

Anaemia in Pregnant Women of Sokoto Residents in North Western Nigeria

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Abstract

Background: In developing countries, anaemia is a cause of serious concern as it contributes significantly to high maternal mortality. The aim of this study was to assess the prevalence of anaemia among pregnant women in Sokoto, Northern Nigeria due to scanty information in this region.

Materials and Methods: The study was conducted on 273 pregnant women at Usmanu Danfodio University Teaching Hospital (UDUTH), Sokoto between June and November, 2015. Socio-demographic characteristics of the pregnant women were collected using structured questionnaire while the red cell parameters of each subject were determined using haematology analyser.

Results: Overall prevalence of anaemia was 39.2% while the prevalence of anaemia with respect to pregnant women less than 19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years and ≤ 40 years were 50.0%, 46.8%, 38.9%, 37.5%, 23.3%, and 100.0%, respectively. Out of all the anaemic pregnant women, 86.0% had mild anaemia, 14.0% had moderate anaemia and none had severe anaemia. The means and standard deviations of haemoglobin and haematocrit for the pregnant women were 11.1 ± 1.27 g/dL and $33.5 \pm 3.2\%$, respectively.

Conclusion: The study has revealed an overall prevalence of anaemia in pregnant women of 39.2% with the highest prevalence amongst those above 40 years. The high prevalence of pregnant women with mild anaemia may be associated with proper antenatal care at UDUTH and good dietary habit. Early booking and improvement on health and nutritional education are recommended.

Keywords: Anaemia; Pregnant women; Sokoto residents; Nigeria

Introduction

Anaemia is one of the most commonly encountered medical disorders during pregnancy. In developing countries, it is a cause of serious concern as it contributes significantly to high maternal mortality. According to United Nations declaration 1997, anaemia has been considered to be a major public health problem that needs total elimination and has been estimated that globally, two billion people suffer from anaemia or iron deficiency [1,2].

Relative anaemia is normal physiological phenomenon that occurs in pregnancy due to larger increase in plasma volume (approximately 45.0% in singleton and 50.0-60.0% in twin gestation) than in red cell mass, resulting in the well-known physiological anaemia of pregnancy while absolute anaemia involves a true decrease in red cell mass, involving increased red cell destruction as in haemoglobinopathy, malaria, bacterial infection as in urinary tract infection, bleeding or decreased red cell production as in nutritional deficiency or chronic disease [3,4].

According to WHO, haemoglobin level below 11 g/dL in pregnant women constitutes anaemia and haemoglobin value below 7 g/dL is severe anaemia while Center for Disease Control and Prevention (1990), defined anaemia as less than 11 g/dL in the first and third trimesters and less than 10.5 g/dL in second trimester [5,6]. However,

mild, moderate and severe anaemias were classified based on haemoglobin values of 10.0-10.9 g/dL, 7.0-9.9 g/dL and less than 7.0 g/dL, respectively [7].

In India, National Family Health Survey of 1998-1999 showed that 54% of women in rural and 46% of women in urban areas were anaemic [8] but in Nigeria, overall prevalence of anaemia of 54.5-62.6% has been observed in South-southern region of Nigeria [9,10] while prevalence rates of anaemia of 24.5%, 40.4% and 76.5% have been reported in Kano, Enugu and Abeokuta, respectively [11-13]. However, 21.3-32.5% prevalence of anaemia have been documented in Ethiopia and Uganda [14-16].

Varying magnitude of prevalence of anaemia in different parts of Nigeria coupled with scanty information in the Northern Nigeria, necessitated the study on the prevalence of anaemia among pregnant women in Sokoto, North-Western Nigeria. It is our believe that the knowledge of this study will enhance the control or prevention of anaemia in this locality.

Materials and Methods

Study design

The study was conducted on pregnant women attending antenatal clinic of Usmanu Danfodio University Teaching Hospital (UDUTH), Sokoto after the ethical clearance from the ethical committee of

UDUTH and informed consent sought from all the participants. A total of 273 pregnant women using the sample size's formula of Areoye [17], aged 18-42 years, were enrolled in this study between June and November, 2015.

Pregnant women who gave informed consent and resident in Sokoto State of Nigeria were included in this study while the pregnant women with bleeding disorders and/or receiving therapy for anaemia and those ones who refused to give informed consent were excluded from the study.

Sample collection

Two milliliters of blood was collected from each subject through the antecubital vein, into the EDTA bottle for the determination of haemoglobin, haematocrit and red cell indices using Mythic 22 CT-2008 haematology analyzer. The control reagents were run to check for the accuracy and precision of the haematology analyzer.

Data collection

Data on the socio-demographic characteristics of pregnant were collect using structured questionnaire. According to WHO [7], anaemia in pregnancy was defined as haemoglobin <11 g/dL while mild, moderate and severe anaemias were based on haemoglobin measurements of 10.0-10.9 g/dL, 7.0-9.9 g/dL and less than 7 g/dL, respectively. These criteria were used in this study.

Data analysis

Data were analysed using statistical package for social sciences (SPSS package) version 20 (SPSS, Chicago, USA). Values were expressed as mean ± standard deviation and comparative analysis was done using chi-square test and graphically (Microsoft Excel 2010). Level of significance was set at p<0.05.

Results

Table 1 shows the red cell parameters of apparently healthy pregnant women. The means and standard deviations of haemoglobin concentration, haematocrit, RBC count, mean cell volume (MCV), mean cell haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) and red cell distribution with (RDW) were 11.1 ± 1.27 g/dL, 33.5 ± 3.2%, 3.63 ± 0.43 × 10¹² /L, 92.9 ± 8.1 fl, 31.0 ± 3.0 pg, 33.2 ± 0.43 g/dL and 13.7 ± 1.2%, respectively.

Prevalence of anaemia among the pregnant women is revealed in Table 2. Out of 273 of the participants in this study, 107 of them were anaemic (39.2%) using a cut-off level of haemoglobin <11 g/dL.

Effect of age on the prevalence of anaemia among the pregnant women is shown in Table 3. The prevalence of anaemia with respect to age groups less than 19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years, and ≥ 40 years were 50.0%, 46.8%, 38.9%, 37.5%, 23.3%, and 100.0%, respectively. The prevalence rates of anaemia with different age groups showed significance (p>0.05).

Table 4 shows the classification of anaemia amongst anaemic pregnant women. Out of all the anaemic pregnant women, 86.0% had mild anaemia, 14.0% had moderate anaemia and none had severe anaemia (0%).

Influence of age on haemoglobin values of pregnant women is shown in Figure 1. There was statistically significant difference in haemoglobin level with age (p<0.05).

| Parameter | Mean ± SD (n=273) |
|----------------------------------|-------------------|
| Haemoglobin (g/dL) | 11.1 ± 1.27 |
| Haematocrit (%) | 33.5 ± 3.2 |
| RBC count (×10 ¹² /L) | 3.63 ± 0.43 |
| MCV (fl) | 92.9 ± 8.1 |
| MCH (pg) | 31.0 ± 3.0 |
| MCHC (g/dL) | 33.2 ± 0.43 |
| RDW (%) | 13.7 ± 1.2 |

Table 1: Red cell parameters of healthy pregnant women in Sokoto.

| | Anaemic number | Non-Anaemic number | Total number |
|--------------------|----------------|--------------------|--------------|
| Frequency (number) | 107 | 166 | 273 |
| Percentage (%) | 39.2 | 60.8 | 100.0 |

Table 2: Prevalence of anaemia among pregnant women.

| Age (years) | Anaemic number (%) | Non-anaemic number (%) | Total number (%) | X ² | p-value |
|-------------|--------------------|------------------------|------------------|----------------|---------|
| <19 | 4 (50.0) | 4(50.0) | 8(2.9) | | |
| 20-24 | 29(46.8) | 33(53.2) | 62(22.7) | | |
| 25-29 | 42(38.9) | 66(61.1) | 108(39.6) | | |
| 30-34 | 24(37.5) | 40(62.5) | 64(23.4) | 6.7227 | 0.2421 |
| 35-39 | 7(23.3) | 23(76.7) | 30(11.0) | | |
| >40 | 1(100.0) | 0(0) | 1(0.4) | | |

Table 3: Effect of age on the prevalence of anemia among pregnant women.

| Anaemia classification (%) | Frequency (number) | Percentage |
|----------------------------|--------------------|------------|
| Mild anaemi | 92 | 86.0 |
| Moderate anaemia | 15 | 14.0 |
| Severe anaemia | 0 | 0 |

Table 4: Classification of anaemia among the anaemic pregnant women.

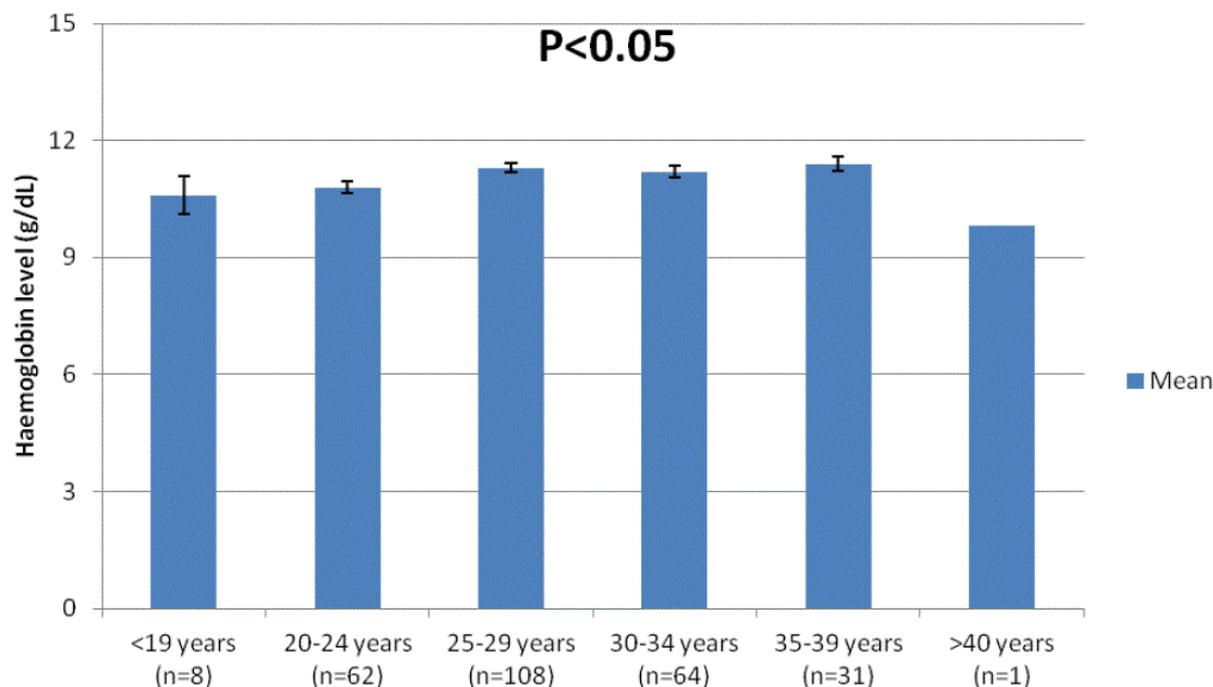


Figure 1: Influence of age on haemoglobin values in pregnant women.

Discussion

Anaemia is one of the most commonly encountered medical disorders during pregnancy and this is of serious concern in developing countries [2].

The revealed mean values of haemoglobin concentration and haematocrit during pregnancy of 11.1 ± 1.27 g/dL and $33.5 \pm 3.2\%$, respectively in this study are in line with the previous reports [9,10,13]. However, these normal values observed in this study may be associated with increased number of non-anaemic pregnant women (60.8%) who must have had improved dietary intakes and proper antenatal care at UDUTH. Mean cell volume, MCH and MCHC levels of 92.9 ± 8.1 fl, 31.0 ± 3.0 pg and 33.2 ± 0.43 g/dL, respectively were observed in this research and they are in agreement with the documented normal ranges [18,19].

The overall prevalence of anaemia (Hb <11.0 g/dL) among the pregnant women in this study was 39.2% and this agrees with the previous findings [16,20,21] but it is contrary with the higher prevalence of 54.5-76.5% documented by other researchers [9-11]. However, the low prevalence of anaemia in this study may be associated with environmental factors and regular health education provided by the antenatal clinic.

Out of all the anaemic pregnant women, 86.0% (92/107) had mild anaemia, 14.0% (15/107) had moderate anaemia and none had severe anaemia in our study. These findings are consistent with the earlier reports [10,12,14] but the higher prevalence of mild anemia compared to other types of anaemia in this study may be due to adequate knowledge of the factors that could cause anaemia and good dietary habits by the participants.

The differences in the prevalence rates of anaemia in pregnant women with age groups of less than 19 years, 20-24 years, 25-29 years, 30-34 years, 35-39 years, and >40 years, were not statistically significant in this research and these results are similar to the findings of other authors [15,16]. However, prevalence of anaemia decreases with increasing age but pregnant women above 40 years had the highest prevalence in this study. This observation may be attributed to reduced sample size for those above 40 years and the believe that anaemia in pregnancy increases with rising parity which leads to repeated drain on iron stores [22]. The high prevalence of anaemia among the pregnant women less than 19 years in this study, agrees with the observation of previous authors [11,16] but disagrees with the other researcher [9]. However, the high prevalence amongst the teenage mothers may be associated with lack of awareness or poor knowledge of antenatal services and probably failure to book early at the ANC.

Haemoglobin level appeared to increase with increasing age but reduced drastically after the age of 40 years in this study and these findings are in contrary with the previous author [13] who reported decreasing PCV value at advancing maternal age. This observation amongst the aging pregnant women in this study may probably be associated with reduced haemodilution, good antenatal services and improved dietary intakes.

In conclusion, the study has revealed an overall prevalence of anemia in pregnant women of 39.2% with the highest prevalence amongst those above 40 years. The high prevalence of pregnant women with mild anaemia amongst other types of anaemia in this study may possibly be associated with awareness on the causes of anaemia, proper antenatal care and good dietary habit. However, early booking for antenatal care and improvement on health and nutritional education

among other antenatal services are strongly recommended as these will significantly reduce the relatively high prevalence of anaemia in this locality.

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