

Comparative Study on the Hematological Profile in the Third Trimester in Multiple and Singleton pregnancies in Two Regions of Cameroon

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ABSTRACT

Objectives: We aimed in this study to elaborate data on the epidemiological, hemoglobin and clinical profiles, factors associated with anemia and evaluate nutritional habits of pregnant women in the third trimester of pregnancy in multiple and singleton pregnancies in two regions, Cameroon.

Methods: We conducted a cross-sectional study assessment with 317 women in third trimester. Anemia was diagnosed using HEMOCUE[®] HB 301 after withdrawal of a sample of capillary blood and hemoglobin concentration <11 g/dl was classified as anemic in the third trimester of pregnancy according to the WHO criteria. A structured questionnaire was used as a tool to collect sociodemographic characteristics, individual's obstetrical and medical histories and the results of the hemoglobin levels noted.

Results: The prevalence of anemia in pregnancy was higher in the Mutengene Baptist Hospital (34.7%) in the South West region than in Mboppi Baptist Hospital (32.9%) in the Littoral region. Prevalence of anemia was higher in women with multiple gestations 50% than in women with singleton gestations 31.6%. Singleton gestation, good adherence to antianemic prophylaxis and more likely fruit diet were found to be factors protective of pregnant women to developing anemia. Origin from the North West region, average adherence and presence of other medical conditions were risk factors to anemia.

Conclusion: The prevalence of anemia during pregnancy remains high. A better approach of mostly multiple gestants is necessary to manage anemia by consuming a diet rich in vegetables and especially fruits.

Keywords: Anemia; Hemoglobin; Multiple; Singleton Pregnancies

INTRODUCTION

Anemia is one of the most commonly encountered medical disorders during pregnancy. In developing countries, it is a cause of serious concern as, besides many other adverse effects on the mother and the fetus, it contributes significantly to high maternal mortality. According to United Nation's declaration in 1997, anemia is a major public health problem that needs total

elimination. It is estimated that globally two billion people suffer from anemia or iron deficiency [1].

The most common true anemias during pregnancy are iron deficiency anemia (approximately 75%) and folate deficiency megaloblastic anemia, which are more common in women who have inadequate diets and who are not receiving prenatal iron and folate supplements.

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The word anemia implies a decrease in the oxygen-carrying capacity of the blood and is best characterized by a reduction in hemoglobin concentration. This may be either relative or absolute. It is known that there is a larger increase in plasma volume relative to red cell mass in almost all pregnancies, and it accounts for "physiologic anemia." These alterations have been known for centuries, and the term "plethora gravidarum" from medieval ages indicates this condition. However, it is still an open question to what extent this "hydremia" is physiologic or pathologic [2].

MATERIALS AND METHODS

Ethical considerations

This study approved by the regional ethic committee of the North West and Littoral regions of Cameroon. All participants provided written informed consent. The study was conducted following all principles of biomedical research as stated in the Helsinki declaration.

Participants and study design

This was a cross-sectional study conducted from November 2019 to July 2020 including women in the third trimester in multiple and singleton pregnancies in two regions. All consenting pregnant women attending antenatal consultation and having undergone hemoglobin level tests were included in the study. We excluded all pregnant women who had a pathology which could have an impact on the hematological profile before and during pregnancy (such as sickle cell disease, leukemias, pre-eclampsia, eclampsia, patients with HIV) and pregnant women who consumed kaolinite. Anemia was diagnosed according to the WHO criteria in pregnancy.

Data collection

Data were collected using a designed and pre-tested questionnaire that included sociodemographic characteristics, individual's obstetrical and medical histories, and clinical characteristics of the participant and the results of the

hemoglobin levels noted. Evaluation of nutritional habits is also included.

Anemia was diagnosed using HEMOCUE® HB 301 after withdrawal of a sample of capillary blood and hemoglobin concentration <11 g/dl was classified as anemic in the third trimester of pregnancy according to the WHO criteria.

After data collection and clinical evaluation, the capillary blood sample was collected and analyzed.

Statistical analysis

Data were collected and analyzed using IBM SPSS Statistics for Windows, version 27.0. (Ar-monk, NY: IBM Corp). Quantitative data are presented as mean \pm SD when normally distributed and median (Interquartile range) when normality was not verified while categorical variables are presented as percentages. The association between the different variables and the level of physical activity was investigated using the *Chi-square test* and expressed as odds ratio.

RESULTS

Characteristics of the study population

Overall, we included a total of 317 (213 from Mboppi and 94 from Mutengene hospitals). In our study, we had women with multiple gestations (in these case twin pregnancies and women with singleton pregnancies).

The study population was in the age group 25-30 years. Regarding the clinical features of participants, the clinical findings (systemic review and physical examination) in anemia were expressed as follows; the majority of multiple gestants presented with pallor (9.4%), headaches (25%), and lower limbs edema (28.1%) as against the singleton gestants who presented with pallor (2.1%), headaches (15.1%) and lower limbs edema (7.7%) respectively in the hematological, nervous, cardiovascular and respiratory systems (Table 1).

Table 1: Clinical profile of participants.

Variables		Singleton	Multiple	P-value
		N (%)	N (%)	
Hematological system	Pallor	6 (2.1)	3 (9.4)	0.019
	Jaundice	1 (0.4)	1 (3.1)	0.192
	Splenomegaly	0 (0)	1 (3.1)	0.101
Nervous system	Headaches	45 (15.1)	8 (25)	0.2
	Dizziness/blurred vision	33 (11.6)	4 (12.5)	0.777
	Tinnitus	11 (3.9)	1 (3.1)	0.836
	Phosphenes	7 (2.5)	1 (3.1)	0.577

Cardiovascular and respiratory systems	Palpitations	14 (4.9)	5 (15.6)	0.032
	Difficulty breathing	12 (4.2)	1 (3.1)	0.769
	Lower limb edema	22 (7.7)	9 (28.1)	0.001
	Systolic murmur	1 (0.4)	0 (0)	0.737

Amongst the multiple gestants, blood group A rhesus positive (21.9%) was most represented as against in singleton gestants the blood group O rhesus positive (45.3%) (Table 2).

Table 2: Paraclinical characteristics.

Variables		Singleton	Multiple	P-value
		N (%)	N (%)	
Blood groups	A+	79 (27.7)	7 (21.9)	0.652
	B+	55 (19.3)	6 (18.8)	0.344
	AB+	16 (5.6)	0 (0)	0.762
	O+	129 (45.3)	18 (56.3)	0.219
	A-	0 (0)	0 (0)	-
	B-	1 (0.4)	0 (0)	0.81
	AB-	0 (0)	0 (0)	-
	O-	5 (1.8)	1 (3.1)	0.661

Prevalence of anemia

In our study we were seen that, the prevalence of anemia was higher in women with multiple gestations 50% than in women with singleton gestations 31.6%. The prevalence of anemia in

pregnancy was higher in the Mutengene Hospital (34.7%) in the South West region than in Mboppi Hospital (32.9%) in the Littoral region (Table 3).

Table 3: Prevalence of anemia.

Variables	Prevalence of anemia
	N (%)
Pregnancy	-
Singleton	90 (31.6)
Multiple	16 (50.0)
Hospitals	-
Baptist Hospital Mutengene	33 (34.7)
Mboppi Baptist Hospital	73 (32.9)

Nutritional habits in pregnancy

Pregnant women who consumed diets which were mostly accompanied with vegetables and fruits had lesser odds of

developing anaemia in pregnancy compared to those who consumed less. But it was the proportion (31.1%) who consumed more fruits that had statistically significant data.

Factors associated with anemia

In this study, several factors were found to be associated with

anemia, whether they are risk factors or protectors (Table 4).

Table 4: Factors associated with anemia.

Variables		Anemia		Odds Ratio (95% CI)	P-value
		Yes N (%)	No N (%)		
Type of gestation	Singleton	90 (84.9)	195 (92.4)	0.462 (0.221-0.964)	0.04
	Multiple	16 (15.1)	16 (7.6)	2.017 (1.981-4.55)	
Region of origin	North	1 (1.0)	5 (2.4)	0.392 (0.045-3.401)	0.396
	North west	49 (47.1)	73 (35.3)	1.635 (1.013-2.640)	
Adherence to anti anemic prophylaxis	Poor	4 (3.8)	3 (1.4)	2.719 (0.597-12.377)	0.196
	Average	34 (32.1)	22 (10.4)	4.057 (2.224-7.4)	
	Good	68 (64.2)	186 (88.2)	0.241 (0.135-4.28)	
Medical history	HTN	0 (0.0)	2 (0.9)	–	0.553
	Diabetes	0 (0.0)	2 (0.9)	–	
	others	78 (73.6)	130 (61.6)	1.736 (1.04-2.9)	
Green vegetables	Most likely	71 (67.0)	151 (71.6)	0.806 (0.487-1.33)	0.401
	Less likely	35 (33.0)	60 (28.4)	–	
Fruits	More of fruits	33 (31.1)	119 (56.4)	0.349 (0.21-0.57)	0.0001
	Less of fruits	73 (68.9)	92 (43.6)	–	

Risk factors

Pregnant women who originated from the North West represented majority (47.1%) of participants with anemia and had more chances of developing anemia (p-value 0.044 with OR of 1.635 with CI of 1.013-2.64). Also, average anti anemic adherence was statistically significant and non-protective with p-value<0.0001 and OR=4.057. Presence of other medical conditions (as past history) majored the risk of anemia with p-value 0.035 and OR=1.736.

Protectives factors

Single gestation was shown to be a protective factor associated to anemia with a significant p value 0.04 (OR=0.462 and CI (0.221-0.964)). The quality of ANC in our study population, pregnant women with good adherence to antianemic prophylaxis had less odds of having anemia thus was a protective factor to anemia and was statistically significant with p-value<0.0001 and OR=0.241. Proportion of women who consumed more fruits had statistically significant data (p-value<0.0001 and OR=0.349) to association with anemia. After

multivariate analysis, two variables remained significantly associated with anemia which was; fruits diet more likely (p-value<0.0001, OR=0.384) and presence of other medical conditions (p-value=0.015, OR=2.144).

DISCUSSION

Anemia in pregnancy is the source of several complications. The increase in the number of cases of anemia in pregnancy especially in multiple gestations which results in perinatal and maternal deaths in some cases. The multiple sociodemographic aspects and risk factors involved motivated our study to determine the causes and to see how appropriate management during ANCs could be carried especially as concerning iron supplementation in this multiple gestants. The main objective in our study is to elaborate data on the epidemiological, hemoglobin and clinical profiles, factors associated with anemia and evaluate nutritional habits of pregnant women in the third trimester of pregnancy in multiple and singleton pregnancies.

The overall prevalence of anemia in our study was more in multiple gestations (50%) with a mean hemoglobin

concentration of 10.89 g/dl compared to singleton pregnancies (31.6%) with a mean hemoglobin concentration of 11.66 g/dl. Also, the proportion of pregnant women with anemia was more from the Baptist hospital in the Mutengene (34.7%) unlike from the Mboppi (32.9%). This slight difference could be due to the fact that the inhabitants in Mutengene are in a more socio-political unstable area (just like the North West region) and thus have average to poor incomes which leads to limited access to nutritious diets and is associated to poor eating habits that may lead to anemia contrary to the Littoral maybe attributed to the higher socioeconomic status of the clientele. However, this was seen to be similar to other studies which had been carried out [3,4] where prevalence ranged from 30% to about 60%. But other studies showed that the prevalence was higher 57% [5]. Probably due to the sociodemographic differences and sample sizes.

The main risk factors associated with anemia in pregnancy were; origin from the North West region as most of them were displaced or in search of better jobs due to the socio-political instability. Thus, low incomes resulted in diet not sufficiently rich in iron and or folic acid then increasing risk of anemia in these women. To the best of our knowledge, no other study has been done in this light. Average adherence to anti anemic prophylaxis was shown to be a factor associated to anemia as it was associated with higher odds developing anemia unlike good antianemic prophylaxis. This is similar to studies carried out in Cameroon [5] and Nigeria [6] which indicates that the lack of iron supplementation is one of the most significant risk factors for developing anemia. The reason being pregnant women who take their iron tablets help to increase their hemoglobin level and prevent anemia.

Presence of other medical conditions in pregnancy mainly gastritis (as reported in this study) was found to be a risk factor. Similar findings were reported and a correlation between iron deficiency anemia and gastritis (due to *H. pylori*) as this reduced the absorption of iron [7].

Singleton pregnancies were associated with lower risk of developing anemia in pregnancy and a more likely fruit diet was also protective of anemia as seen on the multivariate analysis table. This can be explained by the fact that single gestations have lower demands for iron and thus less likely to develop anemia and since our study was carried out on women in the third trimester, the risk of megaloblastic anemia was high [8].

Concerning the nutritional habits, it was evaluated based on diets comprising mostly of green vegetables and fruits, women consuming kaolinite were excluded from the onset of this study. Our study results showed that, the higher proportion of pregnant women with frequent consumption of diets rich in green vegetables did not have anemia (71.6%) as against 67% who developed anemia. Also, in the group of those who

consumed less of green vegetables more women were prone to developing anemia (33%) as against those who did not (28.4%). In the same light, more of fruits consumption was found to be a protective factor against anemia as the proportion of pregnant women who consumed more fruits and had lower proportion with anemia (31.1%) compared to those who consumed less fruits and were more (68.9%). This is similar to studies conducted by Pritchard et al. [8]. which showed that majority of megaloblastic anemia occurs during the third trimester of pregnancy.

This shows that despite the results shown by several studies that anemia in pregnancy is mostly due to iron deficiency anemia [9]. Anemia due to folic acid and folinic acid deficiency (megaloblastic anemia) is also very much present in our context and needs to be handled as shown by our results.

CONCLUSION

Women with multiple gestations had a higher prevalence of anemia. A better approach to manage it, by consuming a diet rich in vegetables and especially fruits.

REFERENCES

1. UNICEF and Micronutrient Initiative. Vitamin and mineral deficiency: a global progress report. 2004.
2. WORLD HEALTH ORGANIZATION. Nutrition in pregnancy and lactation. WHO Tech. Rep ser. 1965;302.
3. Olubukola A, Odunayo A, Adesina O. Anemia in pregnancy at two levels of health care in Ibadan, south west Nigeria. *Ann Afr Med.* 2011;10(4):272-277.
4. Koura KG, Briand V, Massouabodji A, Chippaux JP, Cot M, Garcia A. Determinants of prevalence and etiology of anemia during pregnancy in southern Benin, in conjunction with revision of national management policy. *Med Trop.* 2011;71(1):63-67.
5. Henri E, Valere MK, Esuh EL, Penda Ida. Hematological Profile and Risk Factors of Anemia in Pregnant Women: A Cross Sectional Descriptive and Analytical Study in Douala Cameroon. *Open Journal of Obst. And Gynecol.* 2019; 9(7).
6. Nwizu EN, Iiyasu Z, Ibrahim SA, Galadanci HS. Sociodemographic and Maternal Factors in Anemia in Pregnancy at Booking in Kano, Northern Nigeria. *Afr J Reprod Health.* 2011;15:33-41.
7. Miami AHA, Eeman MM, Ben HH, Hala HH. The impact of *Helicobacter pylori* infection on iron deficiency anemia in pregnancy. *Iraqi J Hematol.* 2017;6(2):60-64.
8. PRITCHARD JA, MCDONALD Pc, Eds. Megaloblastic anemia. In *Williams Obstetrics, Appleton-Century-Crofts.* New York, 1996.
9. Pryor JA, Morrison JC. Nutritional anemias. In: Bern MM, Frigoletto FD, eds. *Hematologic Disorders in Maternal-Fetal Medicine.* New York: Wiley-Liss. 1990;93:1121.