

Anaemia in pregnancy - Are we winning the battle in Nigeria

¹Nwoga HO, Department of Community Medicine, Enugu State University, Teaching Hospital Parklane, Enugu, Nigeria

²Ajuba MO, Department of Community Medicine, Enugu State University, College of Medicine Enugu, Nigeria

²Igweagu CP, Department of Community Medicine, Enugu State University, College of Medicine Enugu, Nigeria

Corresponding Author: Nwoga HO, Department of Community Medicine, Enugu State University, Teaching Hospital Parklane, Enugu, Nigeria.

How to citation this article: Nwoga HO, Ajuba MO, Igweagu CP, “Anaemia in pregnancy - Are we winning the battle in Nigeria”, IJMACR- May - June - 2022, Vol – 5, Issue - 3, P. No. 324 – 332.

Copyright: © 2022, Nwoga HO, et al. This is an open access journal and article distributed under the terms of the creative commons attribution noncommercial License 4.0. Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Background: Anaemia in pregnancy is global public health problem with sub Saharan Africa and South East Asia most affected. The aim of the study was to ascertain the prevalence of anaemia in pregnancy in a tertiary health institution in Enugu State South-East Nigeria.

Methods: This study was a prospective cohort study that involved all the women that attended ANC of a tertiary health institution in Enugu State Nigeria from June 2020 to May 2021. Data was retrieved from the patient’s ante-natal and delivery cards and entered into a pro forma. Cards with incomplete information were not analysed. Data was analysed using SPSS version 25 and variables were presented as frequencies, percentages, means, and standard deviation. Chi-square test was used to test for associations. The level of significance was set at $p \leq 0.05$.

Results: The prevalence of anaemia at booking was 57.2% while that at delivery was 66.0%. The mean PCV at booking was 31.80 ± 3.69 . About half of them

639(50.8%) had mild anaemia, 78(6.2%) had moderate anaemia while 2(0.2%) had severe anaemia at booking. The mean PCV at delivery was 30.67 ± 4.11 . Half of them 634 (50.4%) had mild anaemia, 183(14.6%) had moderate anaemia while 13(1.0%) had severe anaemia at delivery.

No socio-demographic characteristics significantly affected anaemia in pregnancy.

Conclusion: The prevalence of anaemia both at booking and at delivery was high.

Keywords: Anaemia, Enugu State, Nigeria, Pregnancy, Prevalence, Tertiary health institution

Introduction

Anaemia in pregnancy is a worldwide reproductive health problem affecting both the low, middle and high income countries. ^[1,2] It is a significant cause of maternal and perinatal morbidity and mortality, especially in developing countries. ^[3-5] It has been reported to be responsible for about 20% of maternal deaths in Africa and 11% of maternal deaths in Nigeria. ^[3] The World Health Organization (WHO) defines anaemia in

pregnancy as haemoglobin levels of less than 11.0g/dL. [6] This can further be divided into mild, (Hb levels 9 to 10.9g/dL), moderate (Hb levels 7 to 8.9g/dL), and severe anaemia (Hb levels less than 7g/dL). [7] Globally, it was estimated that about 40.1% of pregnant mothers develop anaemia with Sub Saharan Africa (57%) and South East Asia (48%) having the highest prevalence. [8] Some of these mothers were anaemic prior to their pregnancy while some progressively became anaemic in the course of their pregnancy. [7] Common causes of anaemia in pregnancy include deficiencies of iron and other micronutrients, poor nutrition, malaria, hookworm infestation, HIV infections and haemoglobinopathies. [9-11] Pregnancy itself may also increase the burden and severity of anaemia because of dilution effect of the pregnancy, changes on the immune system associated with pregnancy, and increased susceptibility to some of the etiological factors such as hookworm infestation and malaria. [12-14] There is also increased demand of both macro and micronutrients during pregnancy. [9] Unmanaged or poorly managed anaemia in pregnancy could lead to increased risk of preterm delivery, low birth weight, prolonged labour and postpartum haemorrhage. [15] The prevalence of anaemia among pregnant women vary from 53.8% to 90.2% in developing countries, and 8.3–23% in developed countries according to WHO. [3] The wide variations in the prevalence rates are because of differences in socio-demographic characteristics, lifestyles, etiological factors and health seeking behaviour across these countries. [4,10,16] The World Health Organisation (WHO) recommends that menstruating women living in settings with high prevalence of anaemia (20% or higher) should receive intermittent iron and folic acid supplementation while

pregnant women should receive daily iron and folic acid supplementation as part of antenatal care in order to prevent anaemia in pregnancy. [6]

Data on prevalence of anaemia in pregnancy remains an important indicator of the health of this vulnerable group. Moreover, it is related to morbidity and mortality. In spite of the efforts being made by different countries and organizations to reduce the burden of anaemia, its prevalence remains high especially in developing countries including Nigeria. Thus, continuous data on prevalence of anaemia in pregnancy can be used to monitor the progress of these reproductive health interventions. The objective of this study was to determine the prevalence and factors associated with anaemia among pregnant women accessing antenatal care (ANC) at a tertiary health facility in Nigeria.

Methods

Study area: The study was conducted at Obstetrics and Gynecology Department (O&GD) of Enugu State University of Technology Teaching Hospital (ESUT-TH) Park Lane Enugu, Nigeria. ESUT-TH is a tertiary health institution that provides tertiary health services and acts as a referral center for patients within and outside the State. It is located within the state capital, Enugu.

Study design: The study was a prospective cohort study

Study population: All the pregnant women that attended ANC and delivered at the (O&GD) of ESUT-TH Park Lane Enugu within the time of data collection.

Data collection method

Data collection lasted for 12 months from June 2020 to May 2021. All the data were retrieved from the patient's ante-natal and delivery cards and entered into a pro forma. Information retrieved included maternal socio-demographic characteristics and their booking and

delivery haemoglobin levels. Two trained research assistants were used to collect the data.

Data management

The WHO classification of anaemia in pregnancy was used to classify anaemia into mild, (Hb levels 9 to 10.9g/dL), moderate (Hb levels 7 to 8.9g/dL), and severe (Hb levels less than 7g/dL)

Independent variable

Socio-demographic characteristics of the mothers.

Results

Table 1: Socio-demographic characteristics of the mothers

Variable	Frequency	Percentage
Age	N=1257	
Mean± SD	29.99±4.53	
Age in group		
≤20years	9	0.7
21-30	708	56.3
31-40	528	42.0
41-50	12	1.0
Marital status		
Married	1247	99.2
Single	10	0.8
Ethnicity		
Igbo	1249	99.4
Hausa	6	0.5
others	2	0.1
Religion		
Christianity	1253	99.7
Islam	4	0.3
Occupation		
Civil servants	730	58.1
Crafts and related trades	115	9.1
Unskilled workers	11	0.9
Unemployed	401	31.9

Dependent variable

Booking and delivery haemoglobin level of the mothers.

Statistical analysis

Cards with incomplete information were not analyzed. Data was analyzed with SPSS version 25. Univariate analysis was performed. Chi square test with significant level of ≤0.05 was used to test for association between socio-demographic characteristics and the mothers' haemoglobin levels.

Husbands Occupation		
Civil servants	1105	87.9
Agricultural workers	6	0.5
Crafts and related trades	51	4.1
Unskilled workers	81	6.4
Unemployed	6	0.5
NA	8	0.6
Educational level		
Tertiary	880	70.0
Secondary completed	375	29.8
Primary completed	2	0.2
Husbands educational level		
Tertiary	1003	79.8
Secondary completed	238	18.9
Primary completed	4	0.3
NA	12	1.0
Parity		
1-2	864	68.7
3-4	329	26.2
Above 4	64	5.1

Table 1 shows the socio-demographic characteristics of the mothers. Their mean age was 29.99±4.53 while most of them were aged 21-30years 708(56.3%). Majority were married 1247 (99.2%), Igbos 1249 (99.4%) and Christians 1253 (99.7%). About one third of them were unemployed 401(31.9%). Majority of them 880(70.0%) had tertiary education and of low parity 864(68.7%).

Table 2: Booking and delivery anaemia

Variable	Frequency	Percentage
Anaemia at booking		
Mean±SD	31.80±3.69	
Mild	639	50.8
Moderate	78	6.2
Severe	2	0.2
No anaemia	538	42.8
Booking Anaemia re-categorized		
Anaemic	719	57.2

Not anaemic	538	42.8
Anaemia at delivery		
Mean±SD	30.67±4.11	
Mild	634	50.4
Moderate	183	14.6
Severe	13	1.0
No anaemia	427	34.0
Delivery anaemia re-categorized		
Anaemic	830	66.0
Not anaemic	427	34.0

Table 2 shows the booking and delivery anaemia among the mothers. The mean PCV at booking was 31.80±3.69. About half of them 639(50.8%) had mild anaemia, 78(6.2%) had moderate anaemia while 2(0.2%) had severe anaemia at booking. The mean PCV at delivery was 30.67±4.11. Half of them 634 (50.4%) had mild anaemia, 183(14.6%) had moderate anaemia while 13(1.0%) had severe anaemia at delivery.

Table 3: Factors affecting the booking and delivery anaemia

Variable	Booking Anaemia Status		X ²	P value	Delivery Anaemia Status		X ²	P value
	Anaemic N (%)	Not anaemic N (%)			Anaemic N (%)	Not anaemic N (%)		
Age in years								
≤20	5(55.6)	4(44.4)	3.047	0.384	4(44.4)	5(55.6)	3.650	0.302
21-30	390(55.1)	318(44.9)			479(67.7)	229(32.3)		
31-40	317(60.0)	211(40.0)			340(64.4)	188(35.6)		
≥41	7(58.3)	5(41.7)			7(58.3)	5(41.7)		
Marital status								
Married	715(57.3)	532(42.7)	1.218	0.270	825(66.2)	422(33.8)	1.155	0.283
Single	4(40.0)	6(60.0)			5(50.0)	5(50.0)		
Ethnicity								
Igbo	717(57.4)	532(42.6)	4.091	0.129	823(65.9)	426(34.1)	1.840	0.398
Hausa	1(16.7)	5(83.3)			5(83.3)	1(16.7)		
Others	1(50.0)	1(50.0)			2(100.0)	0(0.0)		
Religion								
Christianity	718(57.3)	535(42.7)	1.699	0.192	827(66.0)	426(34.0)	0.144	0.704
Islam	1(25.0)	3(75.0)			3(75.0)	1(25.0)		
Educational								

level								
Tertiary	492(55.9)	388(44.1)	2.082	0.353	589(66.9)	291(33.1)	2.230	0.328
Secondary completed	226(60.3)	149(39.7)			239(63.7)	136(36.3)		
Primary completed	1(50.0)	1(50.0)			2(100.0)	0(0.0)		
Husbands educational level								
Tertiary	572(57.0)	431(43.0)	2.216	0.529	673(67.1)	330(32.9)	2.855	0.415
Secondary completed	140(58.8)	98(41.2)			148(62.2)	90(37.8)		
Primary completed	1(25.0)	3(75.0)			2(50.0)	2(50.0)		
NA	6(50.0)	6(50.0)			7(58.3)	5(41.7)		
Occupation								
Civil servants	428(58.6)	302(41.4)	2.277	0.517	475(65.1)	255(34.9)	2.681	0.443
Crafts and related trades	60(52.2)	55(47.8)			73(63.5)	42(36.5)		
Unskilled workers	7(63.6)	4(36.4)			6(54.5)	5(45.5)		
Unemployed	224(55.9)	177(44.1)			276(68.8)	125(31.2)		
Husbands occupation								
Civil servants	642(58.1)	463(41.9)	3.491	0.625	728(65.9)	377(34.1)	0.881	0.972
Agricultural workers	3(50.0)	3(50.0)			4(66.7)	2(33.3)		
Crafts and related trades	24(47.1)	27(52.9)			34(66.7)	17(33.3)		
Unskilled workers	43(53.1)	38(46.9)			54(66.7)	27(33.3)		
Unemployed	3(50.0)	3(50.0)			5(83.3)	1(16.7)		
NA	4(50.0)	4(50.0)			5(62.5)	3(37.5)		
Parity								

1-2	479(55.4)	385(44.6)	3.360	0.169	576(66.7)	288(33.3)	1.441	0.487
3-4	200(60.8)	129(39.2)			216(65.7)	113(34.3)		
>4	40(62.5)	24(37.5)			38(59.4)	26(40.6)		

Table 3 shows that no factor significantly affected both the booking and delivery anaemia in the studied women.

Discussions

Our study found out that prevalence of anaemia at booking was 57.2% while anaemia at delivery was 66.0%. This clearly indicates that greater than half of the mothers were anaemic from booking through delivery and this is a clear evidence that anemia in pregnancy still constitutes a significant public health problem in Enugu State, Nigeria. The reported booking anemia was corroborated by another study in Ebonyi State Nigeria.^[17] But higher than the report of similar studies in Enugu, Southeast, Nigeria (40.8%), Surulere Lagos, Southwest, Nigeria (35.3%), Benin city South-south Nigeria. (20.7%), Gombe Northeast Nigeria (51.8%) and in Jami Southeast Ethiopia (41.9%).^[1, 2, 11, 13, 14] The wide variations in the prevalence rates are because of differences in etiological factors, socio-demographic characteristics, lifestyles, and health seeking behaviour across the different countries.^[4, 10, 16] Most of the anemic cases were mild both at booking and at delivery. This was corroborated by other studies.^[1, 2, 11, 14-16, 18] Least proportion of the mothers had severe anemia both at booking and at delivery. Other studies from Benin and Abeokuta reported similar findings^[14, 15] while other studies recorded no severe anemia.^[11, 17]

No socio-demographic characteristics significantly affected both the booking and delivery anemia. However, the age-based prevalence of anemia was highest among those 31-40 years at booking while at delivery it was highest among those 21-30 years. The worsening anemia among this age group may be because most of them are primigravidas and are more prone to

malaria in pregnancy which may have reduced their hemoglobin levels. This is similar to the report of other studies.^[11, 19] Moreover, higher prevalence of anaemia among teenage mothers <20 years was recorded by similar studies from Nigeria and India.^[14, 15, 17, 20] Married women had higher prevalence of anemia than the single mothers both at booking and at delivery. Another Nigerian study reported similar finding.^[17] Mothers with secondary education had the highest prevalence of anemia at booking while those with primary education had the highest prevalence at delivery. These group of women are likely to be of low socio economic status which has been reported to be significantly associated with anaemia in pregnancy.^[17] This can be explained by inadequate nutrition.

Mothers that were unskilled workers had higher prevalence of anemia at booking while the unemployed had the highest prevalence at delivery. This was not surprising as these women will most likely not have the financial capability to take care of themselves during pregnancy. The job of unskilled workers are mainly precarious and job precarity have been reported to lead to adverse pregnancy outcomes due to both psychological and physical effects including inadequate nutrition.^[21] Multiparous mothers with more than 4 children had highest prevalence of anemia at booking while mothers with 1-2 children had highest prevalence at delivery. A similar study in Trinidad and Tobago reported similar finding with anaemia in pregnancy associated with increased parity.^[19] The prevalence in the study was booking anaemia. Higher prevalence of

anemia among primigravida may be explained by their higher chances of developing severe malaria during pregnancy which will worsen an already existing anaemia or lead to anaemia in non- anaemic mothers.

Conclusion and Recommendations

The current study was able to show that the prevalence of anaemia among pregnant women in Enugu State Nigeria both at booking and at delivery was high. No socio-demographic characteristics significantly affected the prevalence of anaemia in pregnancy. In view of the high prevalence of anemia at booking, most of these women may be anemic prior to the pregnancy. Thus, women of reproductive age should be routinely given preconceptual health education with anaemia preventive measures in view. Also screening for helminthic infestations should be incorporated into routine ANC in endemic areas like Nigeria with intermittent deworming of women during pregnancy.

Ethical clearance

Ethical clearance was obtained from the Research and Ethics Committee of ESUT-TH Park Lane Enugu, Nigeria.

References

1. Anorlu RI, Oluwsole AA, Abudu OO, 'Socio-demographic factors in anaemia in pregnancy at booking in Lagos, Nigeria', *J Obstet Gynaecol*, vol 5, no.26, 2006, p. 773-6.
2. Bukar M, Audu BM, Yahaya UR, Melah GS, 'Anaemia in pregnancy at booking in Gombe, North-eastern Nigeria', *J Obstet Gynaecol*, vol 28, no. 8, 2008, p. 775-8.
3. Bruno B, Mclean E, Egli I, Cogswell M, 'World prevalence of anaemia 1993-2005' WHO global database on anaemia. Geneva: World Health Organisation, WHO/WH/155; 2008.
4. Candio F, Hofmeyr GJ, 'Treatment of iron-deficiency anaemia in pregnancy: RHL commentary' The WHO Reproductive Health Library. Geneva: World Health Organisation. Available at https://www.aps.who.int/rhl/pregnancy_childbirth/medical/anemia/cfcom/en/. [Accessed 23/02/2022].
5. Malhorta M, Sharma J, Bata S, Sharma S, Murthy N, Arora R, 'Maternal and perinatal outcome in varying stages of anaemia', *Clin Int J Gynaecol*, vol 79, no. 2, 2002, p. 93-100.
6. World Health Organization: Prevention and management of severe anaemia in pregnancy: report of a technical working group, Geneva, 20-22 May 1991.
7. Goonewardene M, Shehata M, Hamad A, 'Anaemia in pregnancy', *Best Pract Res Clin Obstetri Gynaecol*, vol. 26, no. 1, 2012, p. 3-24. doi:10.1016/j. bpubgyn.2011.10.010
8. WHO, *Methods and Data Sources for Global Burden of Disease Estimates 2000-2011*, Geneva: Department of Health Statistics and Information Systems; 2016.
9. Lee AI, Okam MM, 'Anaemia in pregnancy', *Hematol Oncol Clin North Am* vol. 25, no. 7, 2011, p. 241-59.
10. UNICEF/UN/WHO. *Iron deficiency anaemia: Assessment, prevention and control*. Geneva: World Health Organization; 2001.
11. Dim CC, Onah HE, 'The prevalence of anaemia among pregnant women at booking in Enugu, South Eastern Nigeria' *Med. Gen. Med*, vol 9, no. 3, 2007, p. 11
12. Orish VN, Onyeabor OS, Boampong JN, Acquah S, Sanyaolu AO, Iriemenam NC, 'The effects of

- malaria and HIV co-infection on haemoglobin levels among pregnant women in Sekondi-Takoradi, Ghana', *Int J Gynecol Obstet*, vol. 120, no. 3, 2013, p. 236-9.
13. Desalegn S, 'Prevalence of anaemia in pregnancy in Jima town, south-western Ethiopia', *Ethiop Med J*, vol 31, no. 4, 1993, p. 251-8.
 14. Ogbeide O, Wagbatsoma V, Orhue A, 'Anaemia in pregnancy', *East Afr Med J*, vol 71, no. 10, 1994, p. 671-3
 15. Idowu OA, Mafiana CF, Sotiloye A, 'Anaemia in pregnancy. A survey of pregnant women in Abeokuta Nigeria', *Afr Health Sci*, vol 5, no. 4, 2005, p. 295-299.
 16. Bondevik GT, Eskeland B, Ulvik RJ, Ulstein M, Lie RT, Schneede J, et al, 'Anaemia in pregnancy: Possible causes and risk factors in Nepali women', *Eur J Clin Nutr*, vol 54, no. 1, 2000, p. 3-8.
 17. Onoh RC, Lawani OL, Ezeonu PO, Nkwo PO, Onoh T, Ajah LO, 'Predictors of anaemia in pregnancy among pregnant women accessing antenatal care in a poor resource setting in South Eastern Nigeria', *Sahel Med J*, vol 18, no. 4, 2015, p. 182-187.
 18. Aimakhu CO, Olayemi O, 'Maternal haematocrit and pregnancy outcome in Nigerian women', *West Afr J. Med*, vol 22, no. 1, 2003, p. 18-21.
 19. Uche-Nwachi EO, Odekunle A, Jacinto S, Burnett M, Clapperton M, David Y, et al, 'Anaemia in pregnancy: Associations with parity, abortions and child spacing in primary healthcare clinic attendees in Trinidad and Tobago', *Afr Health Sci*, vol 10, no. 1, 2010, p. 66-70.
 20. Thangleela T, Vijayalakshmi P, 'Prevalence of anaemia in pregnancy', *Indian J Nutr Diet*, vol 31, no. 2, 1994, p. 26-9.
 21. Nwoga HO, Ajuba MO, Igweagu CP, 'Influence of maternal occupation on adverse pregnancy outcomes in a Nigerian tertiary health facility', *Int J Community Med Public Health*, vol. 8, no. 7, 2021, p. 3262-8