

Prevalence of anaemia in the antenatal booking population at Ahmadu Bello University teaching hospital, Kaduna, Nigeria

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Abstract

Background: Anaemia has been associated with poor materno-foetal performance among pregnant women in Nigeria. The objective, therefore, of this study is to determine the prevalence of anaemia at the time of antenatal booking and the associated factors in the hospital.

Methods: Four hundred and seventy-seven women were studied prospectively over 3 months in the antenatal booking clinic, and their characteristics compared with their haemoglobin (Hb) levels.

Results: Age range was 15–46 years, and mean Hb concentration was 10.76 g/dl. Nearly 53.05% of the study population had Hb < 11.0 g/dl, but only 20.76% had Hb < 10.0 g/dl. Nearly 1.89% had severe anaemia (Hb < 8.0 g/dl) while 20.12% had Hb of 12.0 g/dl or more. The strongest association was last obstetric event occurring < 1 year before current pregnancy (χ^2 6.17, odds ratio 3.97 and $P = 0.01$). Older women (35 years or more) had a higher prevalence (30.95%) than younger women (19.77%). Only two of the 15 teenagers (13.33%) were anaemic. Six women (1.26%) had sickle cell Hb and it seemed the presence of Hb C tempered the anaemia. Parity and social class were not significant associations. With a mean booking gestational age of 22.49 weeks for the group, 77.77% of the anaemic women booked earlier than 28 weeks. Only two (2.03%) booked later than 34 weeks.

Conclusion: Anaemia is still highly prevalent in the society, and the existing mechanisms for its correction should be reassessed for effectiveness and adequate utilisation in the antenatal clinic. Most anaemic women booked early, therefore, allowing enough time for correction before delivery.

Keywords: Anaemia, antenatal booking population, haemoglobin, Kaduna, Nigeria

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INTRODUCTION

Anaemia is a major global health problem affecting an estimated 42% of pregnant women worldwide.¹ The consequences of anaemia are dire for both the mother and the unborn foetus, affecting every system in the mother and leading to maldevelopment and premature delivery in

the foetus and may even extend to the postnatal life of the baby.²⁻⁷ In developing countries, a prevalence of over 30% have been reported.⁷⁻¹²

African women were found not to be symptomatic at Hb levels lower than the World Health Organization standard¹³

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and such slightly lower levels did not affect the foetus too adversely (at least as adjudged by birth weight).¹⁴ This was apparently due to a more prominent “physiological anaemia of pregnancy” in this race.¹⁵ Hb of 10.0 g/dl has therefore come to be accepted as the cut-off limit for anaemia in this environment. Various measures, including health education and women empowerment, have been put in place to remedy the high prevalence of anaemia and other health hazards in women, their children and their unborn babies in this environment. This study was aimed at assessing the effectiveness of these measures as evidenced by the prevalence of anaemia among pregnant women who presented for booking.

MATERIALS AND METHODS

The study was done at the antenatal clinic of the Ahmadu Bello University Teaching Hospital, Kaduna. Data were collected over a 3 months period, from May 1, to July 31, 2000, using a pro forma filled out for each woman by the interviewer.

During this period, a total of 555 patients presented for booking, of which 78 were referred from other hospitals and were excluded from the study.

Haemoglobin (Hb) and genotype testing are routine parts of antenatal booking. Hb check is with the Hb ometer at the antenatal side laboratory, while genotype is determined by electrophoresis.

Anaemia in this study is defined as Hb of <10 g/dl or packed cell volume of <0.3 ml.

Gestational age was determined by Naegele’s Rule and confirmed by clinical examination. If these disagreed, the date by ultrasonography was used.

Social class was determined by the Social Class based on Occupation Classification since this was more easily ascertained. Most of the women just claimed to be homemakers.

Descriptive statistics were used for data analysis, and the relevant statistical tests of significance were applied including Chi-squared tests, odds ratio (OR) and risk ratio (RR).

RESULTS

The mean Hb for the population studied was 10.76 g/dl with a standard deviation of 1.30 and the range was from 6.8 g/dl to 16.3 g/dl.

Table 1 shows the Hb distribution.

The Hb level was <10.0 g/dl in 20.76% and these were classified as anaemic. About 1.89% had severe anaemia (Hb <8.0 g/dl). Nearly 59.12% of the women had values from 10.0 to 11.9 g/dl, while 20.12% had Hb of 12.0 g/dl and above.

Table 2 shows the relationship between anaemia and the sociodemographic characteristics of the women.

Prevalence of anaemia by age groups

The age range of the sample was 15–46 years, but they were broadly divided into two age groups for the purpose of analysis. The younger age group (age 35 years and below) comprised 91.19% (435) of the sample, while the older group were 8.81% (42) [Table 2]. Among the 42 older women, 13 (30.95%) were anaemic, while the mean Hb for the group was 10.35 g/dl but the mean Hb for the younger age group was 11.17 g/dl, with only 86 of them (19.77%) having values <10.0 g/dl. It was noted that only 15 of the younger women were teenagers, of whom only 2 (13.33%) had anaemia. Older age appeared to be significantly associated with anaemia. When a cross tabulation was done,

Table 1: Haemoglobin distribution in the study population (n=477)

HB (g/dl)	Number of patients	Percent	Cumulated percent
<8.0	9	1.89	20.76% (anaemic)
8.0 to 9.9	90	18.87	
10.0 to 10.9	154	32.29	79.24%
11.0 to 11.9	128	26.83	(Non-anaemic)
12.0 and above	96	20.12	
Total	477	100.0	100.0%

Mean=10.76 g/dl, SD=1.30. SD: Standard deviation, HB: Haemoglobin

Table 2: Sociodemographic characteristics of anaemic and non-anaemic patients

	Anaemic	Non-anaemic	Total
Age (years)			
1-19	2 (13.33)	13 (86.67)	15
20-35	84 (20.00)	336 (80.00)	420
>35	13 (30.95)	29 (69.05)	42
Parity			
0	42 (21.21)	156 (7.76)	198
1	18 (18.18)	81 (81.82)	99
2-4	27 (21.77)	97 (78.23)	124
>4	12 (21.43)	44 (78.57)	56
Last obstetric event (years)			
None	30 (19.74)	112 (80.26)	152
<1	6 (50.00)	6 (50.00)	12
1-2	7 (10.14)	62 (89.86)	69
2-3	26 (25.24)	77 (74.76)	103
>3	30 (21.28)	111 (78.72)	141
Social class			
Upper	37 (24.50)	114 (75.50)	151
Middle	42 (19.27)	176 (80.73)	218
Lower	20 (18.52)	88 (81.48)	108
Total	99 (20.76)	378 (79.24)	477

the Chi-square value was 2.91 although *P* value was 0.09. The RR of exposure (older age) to outcome (anaemia) was 1.57, and the 95% confidence limit for RR was 0.96 < RR < 2.56.

Prevalence of anaemia by parity

The range of parity for the subjects was 0–13 with a mean of 1.65. Nulliparous women constituted the largest group, being 198 (41.51%), while grand multipara were 56 (11.74%). No particular association was found between anaemia and parity. The prevalence was almost similar in the different parities. Para 1 had the lowest prevalence (18.18%), while the multipara had the highest (21.77%).

Anaemia and last obstetric event

The last obstetric events in this study included previous delivery, induced or spontaneous abortion and ectopic pregnancy. The prevalence of anaemia was highest (50%) among those who had an obstetric event <1 year before the current pregnancy. No particular trend was noticed in the other groups. Further analysis examined those who had a previous obstetric event (*n* = 325) and compared the association with anaemia of event occurring <1 year and that occurring after 1 year. There was a significant difference in the effect on anaemia of events occurring <1 year and those occurring >1 year before pregnancy. The RR of outcome (anaemia) to exposure (last event <1 year) was 2.48 and the 95% confidence limit for RR was 1.35 < RR < 4.58. The OR was 3.97, Chi-square was 6.17 and *P* value was 0.01.

Prevalence of anaemia in different social classes

The study population was divided into upper (comprising the Registrar General’s Classes I and II), middle (class III) and lower (classes IV and V) social classes. There was no significant difference in both the mean Hb and the prevalence of anaemia between the different social classes, though the upper class appeared to have a slightly higher prevalence of 24.50% as against 18.52% for the lower class.

Anaemia and genotype

The genotype of most of the sample was either AA (366) or AS (100). Only six had sickle cell disease (genotype SS or SC). This number was too small for any reasonable comparison. However, the distribution of the anaemic and nonanaemic groups among the different genotypes is illustrated by Figure 1. It was noted that all four women with SS genotype had severe anaemia, while one of the two women with SC genotype was anaemic. The highest observed Hb concentration of 16.3 g/dl was in a 27-year-old para 1 + 0 woman of genotype AS, in her 26th week of pregnancy.

Gestational age at booking and anaemia

The mean gestational age at booking was 22.49 weeks with 76.10% booking before the 28th week of pregnancy. Only 2.10% of patients booked after the 34th week. Table 3 shows the gestational age at booking for the 99 anaemic pregnant women. Their mean booking gestational age was 23 weeks. This was slightly later than the mean for the entire study population and that for the nonanaemic patients which was 22 weeks. Most (77.77%) booked earlier than the 28th week, but two anaemic women (2.03%) booked later than 34 weeks.

DISCUSSION

The double standard posed by adopting a Hb level of 10.0 g/dl for African women already poses a problem as was anticipated.¹⁶ Despite that the prevalence of anaemia continues to be unacceptably high in the environment with most authors getting above 20% with a Hb cut-off of 10.0 g/dl and over 30% with 11.0 g/dl.¹⁶⁻¹⁸

The main findings in this study include older women had a greater tendency to anaemia; however, this was not in tandem with the study by Dairo and Lawoyin,¹¹ who noted that anaemia tended to decrease with increasing maternal age.

Parity also had no significant influence on anaemia in this series, as in that of Bukar *et al.*¹⁹ but Anorlu *et al.*¹² and Okpani *et al.*²⁰ found anaemia to be more common in the primigravidae, in whom the fatality tends to be higher. Hughes and Morrison²¹ suggested that the traditional problems associated with grand multiparity such as anaemia

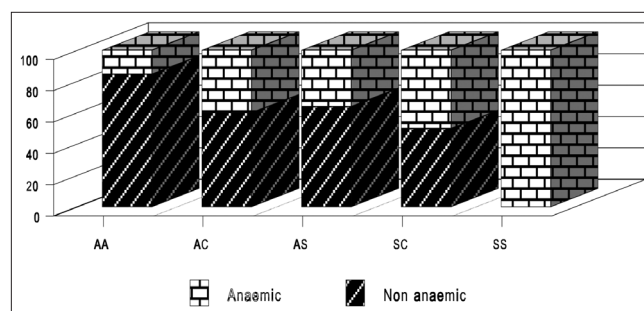


Figure 1: Relative prevalence of anaemia in the different genotypes

Table 3: Gestational age at booking for anaemic patients

Gestational age (weeks)	<i>n</i> (%)	Cumulative percent
13 or less	7 (7.07)	7.07
14-20	27 (27.27)	34.34
21-27	43 (43.43)	77.77
28-34	20 (20.20)	97.97
35 and above	2 (2.03)	100.00
Total	99 (100)	100

were not really determined by parity per SE but by other prevailing factors.

It is not surprising that the last obstetric event proved to be the strongest association with anaemia. Other authors also had similar findings.^{10,22} However, anaemia was found to be more prevalent if the last obstetric event was less than a year; however, a gap of >2 years seems to confer no further advantage. Desalegn reported that the nonuse of contraceptives was a factor in the development of anaemia in their series in Ethiopia.²³

The fairly uniform prevalence of anaemia between the social classes was also an unusual finding, since other reports.^{10,11} found anaemia to be more prevalent in the lower socioeconomic classes. In Nigeria of today, however, it is becoming quite difficult to allocate people to social classes based on occupation alone since the people of the so-called lower classes often have as good or even better income than those of the higher classes. Another explanation is that people of the upper socioeconomic classes shun the Health Education sessions of the ante-natal clinics which constitute the major source of awareness.^{24,25}

Although the women of AS genotype were found to have a prevalence of 36%, AS genotype had been reported in the past as being able to protect from anaemia.^{23,24,26,27}

Probably by protecting the individual from anaemia secondary to malaria parasitemia., This was also borne out in a study by Anorlu *et al.*,¹² who found out that women on haematinics and antimalarial drugs had higher Hb than those on haematinics alone. The presence of the Hb C has also been reported to ameliorate the effect of the HbS by Mashburn *et al.*,²⁶ Pepple²⁷ and Odukogbe *et al.*²⁸ While the present study seemed to suggest a similar finding, the number of sicklers was too small for meaningful analysis.

Gestational age at booking in this study (22.49 weeks) is close to the 23.55 weeks reported by Ekele and Audu.²⁵ and Künzel *et al.*²⁹ This would give adequate time for a less radical approach to correction of anaemia in most of the patients.

CONCLUSION

Anaemia in the booking clinic is an index of anaemia in the general population. Early booking and adequate antenatal care could resolve the problem in most but all the health education and prophylaxis done in the antenatal clinic should be extended to the general population and the effectiveness and the utilisation of the measures put in place for its correction continually reassessed.

The strength of this study lies in its prospective design. However, the main limitation remains the use of Hb level of 10 g/dl for the study which is still the practice in our country. This does not allow comparison with similar studies from developed countries which use a higher level of Hb to define anaemia in pregnancy. In future studies, an attempt will be made to use internationally adopted standards.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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