Full Length Research Paper

The pattern of anaemia in northern Nigerian pregnant women

Muhammad Yalwa Gwarzo*[1] and Emmanual A. Ugwa[2]

[1*]Department Medical Laboratory Science Bayero University, Kano, PMB3011 Kano, Nigeria
[2]Obstetrics and Gynaecology Department, Federal Medical Centre, Birnin Kudu, Jigawa State Nigeria
*Corresponding Author E-mail: mygwarzo@gmail.com

ABSTRACT

The aim of this research is to determine anaemia in pregnancy among women in some rural Northern Nigeria populations, its prevalence, pattern and possible predisposing factors. Two hundred apparently healthy pregnant women of various maternal ages, parities and gestational ages were taken as the study population. Fifty apparently healthy non-pregnant women served as controls. Research structured questionnaires were utilized for vital sociodemographic, obstetrics and nutrition information, clinical anthropometric measurements were done and serum levels of protein, albumin, triglyceride and vitamin A were determined. Data were analyzed using SPSS statistical software and statistical significance was determined using chi square test. This study showed that the prevalence of anaemia in pregnancy is 24.5%. There is a statistically significant difference (p<0.05) in packed cell volume (PCV) between the pregnant (34.94±4.98%) and nonpregnant (38.11±6.47%). It also showed that the PCV increased progressively from the first to the third trimester, while it decreases with advancing maternal age and parity. Intervention to prevent malaria in pregnancy such as mass literacy and public enlightenment, poverty eradication, antimalarial and antihelminths therapy, nutritional supplementation and routine use of haematenics throughout the stages of pregnancy would prove valuable preventive measures.

Keywords: Anaemia, Haemoglobin, Northern Nigerian, Pregnant, Malnutrition.

INTRODUCTION

Anaemia in pregnancy is defined as a haemoglobin concentration < 11.0 g/dl or <10.5 g/dl in the second half of pregnancy (WHO, 1993). Therefore, the mean minimum acceptable haemoglobin level during pregnancy by WHO criteria is taken to be 11g/dL in the first half of pregnancy and 10.5 g/dL in the second half of pregnancy. The World Health Organization further divides anaemia in pregnancy into: mild anaemia (haemoglobin 10-10.9g/dL), moderate anaemia (Hb 7.0-9.9g/dL) and severe anaemia (haemoglobin < 7g/dL). Though there is a conflicting view that argued pregnant woman can be stable at haemoglobin level of 10gm/dL and that for these group of women it is better to define anaemia only when their haemoglobin is <10.00gm/dL(Agboola, 2006). For the purpose of being able to compare outcomes for the various published studies, internationally agreed cut-off points set by WHO is used in this study. In resource-poor areas lacking the requisite manpower, mastery and machines, screening of anaemia is often done solely by clinical examination of the conjunctivae or buccal mucosa, methods that are subject to errors. The haemoglobin colour scale has been used in some rural communities. It was shown to be is simple to use, well accepted, cheap and gives immediate results. It shows considerable potential for use in screening for anaemia in antenatal clinics in settings where resources are limited (van den Broek NR, 1999). Anaemia in pregnancy is thought to be one of the commonest problems affecting pregnant women in developing countries. In 1993, the World Bank ranked anaemia as the 8th leading cause of disease in girls and women in the developing world. Data collected from all over the world indicate that a total of 2170 million people (men, women and children) are anaemic by WHO criteria. The most affected groups, in approximately descending order are pregnant women, the elderly, school children and adult men. In developing countries, prevalence rates in pregnant women are commonly estimated to be in the range of 40%-60%.

Among non pregnant women this is 20%-40% and in school aged children and adult men the estimate is around 20% (WHO,1992). The greatest burden of anaemia is borne by Asia and Africa where it is estimated that 60% and 52% of women, respectively, are anaemic, and between 1% and 5% are severely anaemic (Hb < 7g/dl). Surprisingly, it has been suggested that the unacceptably high prevalence of anaemia in developing countries could be an underestimate because data from rural areas is still lacking, the actual prevalence rates for many individual countries are not known, and there are very few community based surveys (van den Broek, 2000).

Few studies have comprehensively assessed the factors associated with anaemia in pregnancy in developing countries. One showed that adolescent primigravidae had the lowest mean haemoglobin concentration and the highest prevalence of anaemia, followed by adult primigravidae, adult multigravidae and Adolescent multigravidae (Verhoeff et al., 1999). Later some studies reported an increased risk of anaemia for women under 20 years of age, but when corrected for gravidity and trimester at booking the increased risk with young age no longer existed (van den Broek, 2000). In the recent past, it was found that anaemia was more common among adolescents, as a consequence that adolescents are more often primigravidae and not from young age per se (Munasinghe and van den Broek, 2006).

As a result of normal physiological changes in pregnancy, plasma volume expands by 46-55%, whereas red cell volume expands by 18-25%. The resulting haemodilution has been termed 'physiological' anaemia of pregnancy .The haemoglobin concentration, haematocrit and red cell count falls during pregnancy because the expansion of the plasma volume is greater than that of the red cell mass. However, there is a rise in total circulating haemoglobin directly related to the increase in red cell mass (de Swiet, 1989; Daniel and Brain, 2003).

Despite the lack of stringent criteria, problems with definitions and lack of substantial supportive data, in sub Saharan Africa anaemia during pregnancy is most often believed to result from nutritional deficiencies, especially iron deficiency. It is estimated that iron deficiency anaemia affects as many as 200 million people in the world probably making this the commonest nutritional deficiency in the world (WHO, 2000). Among pregnant women at least half of all anaemia cases have been attributed to iron deficiency (Van den Broeket al., 1998). Results of an earlier research showed that the prevalence of iron deficiency may be 2-3 times that of anaemia, ranging from about 50% in some countries to nearly 100% in parts of others (Baker,1979). There is often evidence of iron deficiency before a drop in haemoglobin concentration is noted. Most women show haematological changes suggestive of iron deficiency in

the course of pregnancy especially if they are not receiving iron supplements. The additional demands placed on maternal iron stores by the growing foetus, placenta and the increased maternal red cell mass lead to an increased demand of iron. Requirement during first trimester is low, 0.8mg per day, but this rises considerably during the second and third trimester to a high of 6.3mg/day. The total iron requirement over the whole pregnancy is about 1000mg (WHO, 1993). It has also been proposed that for women in whom bone marrow iron was more than adequate but who had evidence of anaemia and of inflammation(Van den Broek and Letsky,2000), anaemia could have resulted from 'blockage' of the incorporation of iron into heam, which is described in association with inflammation in a number of studies.

Pregnancy involves a number of changes in anatomy, physiology and biochemistry which can challenge maternal reserves (Daniel and Brain, 2003). A basic knowledge of these adaptations is critical for understanding normal anthropometric and laboratory measurements. There is stimulation of the renin-angiotension system by oestrogen which in turn leads to higher circulating levels of aldoslerone. Aldosterone promotes renal absorption of sodium ions and water retention. There is also a disproportionate increase in red cell mass. The consequences of these are that there would be decrease plasma concentration of albumin, most minerals, and most water-soluble vitamins as a result of the dilution effect of the expanded volume. There will also be a physiologic reduction of the packed cell volume leading to physiologic anemia because of the aforementioned reasons.

MATERIALS AND METHODS

Ethical approval for the research was obtained from General Hospital, Dawakin Kudu, Kano, where the research was conducted, in compliance with the Lisbon Declaration on the Rights of the Patient (World Medical Association, 1995). A prospective study of 200 pregnant women at various maternal ages, gestational ages, parities and packed cell volume (PCV) was determined. Fifty apparently healthy non-pregnant subjects were used as control .Research structured questionnaires were administered to the women to retrieve various sociodemographic, obstetrics and nutrition information. The ages, parities an gestational ages of the women were collated. The PCV was determined by centrifugation of whole blood and measurement of haematocrit using haematocytometer. Data obtained were analyzed using SPSS version 14 statistical software. Absolute numbers and simple percentages were used to describe categorical variables. Similarly, quantitative variables were described using measures of central tendency (mean, median) and measures of dispersion (range,

Table 1. Sociodemographic and Obstetrics Information

Variables	Frequency	Percentages	Mean±Standard Deviation
Child Spacing			
<12months	4	2	
12-24months	124	62	26.32±10.19months
>24months	72	36	
Gestational Age			
<13weeks	11	5.5	
13-26weeks	96	48.0	26.60±8.01weeks
>26weeks	93	46.5	
Parity			
0	56	28	
1-4	109	54.5	2.47±2.50
≥5	35	17.5	
Age			
Pregnant			23.67±6.11year
Nonpregnant control			28.22±7.99year

standard deviation) as appropriate. Statistical significance was determined using Chi-square test.

RESULTS

Sixty-two percent of the women had a child spacing of 12-24 months prior to their index pregnancy, 36% had greater than 24 months spacing, while only 2% had a spacing of less than 12 months. The mean length of child spacing was 26.32±10.19 months (95% confidence limit). Most of the women comprising 48% presented for antenatal care at 13-26 weeks pregnancy, 46% presented after 26 weeks, while only 5.5% presented for antenatal care before 13 weeks of pregnancy. The mean gestational age at antenatal care attendance was 26.60±8.01 weeks (Table 1).

Fifty-six percent of the women, although attended antenatal care did not participate in the educative antenatal classes, while 40% attended. Sixty percent of the women did not take antimalarial prophylaxis. Forty percent had the prophylaxis. Most of the women, 82% had any form of haematenics for prevention of anaemia, but 16% had none. Moreover, 62% had antihelminthics to get rid of parasitic worms which can cause chronic anaemia, while 38% did not (Table 3).

There is a progressive increase in the PCV from the first trimester to the third trimester. There is however a progressive decrease with increasing maternal age and gravidity. Gravidity means the number of pregnancy the woman had carried notwithstanding the outcome (Table 4). This differences are statistically significant (p<0.05).

DISCUSSION

The prevalence of anaemia in pregnancy in this study was 24.5%. This is similar to previous report of 5-50% reported for the tropics and much higher than 2% reported in developed economies (Agboola, 2006). It is however lower than over 70% reported elsewhere (Mudalige and Nestel, 1996 and FAO/WHO,1992). The reasons for this comparatively lower prevalence may due to good family planning as shown by average child spacing and averagely low parity among these women.

Compared with the non-pregnant, the pregnant women had lower packed cell volumes. The reasons are due to physiological anaemia resulting from a disproportionate increase in plasma volume over red cell mass, an oestrogenic effect during pregnancy (Daniel and Brian, 2003; Pritchard, 1965). But for these group of women studied it may also be due to low intake of antimalarial prophylaxis and antihelmintic to prevent malaria and hookworm infestation which can cause haemolysis and chronic anaemia respectively. Studies have shown that cell-mediated immunity against infections/infestations are depressed in pregnancy due to raised cortisol levels, hence the susceptibility of pregnant women to these parasitization (Harrison, 1982).

Few studies have comprehensively assessed the factors associated with anaemia in pregnancy in developing countries. One showed that adolescent primigravidae had the lowest mean haemoglobin concentration and the highest prevalence of anaemia, followed by adult primigravidae, adult multigravidae and Adolescent multigravidae (Verhoeff et al., 1999).

Table 2. Comparism of the age and PCV for the pregnant and nonpregnant control

Variables	Pregnant(N=200)	Nonpregnant(N=50)
Age(years)	23.67±6.11	28.22±7.99
Packed Cell Volume(%)	34.94±4.98	38.11±6.47
Proportion Anaemic(%)	24.5	-
Proportion Normal(%)	75.5	-

Table 3. Antenatal classes attendance and intake of chemoprophylaxis

Variables	Frequency	Percentage
Attendance at ANC Classes		
Yes	80	40
No	112	56
No response	8	4
Antimalaria Prophylaxis		
Yes	80	40
No	120	60
Haematenics Intake		
Yes	164	82
No	32	16
No Response	4	2
Antihelminthics Intake		
Yes	124	62
No	76	38

Table 4. The variations of PCV with trimester, Age and gravidity

Variables	Mean PCV(%)	STD
Trimester		
First	30.5	±0.70
Second	34.86	±5.05
Third	35.74	±5.21
Age(yrs)		
≤18	36.38	±5.13
19-34	34.73	±4.54
≥35	32.40	±4.70
Gravidity		
1	35.67	±5.39
2-4	35.16	±4.30
≥5	32.43	±5.20

Later further Some studies reported an increased risk of anaemia for women under 20 years of age, but when corrected for gravidity and trimester at booking the increased risk with young age no longer existed(van den Broek,2000).   And more recently another found that anaemia is more common among adolescents, this appears to be a result of the fact that adolescents are more often primigravidae and not from young age *per se* (Munasinghe and van den Broek, 2006). This study however showed that packed cell volume was significantly higher with advancing gestational age. There is a different pattern of anaemia in these women because

contrary to available literatures on the place of maternal age and gravidity in anaemia in pregnancy, adolescents and primigravidae had higher packed cell volume. The differences were however not statistically significant. Further researches are invaluable to determine the factors responsible for this change in pattern.

This study has shown that anaemia is commoner among the pregnant than non-pregnant women and that in addition to the changes in pregnancy; the relatively younger ages of these women may be a contributory factor.

Despite the lack of stringent criteria, problems with definitions and lack of substantial supportive data, in sub Saharan Africa anaemia during pregnancy is most often believed to result from nutritional deficiencies, especially iron deficiency. Improving the nutritional status of women particular during their child bearing year is an important element of reproductive health. Effort to improve women's nutritional and health needs include increasing food intake at all stages of the life cycle, eliminating micro nutrient deficiencies, preventing and treating parasitic infection, reducing women's work load, and reducing unwanted pregnancies, Iron and folate supplementation, maternal supplements of balanced energy and protein, maternal supplements of multiple micronutrients maternal deworming in pregnancy and Intermittent preventive treatment for malaria and use of insecticide -treated bednets.

Furthermore, certain cultural beliefs are inimical to good nutrition. For instance, such beliefs as if pregnant women eat too much the baby grows too big and results in difficult and painful labour; eating of certain food believed to make their babies brave or cowardly, beautiful or ugly, generous or selfish, lazy or hard working; eating certain food belief to spoil mother's milk, unsuitable for child while others increase flow of milk. All these contribute to vulnerability of the pregnant woman to malnutrition. While some cultural practices are good and should be encouraged, those that have been found to be detrimental to the health of the pregnant women and their babies should be skillfully discouraged through mass mobilization and education. In this regard, community leaders and support groups are indispensable.

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