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PREVALENCE OF ANAEMIA IN PREGNANCY AT ANTENATAL CARE BOOKING IN JIGAWA, NORTH-WEST NIGERIA

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ABSTRACT

Introduction: Anaemia in pregnancy is a major reproductive health problem and an important cause of foeto-maternal morbidity and mortality. **Objectives:** This study aims to determine the prevalence of anaemia in pregnancy, its severity and possible correlates. **Materials and methods:** This is a cross-sectional descriptive study carried out among 250 pregnant women attending antenatal clinic. A pretested structured interviewer questionnaire was used to collect relevant biodata, obstetric and medical history. Packed cell volume (PCV) of each pregnant woman was determined. Statistical analysis was performed using IBM SPSS version 21.0. A p-value of < 0.05 was considered significant. **Results:** The mean PCV was 29.8 + 4.2 and the prevalence of anaemia was 69.2%. Majority (58.4%) of the anaemic pregnant women had moderate anaemia, and 1.7% had severe anaemia. Most (31.2%) of the participants were multiparous and 81.2% had either no formal, or only primary level of education. **Conclusion:** The prevalence of anaemia in pregnancy was high. Improved dietary intake of nutritious foods and socio-economic condition may help reduce the prevalence and severity of anaemia in pregnancy.

KEYWORDS: Anaemia, Packed cell volume, Pregnant, Factors.

INTRODUCTION

Anemia is defined as decrease in the oxygen carrying capability of the blood due to either a decrease in total number of red blood cells (each having normal quantity of haemoglobin), diminished concentration of haemoglobin per red blood cells or combination of both. According to World Health Organization (WHO) cut-off level of anemia is haemoglobin (Hb) less than 11g/dl or packed cell volume (PCV) less than 33%.[1] Furthermore, anaemia in pregnancy is defined as Hb concentration less than 11g/dl in the first and third trimesters and less than 10.5g/dl in the second trimester.(1) However in developing countries Hb level less than 10g/dl is accepted because adverse feto-maternal outcome are not usually reported at this level.[2]

The prevalence of anaemia among pregnant women in developing countries is high. This ranges from 53.8% to 90.2% according to WHO estimates.[3] Likewise, there is inequality in the prevalence of anaemia in pregnancy in Nigeria, with the Northern part having the highest burden. For instance the prevalence of anaemia in pregnancy in Gombe, north-eastern Nigeria was estimated to be 51.8%.[4] A significantly lower prevalence were reported in the southern part, Oyo and Enugu at 32.8% and 40.4% respectively.[5,6]

Anaemia in pregnancy may be relative or absolute. On the order hand relative (physiological) anaemia is as a result of haemodilation due to plasma volume expansion of 40-45% in singleton and 50-60% in twin pregnancy, with only 20-25% increase in red cell mass. Absolute anaemia in pregnancy is due to true decrease in red cell mass. This commonly results from nutritional deficiencies such as iron, folate and vitamin B_{12} deficiency. Other causes of anaemia include chronic medical conditions such as Sickle cell disease, chronic kidney disease, chronic liver disease, haematological malignancies, infections and infestations such as malaria, intestinal infestations, urinary tract infection, tuberculosis and HIV.[7] Predisposing factors associated with anaemia in pregnancy include young age, grand multiparty, low socio-economic status, low level of education, short birth intervals, higher gestational age at booking, low personal and household income.

Furthermore, diagnosis and management of anaemia in pregnancy is a cost effective intervention in reducing

maternal and perinatal morbidity and mortality. However, the prevalence statistics required for the effective management of anaemia in pregnancy is not available in many communities in Nigeria. Hence, this study aims to determine the prevalence of anaemia, its severity and possible correlates among pregnant women at booking clinic of General Hospital Jahun, Jigawa. Results obtained from this study will provide relevant information required to strengthen planning on prevention of anaemia, thus reducing the morbidity and mortality associated with it.

MATERIALS AND METHODS
Study design and area
This is a cross-sectional descriptive study carried out in the antenatal clinic of General Hospital Jahun. General Hospital Jahun is one of the secondary health facilities in Jigawa State, north-west Nigeria. The Hospital has a well-established antenatal clinic with an annual antenatal clinic attendance rate of 4800-6000. This high attendance rate may be attributed to the free maternal and child care services provided by the state government.

Study population and recruitment criteria
All pregnant women visiting the study site during the study duration who met the inclusion criteria were selected. Inclusion criteria are: consenting pregnant women aged 15 to 49 years with a singleton pregnancy at the first antenatal visit. Those excluded were pregnant women at follow-up antenatal visit and those with conditions that may affect the PCV and Hb concentration, which include blood transfusion in the index pregnancy, antepartum haemorrhage, SCD, HIV, pre-eclampsia, diabetes in pregnancy or gestational diabetes, multiple pregnancy and malaria (within 2 weeks of enrolment).

Estimation of sample size
The sample size was calculated using the formula proposed by Araoye[8]

$$N = \frac{Z^2 \, Pq}{d^2}$$

Where N is the desired sample size, Z is the confidence interval set at 1.96. P is the proportion of pregnant women with anameia using data from a published study In Kano which is 17%, q is the probability which is 1-p, while d is the degree of accuracy desired (Absolute precision) which is 5.0% (0.05).

$$N = \frac{(1.96)^2 \times 0.17 \times (1 - 0.17)}{(0.05)^2}$$

$$= \frac{3.84 \times 0.17 \times 0.83}{0.0025}$$

$$= 216.$$

Hence about 216 subjects were required for the study, taking in consideration challenges with data collection the sample size was rounded up to 250.

Data collection and laboratory analysis
A pretested structured interviewer questionnaire was used to collect relevant information such as maternal age, parity, menstrual history, estimated gestational age, level of education and occupation of the women and their partners, presence of chronic medical illness, history of vaginal bleeding in the index pregnancy and fever in the last two weeks. The participants' educational levels and their partners' occupation were used to determine their socioeconomic class as proposed by Olusanya et al.[9] Class 1 represents the highest class while 5 represents the lowest socioeconomic class.

About three milliliters (3ml) of venous blood was collected from antecubital vein of each participant into a labelled ethylene diamine tetraacetic acid (EDTA) container using standard aseptic procedures. The PCV was estimated using standard laboratory technique and procedure in the haemotology unit of the hospital. The participants were categorized using WHO PCV values, as no anaemia (33% and above), mild anaemia (30.0-32.9%), moderate moderate (21.0-29.9%) and severe anaemia (less than 21%).[9]

Data analysis
The data obtained from the study questionnaire and laboratory results were initially checked for completeness and accuracy. Data analysis was carried out using IBM statistical package for social sciences (SPSS) version 21.0. Measured variables were expressed in descriptive statistics, mean $\pm$SD for normally distributed quantitative variables. Qualitative variables were expressed in percentage. Test of association was done using Chi-square non-parametric test, setting p-value at < 0.05.

Ethical consideration
Ethical approval for the study was obtained from Jigawa state Health Ethics Committee. In line with the Helsinki Declaration, informed consent was obtained from the study participants before data and blood sample collection.

RESULTS
A total of 250 pregnant women were involved in the study. The mean age of the women was 23.5 ± 5.0 years with a range of 16-40 years. About half (49.2%) of the participants, were between the ages of 21-30 years and (45.2%) were between the ages of 15-20 years.

The mean parity in this study was 2.6$\pm$2.4. Majority of the participants (31.2%) were multiparous; and grand-multiparous participants (20.8%) were least represented. Additionally, more than two-third (67.2%) of the participants presented to the ANC booking clinic in the second trimester, while only (5.6%) booked in the first trimester. A major proportion (81.6%) had no formal or only primary level of education. Also significant proportions (46.8% and 40.8%) belong to the lower socio-economic class (class 4 and 5 respectively). The socio-demographic characteristics of the study participants are detailed in table 1.

The mean packed cell volume (PCV) was 29.8± 4.2, with a range of 17% - 39%. As shown in table 2 the prevalence of anaemia in this study was (69.2%). More so, the most predominant category of anaemia among the participants is moderate anaemia, 58.4% of the participants. Likewise there were 69(30.8%) cases of mild and 3(1.7%) cases of severe anaemia (see Figure 1).

Table 1: Socio-demographic characteristics of the study participants.

Socio-demographic characteristics	Frequency(n)	Percentage(%)
Age (years) Mean age 23.5±5.0		
15-20	113	45.2
21-30	123	49.2
31-40	14	5.6
41-50	0	0.0
Parity Mean parity 2.6±2.4		
Nulliparous	62	24.8
Primiparous	58	23.2
Multiparous	78	31.2
Grand-multiparous	52	20.8
Gestational age at booking		
1st trimester	14	5.6
2nd trimester	168	67.2
3rd trimester	68	27.2
Educational status of the pregnant women		
None/ Primary	204	81.6
Secondary	42	16.8
Tertiary	4	1.6
Partner's occupation		
Professional	8	3.2
Semi-skilled	122	48.8
Unskilled	120	40.8
Socio-economic status		
Class 1	0	0.0
Class 2	10	4.0
Class 3	21	8.4
Class 4	117	46.8
Class 5	102	40.8

Table 2: Prevalence of anaemia in pregnancy.

haracteristics	Frequency(n)	Percentage(%)
Normal	77	30.8
Anaemia	173	69.2
Total	250	100

Table 3 shows correlation between the study variables and anaemia. There was no significant statistical association between the individual variables and anaemia in pregnancy. Participants aged 15-20 (49.7%) had the highest age-based prevalence. The parity of the anaemic participants was evenly distributed. Women who booked in the second trimester (67.6%) had the highest prevalence. Participants with no formal or primary education had the highest educational status-based prevalence.

Table 3: Correlation between socio-demographic characteristics and anaemia.

Variable	Non- anaemic(n)	Anaemic(n)	Test	
Age Mean=23.5+5.0			4.978	0.156
15-20	27(35.1%)	86(49.7%)		
21-30	46(59.7%)	77(44.5%)		
31-40	4(5.2%)	10(5.8%)		
41-50	---	---		
Parity Mean=2.6+2.4			1.218	0.968
Nulliparous	16(20.8%)	46(26.6%)		
Primiparous	16(20.8%)	42(24.3%)		
Multiparous	25(32.5%)	53(30.6%)		
Grandmultiparous	20(26.0%)	32(18.5%)		
Gestational age at booking				
1st trimester	4(5.2%)	10(5.8%)		
2nd trimester	51(66.2%)	117(67.6%)		
3rd trimester	22(28.6%)	46(26.6%)		
Educational status of the pregnant women			1.302	0.927
None/Primary	59(76.6%)	145(83.4%)		
Secondary	15(19.5%)	27(15.6%)		
Tertiary	3(3.9%)	1(0.6%)		
Partner's Occupation			1.927	0.944
Professional	4(6.2%)	4(2.3%)		
Semi-skilled	39(50.6%)	83(47.9%)		
Unskilled	34(44.2%)	86(49.8%)		
Socio-economic status				
Class 1	----	----		
Class 2	6(7.8%)	4(2.3%)		
Class 3	7(9.1%)	14(8'1%)		
Class 4	36(46.8%)	81(46.8%)		
Class 5	28(36.4%)	74(42.8%)		

PCV

No Anaemia= 77 (30.8%)
Mild Anaemia=69 (27%)
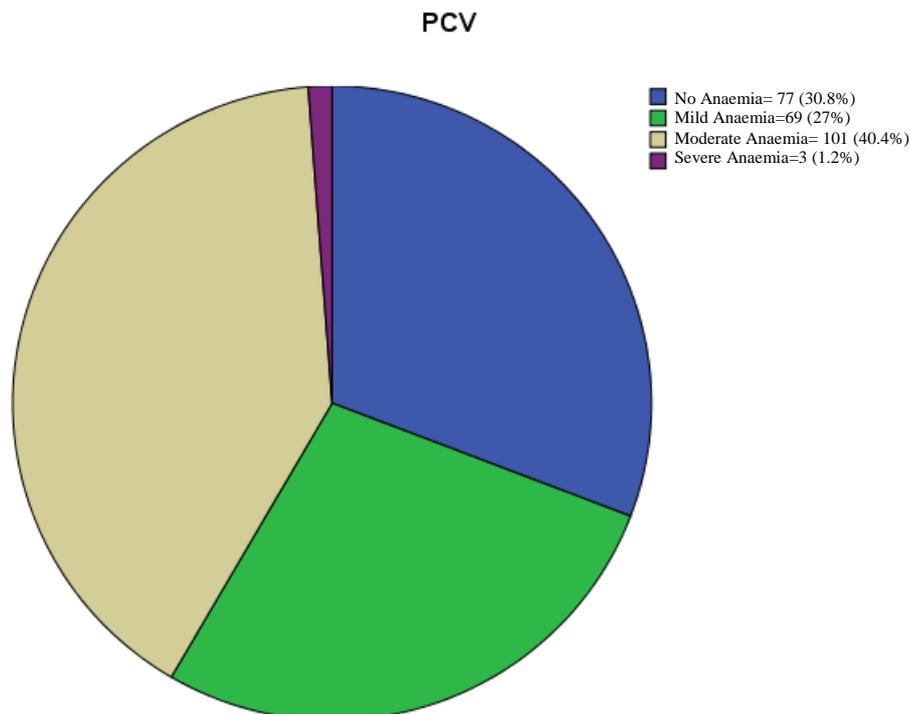Moderate Anaemia= 101 (40.4%)
Severe Anaemia=3 (1.2%)

Figure 1: Distribution of participants according to severity of anaemia.

DISCUSSION

This study was carried out to evaluate then prevalence of anaemia in pregnant antenatal care attendees. The prevalence of anaemia is high in this study (69.2%). This falls within the WHO estimates for developing countries.[3] Also, a previous review by Omigbodun reported prevalence of anaemia in pregnancy that ranged from 35.0% to 75.0%.[11] However, the prevalence observed in this study is higher than the 32.8% reported in Oyo, south-west Nigeria, 51.8% in Gombe, north-east; 54.5% in Uyo, south-south and 58% in Abakaliki, south-east Nigeria.[5,6,12,13] Similarly the prevalence is also higher than reports from Ethiopia and India.[14,15] On the contrary the prevalence in this study is lower than 76.5% recorded in Abeokuta, south-west Nigeria.

Variation in PCV cut-off values for diagnosis of anaemia in pregnanacy is a significant factor in the determination of prevalence. While WHO recommends PCV less than 33%, other studies recommend the use of PCV value less than 30% for the diagnosis of anaemia.[5] Using the cut-off value of less than 30% for the diagnosis the prevalence in this study dropped from 69.2% to 41.6%. Nevertheless, the mean PCV in this study was 29.8±4.2% and indicates anaemia irrespective of diagnostic value of PCV.

Most of the anaemic pregnant women had anaemia of moderate severity (58.4%). There were 3(1.7%) cases of severe anaemia. This is in contrast with findings by Onoh et al, where mild anaemia was dominant and no case of severe was recorded.[13] This is also in contrast with Ugwuja et al where most of the pregnant women had anaemia of mild to moderate severity.[17]

The percentage (67.6%) of women who had anaemia was highest among pregnant women that booked for ANC in the 2nd trimester and lowest in the 1st trimester of pregnancy. This is in agreement with some studies.[7, 12, 18] This may be due to dilution effect of pregnancy and increased fetal demand occurring mainly after 1st trimester.

Majority (83.4%) of the study participants had no formal or only primary education. This is similar to the findings of some studies.[19,20,21] Similarly most of the anaemic pregnant women belonged to low socio-economic class as also noted in some studies.[7,12] Low social class may have significant impact on their nutritional status and health seeking behavior.[2, 7, 9]

CONCLUSION

This study revealed that anaemia in pregnancy is highly prevalent in our community. Although all the variables lacked statistical significance, low socio-economic status and low literacy level were found to be predisposing factors. Awareness on dietary intake of nutritious foods as well as improvement of socio-economic condition of the pregnant women could help in reducing the high prevalence of anaemia in pregnancy.

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