

Prevalence of Anaemia in pregnancy among antenatal attendees in A Teaching Hospital in North - Central Nigeria: A cross-sectional study

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World Journal of Advanced Pharmaceutical and Medical Research, 2025, 09(01), 001-006

Publication history: Received on 23 May 2025; revised on 29 June 2025; accepted on 01 July 2025

Article DOI: <https://doi.org/10.53346/wjapmr.2025.9.1.0029>

Abstract

Background: Anaemia in pregnancy remains a significant public health issue, particularly in developing countries, due to its associated risks for both mother and fetus. This study aimed to determine the prevalence and severity of anaemia among pregnant women attending antenatal care at Bingham University Teaching Hospital, Jos, Nigeria. Methods: A cross-sectional study was conducted from June to August 2024, involving 200 pregnant women aged 15–49 years. Participants were recruited using consecutive non-probability sampling. Haemoglobin levels were measured, and anaemia was classified based on WHO criteria. Socio-demographic and obstetric data were also collected and analyzed using SPSS version 22.

Results: The prevalence of anaemia among the study population was 66%, categorizing it as a severe public health issue according to WHO guidelines. Most anaemia cases were mild (65.9%) or moderate (33.3%), with only 0.8% being severe. No clear associations were found between anaemia and education level, gravidity, or trimester. The high prevalence is likely influenced by socioeconomic, nutritional, and regional disparities.

Conclusion: Anaemia in pregnancy is highly prevalent among antenatal attendees in Jos, underscoring the urgent need for enhanced screening, health education, and targeted nutritional interventions throughout pregnancy.

Keywords: Pregnancy; Anaemia; Haemoglobin Levels; Prevalence; WHO Criteria; BHUTH; Nigeria

1. Introduction

Anaemia is a condition that results when the haemoglobin concentration in an individual is lower than the normal expected for age, sex and physiological status [1]. Anaemia is a major public health concern affecting mainly children, pregnant women, menstruating girls and women and women in the puerperal period [1]. Anaemia during pregnancy is a public health problem especially in developing countries and is associated with adverse outcomes in pregnancy [2]. In pregnancy, anaemia has grave consequences for mother and baby. For the mother, she is at risk of impaired quality of life, need for blood transfusions and its attendant complications, shock, postpartum haemorrhage and even maternal mortality [3, 4]. For the baby, it is at risk of preterm birth, fetal growth restriction, malformations and even stillbirth [3, 4]. This is why prevention of anaemia in pregnancy is of utmost importance. Also, early identification and management of anaemia is needed to avert possible adverse outcomes and ensure that a healthy baby is born to a healthy mother at term.

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Several factors can lead to the development of anaemia including nutritional deficiencies, infections and inflammations, chronic diseases, gynaecological and obstetric conditions, inherited blood disorders, chronic diseases etc. [2, 3]. In pregnancy, iron deficiency anaemia due to inadequate intake of iron, blood volume expansion and increased iron requirements by the developing fetus are the most prominent causes. Thus, adequate dietary intake of iron supplements and iron rich foods is important to prevent the development of anaemia in pregnancy. It is also important to tackle other causes of anemia if found in a pregnant woman [1, 3, 4].

Anemia among pregnant women throughout the entire pregnancy may be more harmful to both mother and baby [5]. According to various reports, anemia in pregnancy can lead to an increased risk of premature birth [6] intrauterine fetal death [7], low birth weight (LBW) [8], and perinatal mortality [9].

Haemoglobin concentrations change significantly in pregnancy to accommodate the increasing maternal blood volume and iron requirements of the growing fetus [10]. There is a gradual decline in haemoglobin concentrations beginning from the first trimester reaching their lowest levels in the second trimester and rising again in the third trimester [10]. As indicated by the World Health Organization (WHO), anaemia in pregnancy is defined as haemoglobin concentration less than or equal to; 11.0g/dl. Even though it has been noted that haemoglobin concentrations fall by up to 5 g/l in the second trimester, the WHO has no recommendations for different haemoglobin concentrations by trimester [10]. The WHO categorizes the severity of anaemia in pregnancy into mild, moderate and severe viz; Mild: 10.0 - 10.9 g/l, Moderate: 7.0 - 9.9 g/l and Severe when it is less than 7 g/l [10]. Globally, the prevalence of anaemia in pregnancy is 37% with the highest prevalence noted to be in Africa with a prevalence of 41.7% [1,11]. Nigeria has a prevalence rate of 55.9% of anaemia in pregnant women [12]. The WHO categorizes prevalence rate of anaemia into mild, moderate and severe. Anaemia prevalence is mild if prevalence rate is between 5 - 20%, moderate if prevalence rate is between 20 - 40% and severe if it is greater than 40% [12]. According to this categorization, Africa falls within the category of severe with a continental prevalence of 41.7%, which includes Nigeria with a prevalence of 55.9% [11,12].

Stephen et al., reported clinic of recruitment and low level of education of the women as the factors that were independently associated with anaemia during pregnancy from an outcome of 18.0% mild and 2% severe anaemia prevalence in a Tanzanian setting [13].

In this study, we aimed to find out the prevalence rate of anaemia and its severity among pregnant women accessing antenatal at the Bingham University Teaching Hospital Jos, North-Central Nigeria. This will enable in advocating for routine checks of haemoglobin levels, not just at booking, but also in all trimesters so that anaemia can be identified early enough and corrective measures instituted on time to prevent adverse maternal and fetal outcomes. Results from this study will also help drive health education efforts and policies in order to help prevent the development of anaemia in the first place.

2. Material and Methods

2.1. Study design and site

The study is a cross-sectional study conducted at the Obstetrics and Gynaecology Department of Bingham University Teaching Hospital (BhUTH) in Jos Nigeria involving pregnant women attending the Antenatal Clinic within a 3-month period (June to August 2024).

2.2. Inclusion and exclusion criteria

Pregnant women attending the antenatal clinic Obstetrics and Gynaecology Department of Bingham University Teaching Hospital (BhUTH) from June to August 2024. Those who were younger than 15 or older than 49 were excluded from the study. Others which were excluded include; those with multiple pregnancies, sickle cell disease and other haemoglobinopathies, and those who did not give consent.

2.3. Sample size and collection

A total of 200 women were recruited by consecutive non-probability sampling. Information needed was retrieved from them and inputted into a proforma. Venous blood sample was also taken from them and sent to the lab where their haemoglobin concentration was determined.

2.4. Data analysis

All data was inputted into the SPSS version 22 and analyzed. The prevalence rate was determined using a simple percentage.

3. Result and Discussion

Table 1 Socio-demographic and Reproductive Data

Characteristics	Frequency (n = 200)	Percentage (%)
Age		
15 - 24	40	20
25 - 34	118	59
35 - 44	42	21
Mean age	29.6	
Occupation		
Civil servant	55	27.5
House wife	56	28
Trader	41	20.5
Artisan	17	8.5
Others	31	15.5
Education		
None	5	2.5
Primary	9	4.5
Secondary	68	34
Tertiary	118	59
Ethnic group		
Hausa/Fulani	65	32.5
Igbo	14	7
Yoruba	9	4.5
Plateau Indigenous Tribes	65	32.5
Others	47	23.5
Gravidity		
Primigravida	53	26.5
Multigravida	147	73.5
Trimester		
1st	15	7.5
2nd	91	45.5
3 rd	94	47

Table 2 Prevalence of Anaemia in pregnancy among population studied

Anaemia	Frequency (N)	Percentage (%)
Yes	132	66
No	68	34
Total	200	100

Table 3 Classification of Anaemia

Classification	Mild Anaemia (10.9 - 10 G/Dl)	Moderate Anaemia (9.9 - 7 G/Dl)	Severe Anaemia (<7 G/Dl)	Total
Frequency	87	44	1	132
Percentage	65.9	33.3	0.8	100

Table 4 Factors affecting anemia

Factors	Anaemia		Total (100%)
	Yes [%]	No [%]	
Education			
None	3 [60%]	2 [40%]	5 [100%]
Primary	4 [44.4%]	5 [55.6%]	9 [100%]
Secondary	41 [60.2%]	27 [39.8%]	68 [100%]
Tertiary	84 [71.2%]	34 [28.8%]	118 [100%]
GRAVIDITY			
Multigravida	94 [63.9%]	53 [36.1%]	147 [100%]
Primigravida	38 [71.6%]	15 [28.4%]	53 [100%]
Trimester			
1st	5 [31.3%]	10 [68.7%]	16 [100%]
2nd	64 [69.5%]	28 [30.5%]	92 [100%]
3 rd	63 [68.4%]	29 [31.6%]	92 [100%]

Our study showed that out of 200 women studied, 132 of them had anaemia, making it a prevalence of 66% among the population of women studied. This 66% places the population studied under a population with severe prevalence rate for anaemia as per WHO categorization. This prevalence rate agrees with many studies done in Africa. A meta-analysis of studies done between 1991 and 2021 places the prevalence rate of anaemia in pregnancy at 41.7% [11]. Another meta-analysis of studies done in Egypt in North Africa placed the prevalence rate of anaemia in pregnancy at 49% [7, 14]. Our study also agreed with the WHO Nigerian figures for anaemia in pregnancy which was 55.5% [12]. However, some other studies in Nigeria placed the prevalence rate of anaemia in pregnancy as moderate (as opposed to severe in our study). The study by Okunade *et al* in Lagos and Omote *et al* in Warri placed the prevalence rate of anaemia in pregnancy at 14.5% and 37.6% respectively [15, 16]. Our study also did not show any clear pattern of association between educational level, gravidity, trimester and anaemia. This study found higher rates of anemia in pregnant women compared to other studies, and we think economic, ethnic, and nutritional factors play a big role. For example, studies done in southern Nigerian cities like Lagos and Warri often show lower anemia rates. That's likely because

people in southern Nigeria generally have more economic power than those in the north. This means better access to good food and healthcare, which can prevent anemia. In our study, conducted in Jos, North Central Nigeria, we have a diverse population. Jos is a busy city with many different Nigerian tribes, not just the local people from Plateau State. The hospital where we did our study is right in the city center, making it easy for everyone from different ethnic groups to get care. This means our study population likely has varied nutritional habits compared to areas like Warri, which tend to have a more ethnically similar population. These nutritional differences among the various ethnic groups could contribute to the higher anemia prevalence we observed.

Further still, the 66% prevalence rate for anaemia in pregnancy among the population studied showed 22.5% prevalence increase compared to a similar study in same the same institution as asserted by Bassi *et al*, that prevalence of anaemia amongst pregnant women in BhUTH was 43.5%, with mild anaemia as the most common type and that the prevalence of anaemia was found to predominate amongst women in their third trimester [17]. It places the population in the severe category according to the WHO categorization for anaemia prevalence rates. This underscores the need for a robust health education platform and policy among girls and young women planning to get pregnant and also among the pregnant population. Education on understanding what anaemia is, the dangers it poses to them and their babies, and also on measures to build blood and prevent the onset of anaemia in the first place. Also, screening for anaemia should be institutionalized for every pregnant woman at booking, and at least once in the second trimester and third trimester before delivery. This will ensure that a healthy haemoglobin concentration is maintained throughout pregnancy, and a healthy baby is born to a healthy mother at term.

4. Conclusion

The study revealed a high prevalence (66%) of anaemia among pregnant women attending antenatal care at Bingham University Teaching Hospital, categorizing it as a severe public health concern by WHO standards. This finding calls for urgent action to implement comprehensive health education, focusing on the causes and consequences of anaemia, and promoting dietary and lifestyle measures that support optimal haemoglobin levels. Routine haemoglobin screening should be institutionalized at booking and during the second and third trimesters. These interventions are crucial for ensuring healthy maternal outcomes and improving neonatal health in the region.

Compliance with ethical standards

Acknowledgments

We acknowledge the management and the staff of the Obstetrics and Gynaecology Department of Bingham University Teaching Hospital Jos, Nigeria for their various assistance.

Disclosure of conflict of interest

Authors declare no conflict of interest.

Statement of ethical approval

Ethical approval with ref no. JUTH/DCS/ADM/127/XIX/6587 was obtained from the Research and Ethical Committee of the Jos University Teaching Hospital.

Statement of informed consent

Research subjects were provided with adequate information about the study and thus agreed to be part of this study via their verbal consent.

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