated with expert advice from clinical and basic science faculties. The written and verbal consent was taken from each eligible participant. Before conducting the actual study, the questionnaire was pretested on 5% of the sample size, and required modifications were made. The pilot study's findings were not included in the final analysis.

The questionnaire had socio-demographic information, obstetrics related information, and questions about participants' adherence to IFAS during pregnancy, from the second trimester to delivery date. The haemoglobin level of the participants was recorded from the routine blood investigation report of the patient file, which is usually done after they are admitted to the labour room before the delivery, to determine their anaemia status. In this study, intake of at least eighty per cent of the recommended tablets (i.e. 144 or more tablets out of 180) was considered adherent during pregnancy.[12] Similarly, a haemoglobin (Hb) level of less than 11 gm/dl was considered anaemic.[13]

The collected data was entered and coded in Mircosoft Excel, then further analyzed after exporting to Statistical Package for the Social Sciences version 20, following the study's objectives. A binary logistic regression model was used to evaluate the relationship between IFAS adherence and associated variables. The link between the adherence and independent variables was first discovered using a bivariate regression model. The factors found to be significant (p 0.05) in bivariate analysis were included in multivariate logistic regression to assess their net effect on IFAS adherence.

The p-value was used to examine the statistical significance of two variables, with a p-value of less than 0.05 being considered statistically significant at 95% confidence interval.

RESULTS

Two hundred mothers took part in the study, with the majority (79%) falling into the 20-30 years age group. One-fifth of postpartum mothers were illiterate. The majority of the participants, 83%, were Hindus. The most common occupation was a housewife (87.5%), and over half of the participants (57%) had a monthly salary of less than thirty thousand rupees (Table 1).

Table 1: Socio-demographic characteristics of participants (n=200)

Variables	Frequency (%)
Age	
< 20 years	18 (9%)
20 -30 years	158 (79%)
>30 years	24 (12%)
Religion	
Hindu	166 (83%)
Non-Hindu	34 (17%)
Level of education	
Illiterate	41 (20.5%)
Primary (1-5)	89 (44.5%)
Secondary level (6-10)	44 (22%)
SLC and +2	6 (3%)
Bachelor level	20 (10%)
Occupation	
Housewife	175 (87.5%)
Employed	25 (12.5%)
Monthly Family Income (NPR/month)	
Less than 30,000	114 (57%)
More than 30,000	86 (43%)

Most participants (53%) began their antenatal care appointment in the second trimester, compared to 43% who began in the first trimester. Primiparous women made up 42.5% of total participants, while multiparous women made up 57.5%. A total of 23.5% of the participants reported that their children were born at a low birth weight (<2500gm). A total of 48 participants (24%) were determined to be anaemic (11gm/dl). A majority of anaemic participants (93.7%) had mild anaemia, followed by 6.3% who had moderate anaemia (Table 2).

Table 2: Obstetrics and health related characteristics of participants (n=200)

Variables	Frequency (%)
Gravida	
Primigravida	85 (42.5%)
Multigravida	115 (57.5%)
Child birth weight	
Low (<2500gm)	47 (23.5%)
Normal	153 (76.5%)
Gestational age when Ante Natal Care was started	
First trimester	88 (44%)
Second trimester	106 (53%)
Third trimester	6 (3%)
Current haemoglobin level (gm/dl) OR Status of Anaemia	
<11gm/dl OR Anaemic	48 (24%)
≥11 gm/dl OR Non-anaemic	152 (76%)
Severity of anaemia	
Mild (9-10.9gm/dl)	45 (93.7%)
Moderate (7-8.9gm/dl)	3 (6.3%)

Table 3 shows 82% adherence to IFAS and forgetfulness (66.7%) was the most common reason for irregular consumption (Table 3).

Only gestational age when ANCV was initiated, infant birth weight and anaemic status of participants showed a statistically significant relationship with IFAS adherence in multivariable regression analysis. Compared to first ANC visits in the second or third trimesters, participants who started their ANCV in the first trimester were more adherent to IFAS (AOR = 0.13, 95% CI (0.05–0.39)). Participants with a normal childbirth weight were more likely to follow IFAS than those with a low birth weight (AOR = 3.19, 95% CI (1.38–7.39)). Similarly, as demonstrated in table 4, non-anemic subjects were more likely to follow the recommended IFAS during pregnancy (AOR = 0.26, 95% CI (0.11–0.63)).

Table 3: Adherence to iron and folic acid supplementation among participants (n=200)

Variables	Frequency (%)
How many tablets/days did you consume IFA supplement during your pregnancy?	
Good adherence (≥144 tablets/days)	164 (82%)
Poor adherence (< 144 tablets/days)	36 (18%)
Reasons for irregular consumption of IFA supplement (n=36), Multiple response	
Forgetfulness	24 (66.7%)
Side-effects	6 (16.7%)
Duration of treatment	9 (25%)
Not necessary	16 (44.4%)
Misguidance from relatives	8 (22.2%)
Unpalatibility	1 (2.8%)

Table 4: Multivariate regression analysis on adherence to IFAS during pregnancy (n=200)

Variables	Adherence		P-value	COR (CI 95%)	AOR (CI 95%)
	Good	Poor			
Age (years)					
< 20	11 (61.1%)	7 (38.9%)		1	1
21-30	137 (86.7%)	21 (13.3%)	0.003*	4.15(1.45-11.9)	2.97(0.92-9.66)
>30	16 (66.7%)	8 (33.3%)		1.27(0.36-4.54)	0.78(0.18-3.36)
Religion					
Hindu	137 (82.5%)	29 (17.5%)	0.666	1	
Non-Hindu	27 (79.4%)	7 (20.6%)		0.82(0.32-2.06)	
Gravida					
Primigravida	68 (80%)	17 (20%)	0.527	1	
Multigravida	96 (83.5%)	19 (16.5%)		1.26(0.61-2.60)	
Education of participants					
Illiterate	31 (75.6%)	10 (24.4%)	0.232	1	
Literate	133 (83.6%)	26 (16.4%)		1.65(0.72-3.78)	
Occupation of participants					
Housewife	142 (81.1%)	33 (18.9%)	0.404	1	
Employed	22 (88%)	3(12%)		1.70(0.50-6.03)	
Family income (NPR/month)					
Less than 30,000	89 (78.1%)	25 (21.9%)	0.096	1	
More than 30,000	75 (87.2%)	11 (12.8%)		1.92(0.88-4.15)	
Gestational age when ANC was started					
First trimester	83 (94.3%)	5(5.7%)	<0.001*	1	1
Second trimester/ Third trimester	81 (72.3%)	31 (27.7%)		0.16(0.06-0.43)	0.13(0.05-0.39)*
Birth weight					
Low (<2500gm)	30 (63.8%)	17 (36.2%)	<0.001*	1	1
Normal	134 (87.6%)	19 (12.4%)		4.0(1.86-8.59)	3.19(1.38-7.39)*
Anaemic status					
Non-anaemic	132(86.8%)	20(13.2%)	0.002*	1	1
Anaemic	32(66.7%)	16(33.3%)		0.30(0.14-0.65)	0.26(0.11-0.63)*

*denotes statistically signifcant at p<0.05.

DISCUSSION

The majority of participants in the present study (79%) were between the ages of 20 and 30, presumably because women between these ages are more likely to have children, according to a report issued by the National Department of Health and Human Services in 2016.[10] Only 9% of the total participants were under 20, which is a high-risk age group for pregnancy and

maternal/child mortality.[14]

Pregnant women are one of the most vulnerable groups when it comes to nutritional anaemia. WHO recommends starting with a regular dose of 30-60 mg iron + 400 µg folic acid supplementation as early as possible to prevent IDA. However, adherence to the regimen plays a critical role. The goal of this study was to find out how well pregnant women followed the IFAS guidelines and the prevalence of anaemia and their associated factors.

Adherence to IFAS was 82% in our study, which is significantly higher than the finding (42%) reported in a 2016 nationwide survey.[10] The difference in time between the studies could be the likely cause. Similarly, adherence was higher than the 58% reported in research conducted in government hospitals in Nepal's eastern region.[8] These variations could be due to the geographical context of our study, which took place in a private tertiary care referral hospital. Furthermore, the participants in this research had a high literacy rate, which raises IFAS awareness. However, our findings matched those of a study conducted at Kathmandu, Nepal's Paropakar Maternity and Women's Hospital, which revealed 86 per cent adherence.[11]

The adherence rate in similar study contexts was reported to be 43.4% and 38.3% in Ethiopian institution-based cross-sectional research.[15,16] Differences in lifestyle, pregnant women's understanding of IFAS, and respondents' educational status could be contributing factors.

In this Study, forgetfulness/negligence (66.7%) was the major reason that hindered adherence to IFA supplement supported by the studies conducted in Nepal and Ethiopia, which similarly identified forgetfulness as a key difficulty.[16-18] During the ANC visit, this problem could be addressed with effective counselling. Suggestions for remembering their tablets included placing them in a visible location that might be seen every day.

The gestational age of pregnant women when antenatal care visits began was a major influence on IFAS adherence. Participants who had their first prenatal care visit in the first trimester were significantly more likely to follow IFAS than others who had their first antenatal care appointment in the second/third trimester (p=0.001). The findings of Ethiopian studies support this notion.[9,19] The reason for this could be because pregnant women who had their initial antenatal care appointment in the first trimester were more exposed to health care practitioners and were better advised on the benefits of early and comprehensive IFAS consumption to avoid anaemia during pregnancy.

However, age of women, religion, occupation and gravidity of participants were not significantly associated with adherence to IFAS, parallel with the other studies done by Neupane et al. and Rai et al.[11,20]

In the present study, participants with a higher proportion of normal birth weight (87.6%) were three times more likely to adhere to IFAS during pregnancy than participants (12.4%) who did not take iron-folic acid regularly. This finding is consistent with a cross-sectional study conducted in Kathmandu by Deo S et al., which found a positive link between iron-folic acid supplement use during pregnancy and infant birth weight.[21]
The prevalence of anaemia among participants was 24%, similar to the study conducted in western part of Nepal.[22] This resemblance could be attributable to the fact that they are both located in the same geographical area. But this prevalence is less as compared to a study conducted in Nepal by World Bank (43%) in 2019.[23] However, the prevalence was higher than the studies conducted in Ethiopia 4.8% and Sudan, 10%.[9, 24] Socioeconomic inequalities, food behaviors connected to culture, nutritional variables, and available health care and utilization may play a role in anaemia prevalence. The present study also revealed that anaemic participants were less likely to follow IFAS (p=0.002), supported by the study findings from eastern Terai of Nepal.[8]

The results of the present study can be helpful to the government of Nepal to focus anaemia control initiatives on pregnant women through diverse nutrition treatments, such as encouraging regular intake of IFAS, fruits, and various iron-rich diets; adequate health education should be made mandatory during ANC visits.

There were several drawbacks to this study as well. As our study involved women visiting a single private medical hospital, it cannot be applied to the entire population. Because the participants had to recollect medication practice from the previous months during the interview, recall bias was risk.

CONCLUSION

The adherence of participants to iron and folic acid supplementation was good and significantly associated with antenatal care visit when gestational age was started and child birth weight. The prevalence of anaemia was linked with adherence to IFAS. By strengthening the national level awareness campaign, we can further improve the adherence and prevent anaemia and other adverse pregnancy outcomes.

ACKNOWLEDGEMENT

We are grateful to all the participants who gave up their valuable time to take part in the study.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

REFERENCES:

1. World Health Organization. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. Geneva: World Health Organization; 2011. Acessed on 10 April 2022. Available from : https://apps.who.int/iris/bitstream/handle/10665/85839/WHO_NMH_NHD_MNM_11.1_eng.pdf
2. World Health Organization. Iron deficiency anemia: assessment, prevention, and control. A guide for programme managers. Geneva: World Health Organization; 2001. Acessed on 10 April 2022. Available

from :https://apps.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/index.html

3. Clark SF. Iron deficiency anemia. Nutrition in clinical practice. 2008;23(2):128-41. [DOI]
4. Camaschella C. Iron-deficiency anemia. New England journal of medicine. 2015; 372(19):1832-43. [DOI]
5. Stevens G.A. Global, regional, and national trends in haemoglobin concentration and prevalence of total and severe anaemia in children and pregnant and non-pregnant women for 1995-2011: a systematic analysis of population-representative data. The Lancet Global Health. 2013;1(1):16-25. [DOI]
6. World Health Organization. Guideline: Daily iron and folic acid supplementation in pregnant women. Geneva: World Health Organization; 2012. Acessed on 15 April 2022. Available from: http://apps.who.int/iris/bitstream/handle/10665/77770/9789241501996_eng.pdf
7. Galloway R, McGuire J. Determinants of compliance with iron supplementation: supplies, side effects, or psychology? Social science & medicine. 1994;39(3):381-90. [DOI]
8. Yadav KD. Compliance of iron and folic acid supplementation and status of anaemia during pregnancy in the Eastern Terai of Nepal: findings from hospital based cross sectional study. BMC research notes. 2019;12(1):1-6. [DOI]
9. Nasir BB, Fentie AM, Adisu MK. Adherence to iron and folic acid supplementation and prevalence of anemia among pregnant women attending antenatal care clinic at Tikur Anbessa Specialized Hospital, Ethiopia. PloS one. 2020;15(5):1-11. [DOI]
10. Ministry of Health, Nepal. Nepal Demographic and Health Survey 2016. Kathmandu, Nepal: Ministry of Health 2017. Acessed on 15 April 2022. Available from: https://www.dhsprogram.com/pubs/pdf/fr336/fr336.pdf
11. Rai S. Compliance and its determinants regarding iron and folic acid supplementation during pregnancy in Kathmandu, Nepal. Kathmandu Univ Med J. 2016;14(56):311-7. [PMID]
12. Nepal Nutrition and Food Security Portal. Evaluation of intensification of maternal and neonatal micronutrient program in Nepal 2011. Acessed on 15 April 2022. Available from: http://nnfsp.gov.np/PublicationFiles/2877a3ea-7cfe-4c1b-a6e7-3eac91c0778f.pdf
13. World Health Organization. The global prevalence of anaemia in 2011. Geneva: World Health Organization; 2015. Acessed on 15 April 2022. Available from: https://apps.who.int/iris/bitstream/handle/10665/177094/9789241564960_eng.pdf
14. World Health Organization. Adolescent Pregnancy. Geneva: World Health Organization; 2019. Acessed on 15 April 2022.Available from: https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy
15. Mamo TT. Adherence to prenatal iron-folic acid supplementation and associated factors among pregnant women attending antenatal care services in Dilla town, South Ethiopia. Medicine Access@ Point of Care. 2021;5:1-9. [DOI]
16. Obsa AK, Tegene Y, Gebretsadik A. Iron and Folic Acid Supplementation Compliance and Associated Factors among Pregnant Women Attending Antenatal Clinic in Shalla District, Southwest Ethiopia: A Cross-Sectional Study. Journal of Nutrition and Metabolism. 2021;2021:1-7. [DOI]
17. Shrestha SS. Adherence to Iron, Folic Acid and Calcium Supplement and Factors Affecting it among the Antenatal Care Attending Women in a Tertiary Care Hospital: A Cross Sectional Study. Kathmandu University Medical Journal. 2020;18(2):83-90. [DOI]
18. Mishra RK , Tiwari K. Knowledge and Compliance of Iron and Folic Acid Supplementation among Pregnant & Postnatal Women in a Hospital of Kathmandu. Journal of Advanced Academic Research. 2020;7(1):63-9. [DOI]
19. Birhanu TM, Birarra MK, Mekonnen FA. Compliance to iron and folic acid supplementation in pregnancy, Northwest Ethiopia. BMC research notes. 2018;11(1):1-5. [DOI]
20. Neupane N, Sharma S, Kaphle HP. Factors affecting compliance of iron and folic acid among pregnant women attaining Western Regional Hospital, Pokhara, Nepal. Int J Res Current Dev. 2015;1(1):43-7. [LINK]
21. Deo S, Pandey S, Kharel S. Prevalence of Women Taking Iron-Folic Acid (IFA) During Pregnancy and its Impact on Child's Birth Weight. Arch Med Biotechnol. 2018;1(1):24-6. [LINK]
22. Karki KB. Anemia and its Determinants among Women of Reproductive Age in Mid-Western Tarai of Nepal 2015. 2016, Nepal Health Research Council. [LINK]
23. The World Bank. Prevalence of anemia among pregnant women (%): World Health Organization, Global Health Observatory Data Repository/ World Health Statistics 2019; Acessed on 15 April 2022. Available from: https://data.worldbank.org/indicator/SH.ANM.NPRG.ZS
24. Abdelgader EA, Diab TA, Kordofani AA, Abdalla SE. Hemoglobin level, RBCs Indices, and iron status in pregnant females in Sudan. Basic Res J Med Clin Sci. 2014;3(2):8-13. [LINK]