International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Opuni N et al. Int J Reprod Contracept Obstet Gynecol. 2026 Feb;15(2):448-453
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20260161

Original Research Article

Knowledge assessment of healthcare providers and pregnant women on anemia management in selected regions of Ghana

Nicholas Opuni[1], Victor Collins Wutor[2,3], Benoit Banga N'guessan[1,4,5]*

[1]Department of Pharmacology and Toxicology, School of Pharmacy, College of Health Sciences, University of Ghana, Legon, Accra, Ghana
[2]Department of Biotechnology, Microbiology and Public Health, AEServe, Lethbridge, AB, Canada. 120 Couleesprings Way South. Lethbridge. Alberta T1K 5C5, Canada
[3]Faculty of Pharmacy and Pharmaceutical Sciences. University of Alberta. 2-35 Medical Sciences Building. Edmonton, Alberta T6G 2H1, Canada
[4]Department of Pharmacology and Toxicology, School of Pharmacy, University of Health and Allied Sciences, Ho, Volta Region, Ghana
[5]Institute of Traditional and Alternative Medicine, University of Health and Allied Sciences, Ho, Volta Region, Ghana

Received: 01 December 2025
Accepted: 05 January 2026

***Correspondence:**
Dr. Benoit Banga N'guessan,
E-mail: kbanga@uhas.edu.gh

ABSTRACT

Background: Anemia in pregnancy is a global health concern, and Ghana, a developing country, is no exception. Overall, it is a significant cause of maternal mortality. This study assessed the effectiveness of hematinic supplements and evaluated healthcare providers' and pregnant women's knowledge of anemia in selected regions of Ghana.
Methods: A cross-sectional study was conducted among 470 participants, comprising 329 pregnant women and 141 healthcare providers, across selected hospitals in Ghana's Central and Greater Accra regions. Data was collected using structured questionnaires and complete blood count (CBC) results. Descriptive statistics and logistic regression were used for analysis.
Results: The prevalence of anemia among pregnant women was 84%, with severity distributions of 43.7% mild, 27.3% moderate, and 13.7% severe cases. Healthcare providers (96.45%) demonstrated a high level of familiarity with hematinics. Among pregnant women, 82.67% showed a good understanding of anemia.
Conclusions: Both healthcare providers and pregnant women demonstrated good knowledge of anemia and hematinic supplementation. These findings support the role of hematinics in the management of anemia during pregnancy, highlighting the need for continued education and early antenatal care.

Keywords: Anemia, Healthcare providers, Hematinic, Ghana, Pregnancy

INTRODUCTION

Anemia is the most common blood disorder encountered in pregnancy and affects approximately 16% of pregnant women in the United States and 38% globally.[1] In Africa, 57.1% of pregnancies are affected by anemia.[2,3] Up to 90% of pregnant women have iron stores of fewer than 500 mg or serum ferritin levels of less than 70 mg/l, indicating iron deficiency in up to one in four women.[4-6] A decreased consumption of iron and other micronutrients before and during pregnancy in Sub-Saharan Africa contributes to the higher prevalence of anemia.[2,5] Due to fetal development and altered physiological conditions, pregnancy is a time of high iron demand. An ongoing risk factor for maternal mortality and overall mortality in the general population is the lack of iron during this time.[7]

Preterm births, heart failure, postpartum hemorrhage, and even death are just a few of the maternal health implications of anemia in pregnancy.[8,9] Low birth weight, hypoxia at birth, and perinatal mortality are among the impacts on the fetuses. Babies born to anemic mothers have a higher chance of later mental and physical impairment as well as poor academic performance.[10,11] Additionally, preterm babies are more likely to experience growth retardation and show signs of insufficient iron reserves in their first year of life.[12,13] Due to low educational attainment, decreased quality of life, decreased economic production, and a subsequent cycle of poverty, pregnancy anemia can have long-term effects on the development of the national economy.[7,14] Member States have requested guidance from the WHO on the effectiveness and safety of daily iron and folic acid supplementation in pregnant women as a public health measure to improve pregnancy outcomes in support of their efforts to achieve the millennium development goals.[7,14]

Anemia and other pregnancy-related problems can be addressed by ensuring high-quality medical treatment in antenatal clinics (ANCs), where the effectiveness of medicines provided to pregnant women needs to be closely monitored.[1,15] Daily oral iron and folic acid supplementation is highly recommended in antenatal care to reduce the risk of low birth weight, maternal anemia, and iron deficiency.[7] In Ghana, numerous hematinics are available on the market, making it challenging to select the most suitable one.

METHODS

Study design and setting

A cross-sectional study was conducted across five hospitals in Ghana's Central and Greater Accra regions: Cape Coast Teaching Hospital, Mamobi Hospital, Mercy Women Hospital, Sanford Clinic, and Ewim Polyclinic. The study population consisted of pregnant women (aged 17-45) and healthcare providers, including gynecologists, obstetricians, pharmacists, and midwives.

Ethical approval for this study was obtained from the School of Pharmacy Ethics Committee of the University of Ghana (Approval ID: UGSOPEC/AC2021-2022/017).

Inclusion and exclusion criteria

Pregnant women attending ANC at the designated hospitals from the first visit were included in the trial. The study included healthcare professionals who provide services to expectant mothers. As mentioned earlier, it did not include women who did not begin their initial ANC visit at the facilities. Pregnant women who could not communicate in Akan (Asante Twi, Fante Twi), Ga, or English were also excluded from the study.

The study was carried out between January and June 2023.

Sample size and sampling

The sample size was estimated using the formula proposed by Moser and Kalton.[16] The margin of error for determining the sample size was 0.05.

$n=ZP_1(1-P_1)/e^2$

n: sample size

Z: 1.96 for a confidence level of 95%

P_1: proportion (expressed as a decimal, 0.5)

e: margin of error

$n=1.96x0.5(1-0.5)/(0.05)^2$

Therefore, the study recruited 470 individuals (329 pregnant women and 141 healthcare providers). Participant selection was conducted using systematic sampling.

Data collection and analysis

Data was collected through structured questionnaires and complete blood count (CBC) results. STATA version 20 and SPSS version 21 were used for analysis. Bivariate and multivariate logistic regression analyses were conducted to identify factors associated with anemia.

Ethical clearance was obtained from the University of Ghana Ethics Committee to allow data collection. Permission to conduct the study was obtained from the chief executive officer or the medical officer at each hospital and clinic. Confidentiality was maintained during participant data collection, as their details were not disclosed, and the questionnaires were securely destroyed or deleted using the most appropriate method after data collection was completed. Participant consent was obtained, and they were informed that they could withdraw from the study at any time.

RESULTS

Table 1 shows that the median age of pregnant women was 30 years (SD ±6.83). Most participants (84.3%) were married, with 76.6% having formal education. The majority (54.41%) were self-employed.

According to Table 2, most pregnant women (68.39%) were in the third trimester. At the first ANC visit, 78.12% were in their second trimester. Slightly more than half of pregnant women (53.5%) do not have a secure, balanced diet.

Table 1: Socio-demographic and economic characteristics.

Variables	Frequency (N)	Valid percent
Age (years)		
16-25	150	45.59
26-35	156	47.42
36-45	23	6.99
Education level		
No formal education	77	23.40
Below secondary education	179	54.41
Secondary education and above	73	22.19
Current marital status		
Married or living together	277	84.3
Not married	52	15.7
Employment status		
Self-employed	179	54.41
Full-time employed	52	15.81
Part-time employed	44	13.37
Unemployed	54	16.61

Table 2: Term of pregnancy and diet status.

Variables	Frequency	Valid percent
Pregnancy trimester		
1st trimester	59	17.93
2nd trimester	45	13.68
3rd trimester	225	68.39
Pregnancy trimester at first ANC visit		
1st trimester	77	23.4
2nd trimester	257	78.12
3rd trimester	5	1.52
Balanced diet status		
Balanced diet secured	50	46.50
Balanced diet insecure	279	53.50

Table 3: Description of healthcare providers.

Health care providers	Frequency	Valid percent
Prescribing midwives	65	46.1
Physicians	31	20.8
Physician assistants	23	16.31
Pharmacists	22	16.79

As depicted in Table 3, 46.1% of the healthcare providers were prescribing midwives. They were followed by physicians (20.8%), pharmacists (16.79%), and physician assistants (16.31%).

Table 4: Anemia prevalence among participants (pregnant women).

Variables	Frequency	Valid percent
Anemia status at the time of the first ANC visit		
Anemia diagnosed	279	84
Anemia not diagnosed	50	15.3

As shown in Table 4, 84% of the pregnant women under study were anemic at the first ANC visit.

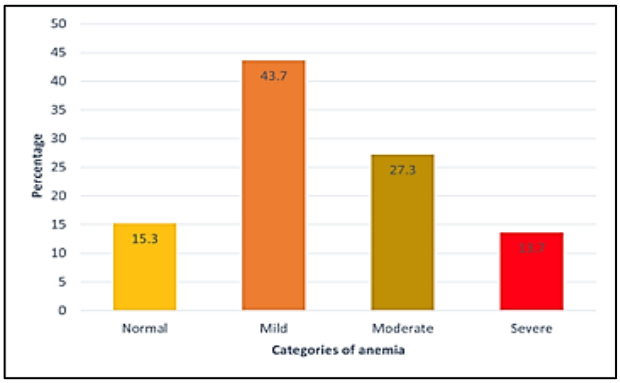

Figure 1: Prevalence of anemia among pregnant women.

Regarding anemia severity, 15.3% were classified as usual, 43.7% as mild, 27.3% as moderate, and 13.7% as severe (Figure 1).

Table 5: Frequency of encountering pregnant women who are anemic.

Variable	Frequency	Valid percent
Healthcare providers' frequency of encountering anemia among pregnant women		
Frequently	131	92.91
Not frequently	10	7.09

Table 5 shows that 92.91% of healthcare providers frequently encounter pregnant women with anemia during ANC. In contrast, only 7.09% do not often handle pregnant women with anemia at the ANC.

Table 6: Knowledge of participants about hematinics.

Variables	Frequency	Valid percent
The meaning of anemia in pregnant women		
Low Hb level	198	60.18
Low RBC level	74	22.49
Low blood volume	45	13.68
Low WBC level	12	3.65
Perception of hematinics by pregnant women		
Iron supplement only	97	29.48
Iron multivitamin supplement	168	51.10
Folic acid supplements only	30	9.12
Multivitamin	34	10.32

According to Table 6, over 60% of pregnant women considered a low Hb level to be anemia, while nearly 14% believed that low blood volume indicated anemia. Almost half (51.10%) of the pregnant women believed that iron multivitamins were hematinics.

According to the data collected, 82.67% of the pregnant women in the study understood the meaning of anemia. Only 3.65% had an idea different from the meaning of anemia, whilst 13.68% had a fair understanding. All pregnant women, especially those who are 29.48% of the population, understand the role of iron supplements in providing hematinic acid.

Table 7: Knowledge of health care providers on hematinic.

Variables	Frequency	Valid percent
Healthcare professionals' familiarity with hematinics		
Familiar	136	96.45
Not familiar	5	3.55

Findings in Table 7 show that healthcare providers showed high familiarity (96.45%) with hematinics.

DISCUSSION

Physicians, pharmacists, midwives, and other healthcare providers have widely prescribed and dispensed hematinic because it promotes growth, enhances immunity, and improves appetite.

Hematinics are indicated for treating iron deficiency anemia, used during convalescence after debilitated states, and for treating Iron deficiency anemia in pregnant and geriatric patients, as well as anemia associated with infections.

The study found that 84% of pregnant women who attended ANC at the health centers were anemic based on their full blood count results. The complete blood count is a routine lab investigation during the ANC's first visit. The average hemoglobin level was 10 gm/dl, with a standard deviation of 1.6 gm/dl. Hemoglobin levels below 11 gm/dl indicated an overall severity of anemia of 84.7%. According to the WHO's evaluation of the importance of anemia to public health, anemia in pregnancy is a significant public health issue in the studied region.[7,17]

According to the 2012 Ghana Demographic and Health Survey, the prevalence in this study was higher than the country's overall prevalence rate of 70.3%.[3] These findings may be related to the sociodemographic, economic, and dietary patterns of coastal region residents who, consciously or unconsciously, do not include many fruits and vegetables in their diets. According to reports, the prevalence of anemia ranges from 3 to 18% in wealthy nations, while it ranges from 35 to 75% in impoverished nations.[4,18]

Pregnant women who had only received below secondary education, at a rate of 77.81%, and had the lowest income indices, made up most of the anemic pregnant women. Since educated women are more likely to receive accurate information about health problems like anemia, it has been shown in numerous studies that a low level of education may raise the risk of anemia.

Understanding the material presented at the ANC may also be influenced by education.

Since pregnant women with poor, middle-class wealth and employment were thought to be unable to buy a balanced diet and supplements, wealth and employment position were also considered to be among the predictors of anemia in pregnancy. These results are consistent with other research in Malaysia, Ethiopia, and Ghana, suggesting that unemployment and poverty may contribute to anemia in pregnant women.[19]

A significant percentage of pregnant women (82.7%) have a better understanding of anemia and appreciable knowledge of hematinics. According to the literature, therapeutic doses of iron are expected to increase hemoglobin levels by 0.7-1.0 gm/dl per week. Reticulocytosis occurs within 7-10 days of initiating iron therapy.[20,21]

The study revealed a higher prevalence of anemia (84%) compared to Ghana's national rate of 70.3%.[3,6] The high levels of knowledge among healthcare providers and pregnant women suggest the effectiveness of health education programs, although socioeconomic factors remain significant barriers to anemia prevention.[22-24]

To further validate its findings, additional community-level research should be conducted. The study excluded individuals who did not initiate antenatal care (ANC) at the selected facilities, resulting in a lower prevalence of anemia

CONCLUSION

This study demonstrated that more than eight out of 10 pregnant women receiving ANC at CCTH, Ewim Hospital, Sanford Clinic, and Mamobi Hospital have anemia. The healthcare providers there possess significant knowledge of anemia in pregnant women and are equally conversant with the hematologic supplements used in their management.

Many pregnant women are well-informed about anemia during pregnancy and are aware of the importance of folic acid supplements, including those that contain Vitamin B12.

Funding The university provided financial support to the student
Conflict of interest: None declared
Ethical approval: The study was approved by the School of Pharmacy Ethics Committee of the University of Ghana (Approval ID: UGSOPEC/AC2021-2022/017)

REFERENCES

1. Siu AL, US Preventive Services Task Force. Screening for iron deficiency anemia and iron supplementation in pregnant women to improve maternal health and birth outcomes: US Preventive Services Task Force recommendation statement. Ann Intern Med. 2015;163:529-36.
2. McLean E, Cogswell M, Egli I, Wojdyla D, De Benoist B. Worldwide prevalence of anemia, WHO Vitamin and Mineral Nutrition Information System, 1993-2005. Public Health Nutr. 2009;12:444-54.
3. Appiah PK, Nkuah D, Bonchel DA. Knowledge of and adherence to anemia prevention strategies among pregnant women attending antenatal care facilities in the Juaboso District, Western North Region, Ghana. J Pregn. 2020;2020:2139892.
4. Lebso M, Anato A, Loha E. Prevalence of anemia and associated factors among pregnant women in Southern Ethiopia: a community-based cross-sectional study. PLoS One. 2017;12:e0188783.
5. Okube OT, Mirie W, Odhiambo E, Sabina W, Habtu M. Prevalence and factors associated with anemia among pregnant women attending antenatal clinics in the second and third trimesters at Pumwani Maternity Hospital, Kenya. Open J Obstet Gynecol. 2016;6:16-27.
6. Tawiah EO, Asante KP, Dwommoh RA, Gyasi RK, Ankobea-Kokroe F. Predictors of anemia among pregnant women in Ghana: a case-control study. BMC Pregnancy Childbirth. 2017;17:1 9.28049520.
7. WHO and Margaret Chan. Hemoglobin concentrations for the diagnosis of anemia and assessment of Severity. Geneva: World Health Organization; 2011. American College of Obstetricians and Gynecologists (ACOG). ACOG committee opinion no. 517: Management of iron deficiency anemia among pregnant women. Obstet Gynecol. 2021;121:891-6.
8. Stephen G, Mgongo M, Hashim TH, Katanga J, Stray-Pedersen B, Msuya SE. Anemia in pregnancy: prevalence, risk factors, and adverse perinatal outcomes in northern Tanzania. Anemia. 2018;2018:1846280.
9. Argaw D, Hussen Kabthymer R, Birhane M. Magnitude of anemia and its associated factors among pregnant women attending antenatal care in southern Ethiopia: a cross-sectional study. J Blood Med. 2020;11:335-44.
10. Jimenez K, Kulnigg-Dabsch S, Gasche C. Management of iron deficiency anemia. Gastroenterol Hepatol. 2015;11:241-50.
11. Kidanto HL, Mogren I, Lindmark G, Massawe SN, Nystrom L. Risks for preterm delivery and low birth weight are independently increased by the severity of maternal anemia. South Afr Med J. 2009;99:98-102.
12. Mehrotra M, Yadav S, Deshpande A, Mehrotra H. A study of the prevalence of anemia and associated sociodemographic factors in pregnant women in Port Blair, Andaman and Nicobar Islands. J Fam Med Prim Care. 2018;7:1288-93.
13. Compaore A, Gies S, Brabin B, Tinto H, Brabin L. "There is Iron and Iron…" Burkinabè women's perceptions of iron supplementation: a qualitative study. Matern Child Health J. 2014;18(8):1976-84.
14. Alosaimi AA, Alamri SA, Mohammed M. Dietary knowledge, attitude, and practice regarding preventing iron deficiency anemia among pregnant women in Riyadh, Saudi Arabia. Int J Adv Nurs Stud. 2020;9(1):29-36.
15. AlAbedi GA, Arar AA, Alridh MSA. Assessment of pregnant women's knowledge and practices concerning iron deficiency anemia at Al-Amara City/Iraq. Med Leg Update. 2020;20(3):151.
16. Moser CA, Kalton G. Survey methods in social investigation. Routledge; 2017.
17. Ghana Statistical Service, Ghana Health Service, ICF International. Ghana Demographic and Health Survey 2014. Accra: GSS, GHS, and ICF International; 2015.
18. Mbule MA, Byaruhanga YB, Kabahenda M, Lubowa A. Determinants of anemia among pregnant women in rural Uganda. Rural Remote Health. 2013;13(2):2259-315
19. Anlaakuu P, Anto F. Anemia in pregnancy and associated factors: a cross-sectional study of antenatal attendants at the Sunyani Municipal Hospital, Ghana. BMC Res Notes. 2017;10:402.
20. Little DR. Ambulatory management of common forms of anemia. Am Fam Phys. 1999;59(6):1598-604.
21. Fletcher A, Forbes A, Svenson N, Wayne Thomas D. Guideline for the laboratory diagnosis of iron deficiency in adults (excluding pregnancy) and children. Br J Haematol. 2022;196:523-9.
22. Ademuyiwa IY, Ayamolowo SJ, Oginni MO, Akinbode MO. Awareness and prevention of anemia among pregnant women attending antenatal clinic at a

university teaching hospital in Nigeria. Calabar J Health Sci. 2020;4(1):20-6.
23. Devalia V, Hamilton MS, Molloy AM. Guidelines for the diagnosis and treatment of cobalamin and folate disorders. Br J Haematol. 2014;166:496-513.World Health Organization. Anemia Policy Brief. Global Nutrition Targets 2025, (WHO/NMH/NHD/14.4). Geneva: World Health Organization; 2021:8.
24. WHO/CDC. Worldwide prevalence of anemia 1993-2005. WHO Global Database on Anemia. Geneva: World Health Organization; 2008.

Cite this article as: Opuni N, Wutor VC, N'guessan BB. Knowledge assessment of healthcare providers and pregnant women on anemia management in selected regions of Ghana. Int J Reprod Contracept Obstet Gynecol 2026;15:448-453.