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PATTERN OF RED CELL MORPHOLOGY AMONG PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN AKURE, SOUTH WEST, NIGERIA

Obstetrics & Gynaecology

Theresa Azonima Irinyenikan* Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, University of Medical Sciences, Ondo State, Nigeria *Corresponding Author.

Bolanle Yemisi Alabi Department of Haematology, Faculty of Basic Clinical Sciences, University of Medical Sciences, Ondo State, Nigeria

Bamidele Jimoh Folarin Department of Obstetrics and Gynaecology, Faculty of Clinical Sciences, University of Medical Sciences, Ondo State, Nigeria

ABSTRACT

Background: Anaemia in pregnancy is a global health problem especially due to poor dietary intake. This study was carried out to ascertain the morphological pattern of anaemia among women and the factors associated with it. **Method:** It was a cross sectional study conducted at the antenatal clinic of the University of Medical Sciences Teaching Hospital Complex in Akure, Ondo State, Nigeria. A total number of 400 pregnant women were recruited by systematic sampling and interviewed with structured questionnaires with their blood samples taken for red cell indices. Data was analysed using SPSS Version 22. Descriptive statistics were done for relevant variables and a Chi square test was used to find an association between the variables and anaemia. Significance was set at $p<0.05$. **Results:** Most of the women had normocytic hypochromic anaemia especially among those with less intake of animal products ($X^2= 69.9$, $p=0.013$) and green vegetables ($X^2= 25.9$, $p=0.039$). **Conclusion:** The reported normocytic hypochromic anaemia in this study showed that efforts must be intensified in counselling our women on the intake of iron rich diets which should be complemented by the routine use of haematinics.

KEYWORDS

Red Cell Morphology, Pregnant women, antenatal clinic

INTRODUCTION

Anaemia in pregnancy remains a public health problem in sub-Sahara Africa accounting for 20% of maternal deaths [1]. It has major consequences on both the mother and the foetus if not promptly corrected [2]. Iron needs increase during pregnancy especially due to increasing expansion in haemoglobin and red cell mass for basal iron needs and the growth of foetal tissues and the placenta [3]. The main causes of anaemia in pregnancy are a decrease in RBCs, insufficient Hb synthesis or increased RBCs destruction and the primary cause being iron deficiency [4].

Red cell sizes can be used for morphologic classification of anaemia and in terms of this anaemia can be categorised as microcytic, normocytic or macrocytic [5]. Red blood cell (RBC) indices usually measured include: Haemoglobin concentration (Hb), Haematocrit/Packed Cell Volume (HCT/PCV), Red blood Cell Count (RBC), Mean Corpuscular Volume (MCV), Mean Corpuscular Haemoglobin (MCH), and the Mean Corpuscular Haemoglobin Concentration (MCHC). According to Abbassi-Ghanavati and colleagues, the reference range for red cell indices are: RBC count 2.81–4.49 x 10^{12}/L, MCV 85.8–99.4 fl, MCH 30–33 pg/cell, and MCHC 32.4–35.2 g/dL [6].

The commonest cause of anaemia in pregnancy is iron deficiency anaemia [4]. Evidence suggests that in developing countries sub-optimal dietary intakes during pregnancy remain the primary cause of iron deficiency anaemia [7,8]. Such intakes have been reported to be characterized by imbalance in macro- and micronutrients as a result of being heavily cereal- and plant-based protein-sources with little vegetables and animal products which are important contributors culminating in micronutrient deficiencies, especially folate and iron [7,8]. Lack of animal products and dark green leafy vegetables in the diet are associated with two to five folds odds for anaemia [9]. In Nigeria, food intakes during pregnancy are driven by food beliefs and cultural practices, unfounded knowledge on the functions of foods and supplements, maternal health status, physiological changes during pregnancy and access to nutritional information.

In line with the target of the World Health Assembly Resolution to reduce anaemia in women of reproductive age, this study was carried out to ascertain the pattern of red blood cell morphology among our pregnant women and the possible dietary intakes responsible for anaemia using their red blood cell indices. The findings of this study will help policy makers and programming that could strengthen interventions which can help reduce the incidence of anaemia among our women.

MATERIALS AND METHODS

It was a cross sectional study carried out in the antenatal clinic of the University of Medical Sciences Teaching Hospital Complex in Akure, Ondo State, South West Nigeria from August to December 2022. During this period 400 pregnant women were recruited using systematic sampling method and interviewed with copies of a structured questionnaire administered by trained research assistants who also helped in the collection of the blood samples after obtaining their consent. From each of the recruited woman, 3mls of venous blood was collected from the antecubital vein using plastic disposable syringes into sample bottles containing ethylene diamine-tetra acetic acid (EDTA) and their packed cell volume and other red blood cell morphology were carried out at the haematology laboratory of the hospital. Ethical approval for the study was obtained from the University of Medical Sciences Teaching Hospital Complex, Ondo ethics committee. Data obtained were analysed using the Statistical Package for Social Sciences (SPSS Version 22). Descriptive statistics were computed for all relevant variables and the association between the red cell morphology and the possible risk factors were computed using the chi square test. The level of significance was set at $P < 0.05$.

RESULTS

Among the 400 women recruited into the study, 160(40%) were anaemic and 240(60%) were not anaemic with mild anaemia being the commonest type of anaemia 127(31.7%). Most of the women had normal red cell count (normocytic), 363(90.7%) and normal mean cell volume (normochromic), 398(99.5%).

Most of them had hypochromic anaemia as evidenced by a mean corpuscular haemoglobin of less than 30pg/cell in 336(84%) and mean corpuscular haemoglobin concentration of less than 32.4g/dl in 368(92%) of them. This is shown in Table 1.

Table 1: Morphological Indices Of The Study Participants

Indices	Frequency, n (%)
Haemoglobin g/dl (Hb)	
Mild Anaemia	127 (31.7%)
Moderate Anaemia	33 (08.3%)
Not Anaemic	240 (60.0%)
Mean	2.5 ± 0.66
Red Cell Count (RBC)	
<2.8	1 (0.3%)
2.81-4.49	363 (90.7%)
>4.5	36 (9.0%)
Mean Cell Volume (MCV)	
<80fl	0(0%)

80-89 fl	2 (0.5%)
90-99 fl	398 (99.5%)
Mean Corpuscular Haemoglobin (MCH)	
<30 pg/cell	336 (84%)
30-35pg/cell	64 (16%)
Mean Corpuscular Haemoglobin Concentration (MCHC)	
<32.4 g/dl	368 (92%)
32.4-35.2 g/dl	31(7.8%)
>35.2 g/dl	1 (0.2%)

Table 2 showed that normal red blood cell count (normocytic) was maintained in both the anaemic 159(99.4%) and the non-anaemic 238(99.2%), this was statistically significant χ^2=6.62, p=0.013. Similarly, normal mean corpuscular volume (normochromic) was noticed in both the anaemic 160(100%) and the non-anaemic 240(100%), this was also statistically significant, χ^2=25.9, p=0.039. However, hypochromic anaemia was noticed in majority of them as evidenced by the levels of the mean corpuscular haemoglobin in 133(83.1%) of the anaemic group and 203(84.6%) of the non-anaemic group. Similar trend was seen in the levels of the mean corpuscular haemoglobin concentration of 147(91.9%) of the anaemic and 221(92%) of the non-anaemic groups, though both did not show any statistical significance as p was >0.05.

Table 2: Morphological Classification Of Anaemia Among The Study Participants

Indices	Anaemic Status		Chi Square	P value
	Anaemic	Non-Anaemic	χ2	
RBC			**69.9**	**0.013***
<2.8	1(0.6%)	0 (0%)		
2.81-4.49	159(99.4%)	238(99.2%)		
>4.5	0(0%)	2(0.8%)		
MCV			**25.9**	**0.039***
80-89fl	0 (0%)	0 (0%)		
90-99fl	160 (100%)	240(100%)		
MCH			**18.9**	**0.166**
<30pg/cell	133(83.1%)	203(84.6%)		
30-35pg/cell	27(16.9%)	37(15.4%)		
MCHC			**28.2**	**0.079**
<32.4g/dl	147(91.9%)	221(92%)		
32.4-35.2g/dl	12(7.5%)	19(7.9%)		
>35.2g/dl	1(0.6%)	0(0%)		

***Significant at P <0.05**

The dietary intake of the women showed that daily intake of animal products was commoner among the non-anaemic 165(57.5%) than the anaemic 122(42.5%) group which showed similar trend among those who had animal products on alternate days, weekly and on 2 weekly. This was statistically significant, χ2=7.06, p=0.022. Also, among those who took green vegetables, daily intake was commoner among the non-anaemic 74(54.4%) than the anaemic 62(45.6%) with similar reduction seen among those who took it on alternate days, weekly basis, 2 weekly and monthly among the anaemic group. This was statistically significant, χ2 =6.44, p=0.049. This is shown in Table 3 below.

Table 3: Dietary Intake Of The Study Participants In Relation To Their Anaemic Status

Nature of Diet	Total N (%)	Anaemic Status		Chi Square χ 2	P value
		Anaemic, n (%)	Not Anaemic, n (%)		
Animal Products				**7.06**	**0.022***
Daily intake	287(71.8)	122(42.5)	165(57.5)		
Alternate days	59(14.8)	15(25.4)	44(74.6)		
Weekly	43(10.7)	17(39.5)	26(60.5)		
2Weekly	5(1.2)	3(60)	2(40)		
Monthly	6(1.5)	3(50)	3(50)		
Green Vegetables				**6.44**	**0.049***
Daily intake	136(34)	62(45.6)	74(54.4)		
Alternate days	116(29)	38(32.8)	78(67.2)		
Weekly	120(30)	51(42.5)	69(57.5)		
2 Weekly	18(4.5)	6(33.3)	12(66.7)		
Monthly	10(2.5)	2(20)	8(80)		

***Significant at p<0.05**

DISCUSSION

This study has shown that anaemia is still very prevalent among our women as evidenced by 160(40%) of them having haemoglobin concentration of less than 11g/dl which is in keeping with a prevalence rate of 35-75% reported in developing countries [10]. Though, mild and moderate anaemia were commoner among the women which may be less life threatening but this could still cause some degree of incapacitation in carrying out their daily activities and this should equally be given utmost attention.

The level of anaemia did not significantly reduce the red cell count and the mean corpuscular volume among the study participants indicating that most of them were normocytic and normochromic, this is in keeping with other studies [11,12]. The commonest form of anaemia seen in the study participants was normocytic hypochromic pattern which is in keeping with other studies conducted in other developing countries [13,14].

Hypochromic pattern of anaemia has been reported to be due to iron deficiency [4] and reduced dietary intake of animal products and green vegetables have been reported to account for this pattern of anaemia which was also noted in this study [15]. Low socio-economic status of women may contribute to a high level of hypochromic anaemia leading to reduced access to a diet high in digestible forms of iron [16]. Iron uptake in pregnancy may be hindered by malabsorption due to parasitic infestation therefore routine antenatal intake of iron supplements will be essential to complement the dietary intake.

CONCLUSION

This study has shown that normocytic hypochromic anaemia is the commonest morphological pattern of anaemia among our women especially as a result of poor dietary intake of animal products and green vegetables. More counselling is required to improve the knowledge of our women on the appropriate diets to take during pregnancy in order to reduce its incidence and the consequences on the mother and the foetus.

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