

Compliance with Iron and Folic Acid Supplementation among Postpartum Women in Godawari Municipality of Lalitpur, Nepal

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Abstract

Introduction: Iron deficiency anemia (IDA) is a prevalent global health issue among pregnant women in developing countries. Increased iron demands during pregnancy, often coupled with low dietary intake, contribute to a high prevalence of IDA. This can lead to adverse maternal and fetal outcomes. The World Health Organization (WHO) recommends routine iron and folic acid (IFA) supplementation for pregnant women. In Nepal, the government has implemented the National Nutritional Program, which includes the free distribution of IFA tablets to pregnant and postpartum women through health institutions.

Methods and Materials: This cross-sectional study assessed IFA compliance among postpartum women in Godawari Municipality, Lalitpur, Nepal. A semi-structured questionnaire was administered through face-to-face interviews with 250 postpartum women residing in Godawari Municipality within six months postpartum. Multistage sampling was used to select participants from five out of the 14 wards. Data were entered into EpiData software version 3.1 and analyzed using SPSS version 20.

Results: The study found that 69% of the participants reported compliance with IFA supplementation. Anemia during pregnancy was reported by 47.4% of the participants. Factors associated with IFA compliance included age, ethnicity, marital status, education level of both the woman and her husband, and the husband's occupation. Religion, family type, and the woman's occupation were not significantly associated with IFA compliance. Side effects were the primary reason for non-compliance with IFA supplementation.

Conclusion: The compliance rate of 69% with IFA supplementation among postpartum women in Godawari Municipality is encouraging. However, the high prevalence of anemia (47.4%) highlights the need for continued efforts to address IDA. Targeted interventions should focus on improving IFA compliance, particularly among younger women, those with lower education levels, and those whose husbands have lower education levels or occupations. Strengthening maternal health services and providing comprehensive counseling and support on IFA supplementation are crucial. Engaging families in promoting maternal health can also contribute to improved IFA compliance and reduced anemia.

Keywords: Iron, Folic Acid, Anemia, Postpartum, Women, Nepal

Introduction

Iron deficiency anemia (IDA) is a prevalent global health issue, particularly among pregnant women in developing countries (Bathla & Arora, 2022). The

increased iron demands during pregnancy, often coupled with low dietary intake, contribute to a high prevalence of IDA (Mayasari et al., 2021). This deficiency can lead to adverse maternal outcomes such as preterm birth, perinatal infection, and pre-

eclampsia, as well as poor fetal outcomes including low birth weight and neural tube defects (Lassi et al., 2014). To combat this, the World Health Organization (WHO) recommends routine iron and folic acid (IFA) supplementation for pregnant women, (with a daily dose of 30–60 mg iron and 400 µg folic acid) throughout pregnancy to reduce the risk of low birthweight, maternal anaemia, and iron deficiency

In Nepal, the government has implemented the National Nutritional Program, which includes the free distribution of IFA tablets to pregnant and postpartum women through health institutions (Chitekwe et al., 2022; Paudyal et al., 2022). Despite these efforts, challenges persist in achieving optimal IFA compliance (Berti et al., 2018). According to the 2016 Nepal National Micronutrient Status Survey, only 77% of women consumed the recommended dose of at least 180 IFA tablets during their pregnancy (Bryce, 2021; Carlsson, 2022). Previous research in Nepal has indicated that the Terai region has a higher prevalence of anemia compared to other ecological regions, suggesting potential disparities in IFA compliance or dietary patterns (Yadav et al., 2019; Morrison et al., 2023).

Building on previous research that has linked maternal education, antenatal care visits, institutional delivery, and postnatal care visits to IFA compliance, this study investigates the specific determinants of IFA compliance among postpartum women, including age, ethnicity, marital status, education level, and occupation of both the participant and their husband. The aim is to assess IFA compliance and identify associated factors to inform targeted interventions for improved maternal health outcomes, as compliance with IFA supplementation is crucial for mitigating the risks of IDA. By identifying the factors influencing IFA

compliance, policymakers and healthcare providers can develop and implement targeted strategies to improve compliance, ultimately contributing to the reduction of IDA and its associated adverse health outcomes.

Methods and Materials

Study Design and Setting

This cross-sectional study employed a quantitative design using a semi-structured questionnaire administered through face-to-face interviews with postpartum women residing in Godawari Municipality, Lalitpur, Nepal. Godawari Municipality, a semi-urban area located near the capital city of Kathmandu, comprises 14 wards with a population of approximately 78,000, of which 51.1% are female.

Study Population and Sampling

The study population included all postpartum women residing in Godawari Municipality up to six months postpartum. A multistage sampling technique was used. First, five out of the 14 wards were randomly selected. Then, 50 women from each selected ward were recruited with the help of Female Community Health Volunteers (FCHVs), resulting in a sample size of 250. The sample size was calculated to ensure a 95% confidence level with a 5% margin of error, adjusting for a 10% non-response rate.

Inclusion and Exclusion Criteria

All postpartum mothers residing in Godawari Municipality within six months postpartum were eligible to participate. Women who were unable to provide proper responses due to physical or cognitive problems were excluded to ensure informed consent and reliable data collection.

Data Collection and Tools

Data were collected through face-to-face interviews using a semi-structured questionnaire. Informed

consent was obtained from each participant before the interview. The questionnaire was pre-tested among 25 postpartum mothers in a ward not included in the study sample to ensure clarity and validity. Necessary modifications were made based on the pre-test results.

Data Management and Analysis

Data were entered into EpiData software version 3.1 and analyzed using SPSS version 20. Descriptive statistics were used to summarize the data, and chi-square tests were used to assess the association between IFA compliance and socio-demographic characteristics.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Committee of the Institute of Medicine and permission was granted by the Godawari Municipality. Informed consent was obtained from all participants, who were allowed to withdraw from the study at any time. Confidentiality was maintained throughout the study.

Results

Demographic and Socioeconomic Characteristics

The study included 250 postpartum women with a mean age of 26.18 ± 5.02 years (range: 18-44 years). The majority of the women were married and living with their husbands (88%), and most belonged to the Janajati ethnic group (54.4%). The literacy rate was 77.6%, with 41.2% having completed secondary education. However, there was a disparity in education levels between the women and their husbands, with a higher proportion of husbands having higher secondary education (31.2%). Most women were engaged in household work (27.2%), while their husbands were primarily employed in the service sector (33.2%).

Table 1 Demographic and Social Characteristics of Respondents

Characteristics	Number (n=250)	Percent (%)	
Age			
16-25	122	48.4	
26-44	128	51.2	
Ethnicity			
Brahmin/Chhetri	76	30.4	
Dalit	24	9.6	
Janajati	136	54.4	
Madhesi	7	2.8	
Muslim	7	2.8	
Religion			
Hindu	150	60	
Buddhist	60	24	
Muslim	7	2.8	
Christian	20	8	
Family Type			
Nuclear	210	84	
Joint	17	37.2	
Extended	23	1.2	
Marital Status			
Married	220	88	
Divorced	16	6.4	
Widowed	14	5.6	
Respondent's Education			
Illiterate		56	22.4
Primary/Literate		57	22.8
Secondary		103	41.2
Higher Secondary and above		34	13.6
Husband's Education			
Illiterate		43	17.2
Primary/Literate		44	17.6
Secondary		55	22
Higher Secondary or Above		78	31.2
Non Response (either divorced or widowed)		30	12
Respondent's Occupation			
Agriculture		22	8.8
Service		61	24.4
Daily Wages		51	20.4
Business		48	19.2
Household work		68	27.2
Husband's Occupation			
Agriculture		11	4.4
Service		83	33.2

Daily Wage	40	16
Business	40	16
Others	46	18.4
Non Response (either divorced or widowed)	30	12

IFA Supplementation and Anemia

Out of the 250 participants, 90 (47.4%) reported having anemia during their last pregnancy. The compliance rate with IFA supplementation was 69%, with more than half of the women (55.2%) starting IFA supplements in their second trimester. Most women (76%) underwent hemoglobin testing, suggesting adequate antenatal care. Among non-compliant women, the primary reason for not taking IFA supplements regularly was side effects (41.1%), mainly including constipation and epigastric pain.

Table 2: Details of IFA Supplementation and Anemia

Characteristics	Yes (%)		No (%)	
Anemia during the latest pregnancy	90	47.4	100	52.6
IFA Compliance	167	68.8	83	33.2
Hemoglobin test	190	76	38	15.2

Association between IFA Compliance and Socio-demographic Characteristics

Chi-square analysis revealed a significant association between IFA compliance and age, ethnicity, marital status, education level of both the woman and her husband, and the husband's occupation ($p < 0.05$). No significant association was found between IFA compliance and religion, family type, or the woman's occupation.

Table3: Association between Compliance of IFA and Socio-demographic Characteristics

Variables	IFA Compliance		Frequency (n)	p-value
	No %	Yes %		
Age (years)				
16-25	74.6	25.4	122	0.008*
26-44	59.4	40.6	128	

Ethnicity

Brahmin/Chhetri	23.7	76.3	76	0.043*
Janajati	36.8	63.2	136	
Dalit	37.5	62.5	124	
Madhesi	14.3	85.7	7	
Muslim	71.4	28.6	7	

Religion

Hindu	32.0	68.0	150	0.153
Buddhist	35.0	65.0	60	
Muslim	71.4	28.6	7	
Christian	35.0	65.0	20	
Others	15.4	84.6	13	

Family Type

Nuclear	33.8	66.2	210	0.678
Joint	23.5	76.5	17	
Extended	34.8	65.2	23	

Marital Status

Married	28.6	71.4	157	<0.01*
Divorced	56.3	43.8	7	
Widowed	78.6	21.4	3	

Education

Illiterate	57.1	42.9	56	<0.01*
Primary/Literate	52.6	47.4	57	
Secondary	11.7	88.3	103	
Higher Secondary and above	26.5	73.5	34	

Husband's Education

Illiterate	48.8	51.2	43	<0.01*
Primary/Literate	27.3	72.7	44	
Secondary	36.4	63.6	55	
Higher Secondary or Above	12.8	87.2	78	

Respondent's Occupation

Agriculture	36.4	63.6	22	0.131
Service	19.7	80.3	61	
Daily Wages	41.2	58.8	51	
Business	35.4	64.6	48	
Household work	36.8	63.2	68	

Husband's Occupation

Agriculture	18.2	81.8	11	0.002*
Service	19.3	80.7	83	
Daily Wage	30.0	70.0	40	
Business	22.5	77.5	40	
Others	52.2	47.8	46	

Note: *= *p*-value is <0.05, which is significant at 95% confidence level

Discussion

A compliance rate of 69% with IFA supplementation found in this study suggests that two-thirds of the efforts to promote IFA use in Godawari Municipality of Nepal have been relatively successful. This finding is slightly of more concern than that of the 2016 Nepal National Micronutrient Status Survey, which reported that 77% of women consumed the recommended dose of at least 180 IFA tablets during their pregnancy (Mehata et al., 2021). Further, it is important to note that the prevalence of anemia among the participants was still high (47.4%), indicating that IFA supplementation alone may not be sufficient to address the issue completely (Shomik et al., 2022; Shrestha, 2018).

The significant association between IFA compliance and age, ethnicity, marital status, education level of both the woman and her husband, and the husband's occupation highlights the complex interplay of socio-demographic factors in influencing health behaviors (Sum et al., 2022; Næss-Andresen, 2024; Yogi et al., 2024). These findings are consistent with previous research in Nepal, which has shown that education and socioeconomic status are important determinants of IFA compliance (Bhatt et al., 2021; Paudyal et al., 2022; Pokhrel et al., 2024a). The lack of association between IFA compliance and the woman's occupation may be attributed to the high proportion of women engaged in household work, which limits their autonomy and access to information (Karyadi et al., 2023; Muthuraj et al., 2023).

The fact that side effects were the primary reason for non-compliance emphasizes the need for im-

proved counseling and support for women taking IFA supplements (Bahati, 2022; Pokhrel et al., 2024b). Women should be informed about potential side effects and strategies for managing them, such as taking the tablets with food or at a different time of day (Klemm et al., 2020; Stoffel et al., 2020; Williams et al., 2020). Additionally, healthcare providers should be proactive in identifying and addressing any concerns women may have about taking IFA supplements (Athman, 2020; Ms et al., 2024).

The results also indicate a possible link between Iron and Folic Acid (IFA) supplementation and reduced anemia prevalence among pregnant women (Siekmans et al., 2018; Sendeku et al., 2020; Fite et al., 2021). While nearly half of the women experienced anemia during their last pregnancy, those who complied with IFA supplementation had a slightly lower prevalence of anemia than those who did not. Most women underwent hemoglobin testing, suggesting adequate antenatal care. Increasing institutional deliveries and promoting regular ANC visits can provide opportunities for health education and counseling on IFA supplementation, as well as early diagnosis and management of anemia (Saragih et al., 2022; Sawudatu et al., 2024).

The study's findings also underscore the importance of family support in promoting IFA compliance. Husbands and other family members can play a crucial role in encouraging women to take IFA supplements and providing them with the necessary support to manage side effects (Palivela et al., 2021; Irmawati et al., 2022). Interventions that engage families and communities in promoting maternal health can be effective in improving IFA compliance and reducing anemia (Abdisa et al., 2023; Palivela et al., 2021; Sanghvi et al., 2023).

While this study provides valuable insights into IFA compliance and its determinants among postpartum women in Godawari Municipality of Nepal, it is important to acknowledge its limitations. As a cross-sectional study, it cannot establish causality. Additionally, the study relied on self-reported

data, which may be subject to recall bias. Further analysis is needed to confirm a direct correlation and account for other contributing factors to anemia during pregnancy. Further research, including qualitative studies, can help to explore the barriers and facilitators to IFA compliance in greater depth (Endris et al., 2023).

Despite these limitations, the study's findings have important implications for policy and practice. They highlight the need for targeted interventions to improve IFA compliance, particularly among younger women, those with lower education levels, and those whose husbands have lower education levels or occupations. Strengthening maternal health services, including ANC and postnatal care, and providing comprehensive counseling and support on IFA supplementation are crucial. Engaging families in promoting maternal health can also contribute to improved IFA compliance and reduced anemia.

Conclusion

This study revealed that the compliance of iron and folic acid (IFA) supplementation among postpartum mothers in Godawari Municipality, Lalitpur, was more than two-third. However, the prevalence of anemia was nearly fifty percent, indicating the need for further interventions to address this public health issue. The study identified several key determinants of IFA compliance, including age, ethnicity, marital status, education level of both the woman and her husband, and the husband's occupation.

It is recommended that policymakers and healthcare providers develop and implement targeted strategies to improve IFA compliance, particularly among younger women, those with lower education levels, and those whose husbands have lower education levels or occupations. Strengthening maternal health services, including antenatal care (ANC) and postnatal care, and providing comprehensive counseling and support on IFA supplementation are crucial. Engaging families in promoting maternal health can also contribute to improved IFA compliance and reduced anemia.

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References

- Abdisa, D. K., Jaleta, D. D., Tsegaye, D., Jarso, M. H., Jaleta, G. D., Tolesa, G. F., & Kitila, K. M. (2023). Effect of community based nutritional education on knowledge, attitude and compliance to IFA supplementation among pregnant women in rural areas of southwest Ethiopia: A quasi experimental study. *BMC Public Health*, *23*(1), 1923. <https://doi.org/10.1186/s12889-023-16798-y>
- Ara, G., Khanam, M., Rahman, A. S., Islam, Z., Farhad, S., Sanin, K. I., Khan, S. S., Rahman, M. M., Majoor, H., & Ahmed, T. (2019). Effectiveness of micronutrient-fortified rice consumption on anaemia and zinc status among vulnerable women in Bangladesh. *PLOS ONE*, *14*(1), e0210501. <https://doi.org/10.1371/journal.pone.0210501>
- Athman, M. A. (2020). *Factors Influencing Uptake of Iron and Folic Acid Supplements among Women of Child Bearing Age in Mombasa County* [Thesis, JKUAT-COHES]. <http://localhost/xmlui/handle/123456789/5374>
- Bahati, F. (2022). *Determinants of adherence to iron-folic acid supplementation during pregnancy among mothers seeking Maternal and Child Healthcare 0-6 months post-delivery at Kakamega County Referral Hospital* [Thesis, JKUAT-COHES]. <http://localhost/xmlui/handle/123456789/5921>
- Bathla, S., & Arora, S. (2022). Prevalence and approaches to manage iron deficiency anemia (IDA). *Critical Reviews in Food Science and Nutrition*, *62*(32), 8815–8828. <https://doi.org/10.1080/10408398.2021.1935442>
- Berti, C., Gaffey, M. F., Bhutta, Z. A., & Cetin, I. (2018). Multiple-micronutrient supplementation: Evidence from large-scale prenatal programmes on coverage, compliance and impact. *Maternal & Child Nutrition*, *14*(S5), e12531. <https://doi.org/10.1111/mcn.12531>
- Bhatt, L. D., Pal, L., Dhimi, S. S., & Thapa, K. (2021). Compliance of Iron and Folic Acid Supplementation among Postpartum Urban Mothers of Kathmandu Valley. *Journal of Nepal Paediatric Society*, *41*(2), 154–161. <https://doi.org/10.3126/jnps.v41i2.31248>
- Bryce, E. (2021). *Measurement of antenatal care processes in rural nepal: validation of maternal report and quality of services received.*

- Carlsson, A. (2022). *Micronutrient Deficiencies and Nutritional Status among Children and Women in Nepal*. <https://gupea.ub.gu.se/handle/2077/71765>
- Chitekwe, S., Torlesse, H., & Aguayo, V. M. (2022). Nutrition in Nepal: Three decades of commitment to children and women. *Maternal & Child Nutrition*, 18(S1), e13229. <https://doi.org/10.1111/mcn.13229>
- Endris, B. S., Fenta, E., Getnet, Y., Spigt, M., Dinant, G.-J., & Gebreyesus, S. H. (2023). Barriers and facilitators to the implementation of nutrition interventions at primary health care units of Ethiopia: A consolidated framework for implementation research. *Maternal & Child Nutrition*, 19(1), e13433. <https://doi.org/10.1111/mcn.13433>
- Fite, M. B., Roba, K. T., Oljira, L., Tura, A. K., & Yadeta, T. A. (2021). Compliance with Iron and Folic Acid Supplementation (IFAS) and associated factors among pregnant women in Sub-Saharan Africa: A systematic review and meta-analysis. *PLOS ONE*, 16(4), e0249789. <https://doi.org/10.1371/journal.pone.0249789>
- Irmawati, I., Usman, A. N., Ahmad, M., & Arsyad, N. A. (2022). Husband support in pregnant women who take folamil supplements for increasing hemoglobin levels: a literature review. *Nurse and Health: Jurnal Keperawatan*, 11(1), Article 1. <https://doi.org/10.36720/nhjk.v11i1.315>
- Karyadi, E., Reddy, J. C., Dearden, K. A., Purwanti, T., Mardewi, Asri, E., Roquero, L. B., Juguan, J. A., Sapitula-Evidente, A., Anand, B., Warvadekar, K., Bhardwaj, A., Alam, Md. K., Das, S., Nair, G. K., Srivastava, A., & Raut, M. K. (2023). Antenatal care is associated with adherence to iron supplementation among pregnant women in selected low-middle-income-countries of Asia, Africa, and Latin America & the Caribbean regions: Insights from Demographic and Health Surveys. *Maternal & Child Nutrition*, 19(2), e13477. <https://doi.org/10.1111/mcn.13477>
- Klemm, G. C., Birhanu, Z., Ortolano, S. E., Kebede, Y., Martin, S. L., Mamo, G., & Dickin, K. L. (2020). Integrating Calcium Into Antenatal Iron-Folic Acid Supplementation in Ethiopia: Women's Experiences, Perceptions of Acceptability, and Strategies to Support Calcium Supplement Adherence. *Global Health: Science and Practice*, 8(3), 413–430. <https://doi.org/10.9745/GHSP-D-20-00008>
- Lassi, Z. S., Mansoor, T., Salam, R. A., Das, J. K., & Bhutta, Z. A. (2014). Essential pre-pregnancy and pregnancy interventions for improved maternal, newborn and child health. *Reproductive Health*, 11(1), S2. <https://doi.org/10.1186/1742-4755-11-S1-S2>
- Mayasari, N. R., Bai, C.-H., Hu, T.-Y., Chao, J. C.-J., Chen, Y. C., Huang, Y. L., Wang, F.-F., Tinkov, A. A., Skalny, A. V., & Chang, J.-S. (2021). Associations of Food and Nutrient Intake with Serum Hepcidin and the Risk of Gestational Iron-Deficiency Anemia among Pregnant Women: A Population-Based Study. *Nutrients*, 13(10), Article 10. <https://doi.org/10.3390/nu13103501>
- Mehata, S., Parajuli, K. R., Pant, N. D., Rayamajhee, B., Yadav, U. N., Mehta, R. K., Jha, P., Mehta, N., Dhimal, M., & Singh, D. R. (2021). Prevalence and correlates of Helicobacter pylori infection among under-five children, adolescent and non-pregnant women in Nepal: Further analysis of Nepal national micronutrient status survey 2016. *PLOS Neglected Tropical Diseases*, 15(6), e0009510. <https://doi.org/10.1371/journal.pntd.0009510>
- Morrison, J., Giri, R., James, P., Arjyal, A., Kharel, C., Saville, N., Baral, S., Hillman, S., & Harris-Fry, H. (2023). Assessing food-based strategies to address anaemia in pregnancy in rural plains Nepal: A mixed methods study. *British Journal of Nutrition*, 130(2), 211–220. <https://doi.org/10.1017/S0007114522003208>
- Ms, S. W., Dewi, N. R., & Yana, H. (2024). Healthcare Workers' Roles and Iron Tablet Adherence among Pregnant Women: A Prospective Cohort Study. *Community Medicine and Education Journal*, 5(3), Article 3. <https://doi.org/10.37275/cmej.v5i3.631>
- Muthuraj, L. P., Kandasamy, S., Subbiah, P., Sibqathulla, M. J., Velappan, L. K., Gopal, M., Ramya, E. J., Jayaraman, Y., & Kalyanaraman, S. (2023). Sociocultural and drug-related factors associated with adherence to iron-folic acid supplementation among pregnant women – A mixed-methods study. *Journal of Education and Health Promotion*, 12(1), 121. https://doi.org/10.4103/jehp.jehp_1008_22
- Næss-Andresen, M.-L. (2024). *Iron status and pregnancy. Gestational and postpartum iron deficiency and anaemia, and associations with ethnicity and clinical factors: A multi-ethnic population-based cohort study* [Doctoral thesis]. <https://www.duo.uio.no/handle/10852/107636>
- Palivela, D., Shehnaz, S. I., & Chaturvedula, L. (2021). Effect of direct monitoring by family members and counseling by health professionals on iron-folic acid supplementation: A cross-sectional study among pregnant women in Puducherry, India. *Journal of Family and Community Medicine*, 28(2), 85. https://doi.org/10.4103/jfcm.JFCM_445_20
- Paudyal, N., Parajuli, K. R., Garcia Larsen, V., Adhikari, R. K., Devkota, M. D., Rijal, S., Chitekwe, S., & Torlesse, H. (2022). A review of the maternal iron and folic acid supplementation programme in Nepal: Achievements and challenges. *Maternal & Child Nutrition*, 18(S1), e13173. <https://doi.org/10.1111/mcn.13173>

- Pokhrel, A., Bhatta, B., & Adhikari, A. (2024a). *Compliance to Iron Folic Acid Supplementation and its associated factors among post-partum mothers of Bharatpur Metropolitan* (p. 2024.07.18.24310631). medRxiv. <https://doi.org/10.1101/2024.07.18.24310631>
- Pokhrel, A., Bhatta, B., & Adhikari, A. (2024b). *Compliance to Iron Folic Acid Supplementation and its associated factors among post-partum mothers of Bharatpur Metropolitan* (p. 2024.07.18.24310631). medRxiv. <https://doi.org/10.1101/2024.07.18.24310631>
- Sanghvi, T. G., Nguyen, P. H., Forissier, T., Ghosh, S., Zafimanjaka, M., Walissa, T., Mahmud, Z., & Kim, S. (2023). Comprehensive Approach for Improving Adherence to Prenatal Iron and Folic Acid Supplements Based on Intervention Studies in Bangladesh, Burkina Faso, Ethiopia, and India. *Food and Nutrition Bulletin*, *44*(3), 183–194. <https://doi.org/10.1177/03795721231179570>
- Saragih, I. D., Dimog, E. F., Saragih, I. S., & Lin, C.-J. (2022). Adherence to Iron and Folic Acid Supplementation (IFAS) intake among pregnant women: A systematic review meta-analysis. *Midwifery*, *104*, 103185. <https://doi.org/10.1016/j.midw.2021.103185>
- Sawudatu, Z.-A., Omeife, H., Moran, V. L., Godfred, E., Seth, A.-A., Lowe, N. M., & Aryeetey, R. (2024). Anaemia prevention among pregnant women: Views and experiences of pregnant women and antenatal care providers in Accra, Ghana. *World Nutrition*, *15*(2), Article 2. <https://doi.org/10.26596/w.n.202415287-101>
- Sendeku, F. W., Azeze, G. G., & Fenta, S. L. (2020). Adherence to iron-folic acid supplementation among pregnant women in Ethiopia: A systematic review and meta-analysis. *BMC Pregnancy and Childbirth*, *20*(1), 138. <https://doi.org/10.1186/s12884-020-2835-0>
- Shomik, M., Mondal, P., Huda, M. M., Alam, M. A., Hossain, M. M., Hasnain, M. G., Mondal, D., & Ahmed, T. (2022). Deworming program for women of reproductive age implemented through national iron folate supplementation program reduces prevalence of anemia: Evidence from a community trial in rural Bangladesh. *Gates Open Research*, *6*(146), 1–25. <https://doi.org/10.12688/gatesopenres.13837.1>
- Shrestha, N. (2018). *Prevalence of Anemia and its Associated Factors in Children Aged 6-59 Months in Bhutanese Refugee Camp of Damak Municipality*[Thesis]. <http://202.45.146.37:8080/jspui/handle/123456789/51>
- Siekmans, K., Roche, M., Kung'u, J. K., Desrochers, R. E., & De-Regil, L. M. (2018). Barriers and enablers for iron folic acid (IFA) supplementation in pregnant women. *Maternal & Child Nutrition*, *14*(S5), e12532. <https://doi.org/10.1111/mcn.12532>
- Stoffel, N. U., von Siebenthal, H. K., Moretti, D., & Zimmermann, M. B. (2020). Oral iron supplementation in iron-deficient women: How much and how often? *Molecular Aspects of Medicine*, *75*, 100865. <https://doi.org/10.1016/j.mam.2020.100865>
- Sum, K. K., Tint, M. T., Aguilera, R., Dickens, B. S. L., Choo, S., Ang, L. T., Phua, D., Law, E. C., Ng, S., Tan, K. M.-L., Benmarhnia, T., Karnani, N., Eriksson, J. G., Chong, Y.-S., Yap, F., Tan, K. H., Lee, Y. S., Chan, S.-Y., Chong, M. F. F., & Huang, J. (2022). The socioeconomic landscape of the exposome during pregnancy. *Environment International*, *163*, 107205. <https://doi.org/10.1016/j.envint.2022.107205>
- Williams, P. A., Poehlman, J., Moran, K., Siddiqui, M., Kataria, I., Rego, A. M., Mehrotra, P., & Saldanha, N. (2020). Strategies to address anaemia among pregnant and lactating women in India: A formative research study. *Public Health Nutrition*, *23*(5), 795–805. <https://doi.org/10.1017/S1368980019003938>
- World Health Organization. (2012). *Guideline: Daily iron and folic acid supplementation in pregnant women*. World Health Organization. <https://iris.who.int/handle/10665/77770>
- Yadav, K. D., Yadav, U. N., Wagle, R. R., Thakur, D. N., & Dhakal, S. (2019). 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*, *12*(1), 127. <https://doi.org/10.1186/s13104-019-4167-6>
- Yogi, T. N., Kafle, R., Uprety, S., Makaju, R., Shrestha, S., Gahatraj, M., Bhusal, A., Ghimire, S., B. K., H., Karki, S., Mishra, B., Kunwar, A., Khatiwada, N., Niraula, S., Uprety, S., Khanal, S., Shah, P., Mukhia, S., Chaudhary, D. R., & Malla, N. (2024). Assessment of knowledge, attitude and practice towards maternal healthcare among mothers in Illam: A cross-sectional study from Nepal. *Annals of Medicine and Surgery*, *86*(8), 4422. <https://doi.org/10.1097/MS9.0000000000002297>