

Prevalence of anaemia at booking in a semi-urban community in north-central Nigeria.

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Summary

Aims and objectives: This study was carried out to determine the prevalence of anaemia at booking clinic, describe the antenatal booking pattern, and categorize the degree of anaemia with certain demographic features.

Subjects and methods: This is a descriptive cross-sectional study carried out over a six month period between 1st April and 30th September 2008. A questionnaire was used to obtain demographic information and venous blood samples were collected from 1,086 consecutive patients who consented to participate in the study. The blood samples were tested for haemoglobin levels, genotype and blood group.

Results: Seven hundred and thirty two (67.4%) of the women anaemic at booking. Anaemia was more prevalent among multigravidae than primigravidae ($p < 0.05$). Six hundred and sixty nine (61.6%) had mild anaemia while 40 (4.4%) had moderate anaemia and 15 (1.4%) were severely anaemic, of which 8 (53.3%) were below 18 years of age. Varied degrees of anaemia were more common among women aged 24-28 years and in the 3rd trimester of pregnancy (80.7%) ($p < 0.05$). One hundred and seventy (15.7%) of the enrolled booked for antenatal care in the 1st trimester, while 703 (64.7%) booked in the 2nd trimester and 213 (19.6%) in the 3rd trimester of their pregnancies. Thirteen (1.2%) had sickle cell anaemia.

Conclusion: Prevalence of anaemia at booking remains high in our society. Urgent need for public health education on early antenatal booking and improved literacy level of women is suggested to reduce the burden of anaemia in pregnancy.

Keywords: pregnancy, booking, anaemia, haemoglobin genotype.

Introduction

Anaemia in pregnancy is one of the most serious global public health problems^{1,2}. The prevalence of anaemia in pregnancy varies considerably because of the differences in socio-economic conditions, lifestyles and health-seeking behaviors across different cultures³. World Health Organization (WHO) estimates that more than half of pregnant women in the world have a haemoglobin level indicative of anaemia ($< 11.0 \text{ g/dl}$) and 52% of pregnant

women in developing countries compared with 23% in the developed world have anaemia in pregnancy³.

Women develop anaemia in pregnancy due to increase demand for iron and vitamins resulting from physiological requirements. The inability to meet the required deficiencies coupled with acute or chronic illnesses give rise to anaemia. Other common causes of anaemia are malaria, hookworm, schistosomiasis, HIV infection and haemoglobinopathies^{4,5}.

Categorisation of anaemia ranges from mild, moderate to severe depending on the haemoglobin levels. WHO pegs the values at 10.0-10.9g/dl (mild anaemia), 7-9.9g/dl (moderate anaemia) and <7g/dl (severe anaemia)^{6,7}.

Anaemia in pregnancy can be deleterious to the health of mothers and fetuses. Indeed, it is a known risk factor for many maternal, foetal and infant complications such as poor weight gain in mothers and fetuses, preterm labour, antepartum haemorrhage, pregnancy induced hypertension, pre-labour rupture of membrane, dysfunctional labour, anaesthesia risk, post-natal sepsis, uterine sub-involution, embolism, foetal distress, perinatal asphyxia, failure to thrive, poor intellectual and developmental milestone^{8,9}, etc.

The awareness, identification and management of anaemia in pregnancy are enhanced by the availability of local prevalence statistics in Nigeria¹⁰. Many local studies have used the cut off haemoglobin level of <10g/dl to define anaemia. This is based on the work by Lawson which stated that there is usually no serious harm to the mother and foetus until haemoglobin level is <10g/dl¹¹.

However, for standardisation and presentation of true picture of the magnitude of anaemia in pregnancy in this environment, the WHO criterion is used.

Therefore, this study was aimed at providing prevalence statistics of anaemia in pregnancy at booking clinic in a typical Nigeria health institution that provides primary, secondary and tertiary healthcare.

Subjects and methods

This was a cross-sectional descriptive study conducted at the booking clinic of Federal Medical Centre Bida between 1st April and 30th September 2008, a semi-structured questionnaire was administered by the investigators and the assistants. Information obtained included the biodata, obstetrics and gynaecological history, nutritional history, medical history and drug history.

Pregnant women were enrolled in the study at their first antenatal visit over a period of six months. Two milliliter (2ml) of venous blood was collected from each woman who consented to participate in the study. The samples were analysed at the haematology laboratory to determine the haemoglobin levels, genotypes and blood groups using HemoCue haemoglobinometer, haemoglobin electrophoresis and ABO blood typing system respectively. The data obtained were recorded using tables. Statistical analysis was done using a commercial statistical package (SPSS/PC version 16.0, SPSS Inc., Chicago III, USA). Association between anaemia and pregnancy was tested using chi-square. All significance were reported at $P < 0.05$.

Results

One thousand and eighty six (1086) women had adequate information for analysis. Eight hundred and forty seven (78%) were unemployed, full-time house wives, 750 (69.1%) had no formal education. One hundred and seventy nine (16.5%) had primary, while 4.7%, 8.3% and 1.4% had Arabic, secondary and tertiary education respectively. Seven hundred and thirty two (732) constituting 67.4% of women at the booking clinic demonstrated varied degrees of anaemia with haemoglobin levels less than 11g/dl.

Thirteen (1.2%) had genotype SS, while 242 (22.3%) had genotype AS and 831 (76.5%) genotype AA. Fifteen patients (1.4%) had severe anaemia with haemogram of less than 7g/dl, out of which thirteen 86.7% had sickle cell disease. Moderate and mild anaemia occurred in 4.4% and 61.3% respectively.

The booking pattern is shown in table i. The highest booking rate (64.7%) was recorded in the second trimester. Two hundred and thirteen (19.6%) booked in the third trimester while (170) 15.7% booked in the first trimester.

Table i: Distribution of Gestational Age with Booking Pattern

Gestational age at booking (weeks)	Number of Patients	Percentage
<13	170	15.7
14-26	703	64.7
27-39	191	17.6
>39	22	2.0
Total	1086	100

The comparison of anaemia in each trimester was shown in table ii. In the third trimester, 172 (80.7%) of the women registered were found to have anaemia, while 111 (65.3%) and 449 (63.9%) of women in the first and second trimester respectively demonstrated varied degree of anaemia. There was statistically significant difference between trimester at booking and the degree of anaemia ($p=0.00$)

Table ii: Distribution of Trimester at booking with degrees of anaemia.

Trimester	<7g/dl (severe) Freq (%)	7-8.9g/dl (Moderate) Freq (%)	9-10.9/dl (Mild) Freq (%)	≥11/dl (Normal)	Total
1 st	15 (88)	0(0)	96(56.5)	59 (34.7)	70
2 nd	0(0)	23 (3.3)	426 (60)	254 (36.1)	703
3 rd	0(0)	25(11.7)	147(69.0)	41 (19.2)	213
Total	15(1.4)	48(4.4)	669 (61.6)	354(32.6)	1086

Yates corrected $\chi^2 = 122.739$; $p=0.00$

Table iii showed age distribution in relation to degree of anaemia. Eight (53.3%) out of the fifteen patients with severe anaemia were below 18 years of age. There was statistically significant difference between women's age and degree of anaemia ($p=0.00$)

Table iii. Age Distribution in Relation to Degree of Anaemia

Age (Years)	<7gldl (severe) Freq (%)	7-8.9gldl (moderate) Freq (%)	9-10.9gldl (mild) Freq (%)	=11gldl (normal) Freq (%)	Total (%)
<18	8(53.3)	0(0)	12(1.8)	10(2.8)	30(2.8)
18-22	3(20)	0(0)	115 (17.2)	86 (24.3)	204(18.7)
23-27	2(13.3)	21(43.8)	173(25.9)	86(24.3)	282(26.0)
33- 37	0(0)	7(14.6)	58(8.7)	48(13.6)	113(10.4)
Total	15 (1.4)	48(4.4)	669 (61.6)	354(32.6)	1086(100)

Yates corrected $\chi^2 = 159.301$; $p=0.00$

There was an increasing rate of anemia with increasing parous experience as shown in table iv. Three hundred and twenty two (65.5%) of all primigravida, while 696(66.5%) of all multiparous women (Para 1-4) and 68 (85.3%) of all grandmultiparous women demonstrated varying degree of anaemia in pregnancy. The difference between parity and degree of anaemia was found to be statistically significant ($p=0.00$)

Table iv: Parity in relation to degree of anaemia

Parity	<7g/dl (severe) Freq (%)	7-8.9d/dl (moderate) Freq (%)	9-10.9/dl (mild) Freq (%)	=11g/dl (normal) Freq (%)	Total
Primigravida	7(2.2)	0(0)	204(63.4)	111(34.5)	322
Para 1-4	3 (0.4)	29 (4.2)	431 (61.9)	233 (33.5)	696
Para =5	5(7.4)	19 (27.9)	34(50)	10(14.7)	68
Total	15	48	669	354	1086

Yates corrected $\chi^2 = 119.52$; $p=0.00$

Discussion

The prevalence of anaemia in this study (67.4%) is high. Finding is a reflection of the poor socio-economic development of a semi-urban town like Bida in Nigeria. This is comparable to prevalence rate of 72.5% in Abeokuta an urban town in south-west Nigeria¹. Other developing African countries showed prevalence rates such as 71.7% in rural Tanzania¹², 58% overall prevalence in Mozambique¹³ and 76% in rural Zaire¹⁴.

The prevalence rate in south-east Asia is 56% while it ranges between 40-80% in India^{8,9}. It is however much lower in Greytown, South Africa (39%)² and Namibia (41.5%)¹⁵. The significant difference in the prevalence rate might be due to free maternal and child healthcare provided in public facilities in South Africa couple with better socio-economic indices in that country.

Sickle cell disease was found in 1.2% of the patients booked during the study period. This is lower than 2-3% generally quoted for blacks¹¹. The differences could be explained by the restriction of the study population to pregnant women only as against the general population used in the latter¹¹.

In this study, severe anaemia accounted for 1.4%. Thirteen (86.7%) of patients with severe anaemia were those with sickle cell anaemia. The prevalence of severe

anaemia in neighbouring Africa countries were 3.7% in Zaire¹⁴ and 4% in Tanzania¹⁵. The relatively lower rate in this study might be because our centre is located in a semi-urban area where the care to the pregnant women included the use of folate and routine hematological examination to determine blood level and the prompt medical management of anaemia cases, while the studies in Zaire and Tanzania were in rural settings where the care was mainly in the consumption of herbal preparation made from tree barks, leaves and roots of undisclosed plants that lack iron supplementation necessary to prevent deterioration of anaemic condition during increased physiological burden of pregnancy. However, the prevalence rate of severe anaemia in Greytown, South Africa was lower (0.6%) where maternal healthcare services are free.

The rate of booking was highest in the second trimester (64.7%), followed by 19.6% in the third trimester and 15.7% in the first trimester. Similar highest booking rate in the second trimester were recorded in Abeokuta, Nigeria (63.5%)¹ and 70.6% in South Africa². These findings showed that late registration of pregnancy is still common in the African continent. There is therefore urgent need for intensive health education in public places such as health centers, religious centers, community meeting and market places. The public health education should include men and women of pregnancy will lead to early detection and prompt treatment of anemia before the second trimester. When booking of pregnancy is achieved, pre-pregnancy care, scanning and treatment could be targeted and achieved.

The proportion of women found to be anaemic (80.8%) were highest among women that booked in the third trimester. This could be explained by late booking and late commencement of routine hematinics and lack of antimalaria prophylaxis.

Anaemia was commonest in the age group 24 to 28 years. Within this age group, the proportion of patients with anaemia in pregnancy was 72.9%. This finding is at variance with some other studies that suggested the highest rate of anaemia in teenagers and adolescents. However, this age group appears to be the active reproductive age group, as they constitute 42.1% of all patients who participated in this study. Therefore, since majority of our women at different parity were present in this age group, it is a reflection of the high prevalence rate of anaemia in the community.

It was also discovered that 84.3% of grand multiparous women were anaemic at booking. Two hundred and eleven (65.5%) of all primigravidae and 66.5% of multiparous (para 1-4) women demonstrated varying degrees of anaemia. This showed that there is a correlation between anaemia and parity i.e. the higher the parity, the higher

the rate of anaemia. This may be attributed to the fact that majority of the women enrolled were unemployed and had no formal education. Thus, malnutrition, poor child spacing coupled with late antenatal booking of multigravidae and grandmultiparous women could be responsible for the increasing rate of anaemia with advancing parity. This is contrary to studies that recorded highest rate of anaemia among primigravidae^{1, 11, 15}.

Conclusion

The prevalence of anaemia in Bida, North-Central Nigeria is high. Factors identified in this study include lack of women empowerment, illiteracy, high parity and late booking of pregnancy. Free ante-natal care in all public health facilities as practised in some countries, women empowerment and girl education, public health education of couples and availability of family planning services should be introduced to developing countries.

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