

# Parturient Anemic: Epidemiology and Outcome of Pregnancy in Three Maternities of Brazzaville (Republic of Congo)

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**Abstract:** Objective: Anemia during childbirth remains a concern for reproductive health personnel, both in terms of frequency and the risks involved in all periods of pregnancy and childbirth. This work aims to analyze the epidemiological profile of anemic parturient and the outcome of their pregnancy. Methods: A multicenter case-control study conducted from February 1st to July 31st, 2017, in three Brazzaville maternity clinics, comparing the ratio of one case for two controls, the anemic parturient (n = 67) to those without anemia (n = 134). Any parturient with a hemoglobin level < 11 g / dl was considered anemic. The variables studied were sociodemographic and reproductive, related to anemia, per and postpartum. Results: Sixty-seven anemic parturient were recorded among 10,106 deliveries, a frequency of 0.7%. Anemic female parturient were older (30.1 ± 1.6 years vs 27.5 ± 1.9 years, p < 0.05), out of school (OR = 13.1 [1.5-111], p < 0.05) and unemployed (OR = 3.8 [2.1-7.2], p < 0.05). The mean hemoglobin level was 8.1 ± 0.1g / dl vs 12.1 ± 0.8g / dl. Anemia was microcytic hypochromic (28.4%) and normochromic normocytic (71.6%). Anemia was mild (40.3%), moderate (44.7%) and severe (15%). Delivery was more by caesarean section in cases (97% vs 1.5%, p < 0.05) with a higher recourse to blood transfusion (55.4% vs 3.8%, OR = 29.9 [10.8-82.6], p < 0.05). Maternal lethality was 13-fold higher in case of anemia (OR = 13 [1.5-111], p < 0.05). Neonatal morbidity was represented by poor adaptation to extrauterine life (OR = 40.7 [9.1-180.7], p < 0.05), hypotrophy (OR = 21.9 [7.2-67.1], p < 0.05), prematurity (OR = 6.6 [2.6-16.9], p < 0.05), neonatal resuscitation (OR = 35.4 [10.2-122.5], p < 0.05) and neonatal transfer (OR = 2.8 [2-4], p < 0.05). Neonatal lethality was three times higher in case of anemia (OR = 3.3 [2.6-4.8], p < 0.05). Conclusion: Maternal and neonatal prognosis is poor in anemic female parturient. Reducing the maternal and fetal impact of anemia during childbirth requires early detection and case management during prenatal contact.

**Keywords:** Anemia, Childbirth, Epidemiology, Prognosis, Brazzaville

## 1. Introduction

Defined as a hemoglobin level of less than 11 g / dl,

anemia is a major public health problem [1]. Pregnant women and children represent high-risk groups with higher prevalence in developing countries, in the range of 50 to 60%

for children aged 1 to 5 years and 35 to 75% for pregnant women [2]. In Congo, the prevalence of anemia in pregnant women is 54% [3]. This association remains a concern for the staff in charge of reproductive health, both in terms of its frequency and the risks involved in all periods of the gravid-puerperium. However, few studies have focused on anemia during childbirth, despite the abundance of these during pregnancy and post partum. Thus, the objective of this study is to analyze the epidemiological profile of anemic parturient and the outcome of their pregnancy.

## 2. Methods

It was a multicenter case-control study conducted from 1 February to 31 July 2017, in three Brazzaville maternity hospitals, namely the University Hospital Center, the Central Hospital of the Armed Forces Pierre MOBENGO and the MAKELEKELE Reference Hospital.

The anemic parturient without other pathology (case) were compared to non-anemic (controls) according to the ratio of one case for two controls (67 vs 134), selected in a simple random manner without discount.

Anemia was defined as hemoglobin < 11g / dl according to WHO [1]. Three levels of severity of anemia in pregnant women were distinguished according to the International

Nutritional Anemia Consultative Group (INACG): mild anemia (10-10.9 g / dl), moderate (7-9.9 g / dl) and severe (less than 7 g / dl) [4]. Mean cell volume (MCV) was normal between 80 and 100 $\mu$ 3. A VGM value below 80 $\mu$ 3 was considered microcytosis. Mean corpuscular hemoglobin concentration (MCHC) was normal when greater than 32%.

The variables studied were sociodemographic and reproductive, related to anemia, per and postpartum.

CS-pro 6.1 and SPSS 21 were used for data analysis.

Pearson Chi2, Fisher's exact test, and T-student test were calculated for percentages and averages. The odds ratio with a 95% confidence interval was calculated to assess the association between two variables. The p-value of the probability was considered significant for a value less than 0.05.

## 3. Results

Sixty-seven anemic parturient were recorded among 10,106 deliveries, a frequency of 0.7%. Anemic female parturient were older ( $30.1 \pm 1.6$  years vs  $27.5 \pm 1.9$  years,  $p < 0.05$ ), out of school (OR = 13.1 [1.5-111]  $p < 0.01$ ) and unemployed (OR = 3.8 [2.1-7.2],  $p < 0.0001$ ). Epidemiological characteristics of parturient are shown in Table 1.

*Table 1. Epidemiological characteristics.*

	Case (N = 67) n (%)	Control (N = 134) n (%)	OR	IC (95%)	P
Age (years) Mean $\pm$ SD	30.1 $\pm$ 1.6	27.5 $\pm$ 1.9			0.01
Marital status					0.9
Single	17 (25.4)	35 (26.1)			
In a relationship with	50 (74.6)	99 (73.9)			
Not attending school	6 (9)	1 (0.7)	13.1	1.5 - 111	0.01
Unemployed	31 (46.3)	103 (76.9)	3.8	2.1 - 7.2	0.0001
Multigestitude	54 (80.6)	92 (68.7)			0.06
Parity (Mean $\pm$ SD)	1.8 $\pm$ 0.5	1.7 $\pm$ 0.6			0.1
Prenatal consultation $\geq$ 4	53 (79)	110 (82)			0.6
Iron supplementation	56 (83.6)	100 (74.6)			0.2
Supplementation with folic acid	57 (85)	126 (94)	0.3	0.1 - 0.9	0.04

The circumstances of discovery of anemia were: fortuitous (44.7%), conjunctival pallor (29.9%), vertigo (15%), asthenia (10.4%). The mean hemoglobin level was  $8.1 \pm 0.1$  g / dl vs  $12.1 \pm 0.8$  g / dl ( $p < 0.0001$ ). The hematological characteristics of parturient have been shown in Table 2.

*Table 2. Hematological characteristics.*

	Cas (N = 67) n (%)	Control (N = 134) n (%)	P
Hb (g / dl) Mean $\pm$ SD	8.1 $\pm$ 0.1	12.1 $\pm$ 0.8	0.0001
Severity of anemia			
Light	27 (40.3)		
Moderate	30 (44.7)		
Severe	10 (15)		
Type of anemia			
Normochrome normocytic	48 (71.6)		
Microcytic hypochrome	19 (28.4)		

Delivery was more by caesarean section in cases (97% vs 1.5%,  $p < 0.0001$ ) with a higher recourse to blood transfusion (55.4% vs 3.8%, OR = 29.9 [10.8-82.6],  $p < 0.0001$ ).

Maternal lethality was 13 times higher in case of anemia

(9.2% vs 0.7%, OR = 13 [1.5-111],  $p < 0.01$ ).

Neonatal morbidity was represented by poor adaptation to extrauterine life (OR = 40.7 [9.1-180.7],  $p < 0.0001$ ), hypotrophy (OR = 21.9 [7.2-67.1],  $p < 0.0001$ ), prematurity

(26.8% vs 5.2%, OR = 6.6 [2.6-16.9],  $p < 0.01$ ), neonatal resuscitation (OR = 35.4 [10.2-122.5],  $p < 0.0001$ ) and transfer to neonatology (OR = 2.8 [2- 4],  $p < 0.0001$ ).

Neonatal lethality was three times higher in case of anemia (34.3% vs 2.2%, OR = 3.3 [2.6-4.8],  $p < 0.05$ ). Table 3 shows the neonatal characteristics.

**Table 3.** Neonatal characteristics.

	Cas (N = 67) n (%)	Control (N = 134) n (%)	OR	IC (95%)	P
Weight (g)					
< 2500	27 (40.3)	4 (2.9)	21.9	7.2 - 67.1	0.0001
2500-3900 (Reference)	35 (52.2)	114 (85.1)			
≥ 4000	5 (7.5)	16 (12.0)			> 0.05
APGAR 1 <sup>st</sup> minute					
0-3	23 (34.3)	2 (1.4)	40.7	9.1 - 180.7	0.0001
4-6	7 (10.4)	1 (0.6)	24.7	2.9 - 207.8	0.001
> 7 (Reference)	37 (55.3)	131 (98)			
Resuscitation	30 (44.7)	3 (2.2)	35.4	10.2 - 122.5	0.0001
Transfer to neonatology	7 (10.4)	1 (0.7)	2.8	2 - 4	0.0001
Death	23 (34.4)	3 (2.2)	3.3	2.6 - 4.8	0.0001

## 4. Discussion

The retrospective nature of the study did not allow us to establish a link between the epidemiological characteristics and the severity of the anemia ; and on the other hand between the latter and the outcome of the pregnancy.

Although statistically older, several authors [5-10] found an age around thirty with a peak between 25 and 34 years, making anemia in pregnancy a pathology of the young adult. However, Alemu [11] in Ethiopia, reports a prevalence of the age group of 40 to 44 years (30%) with a risk three times higher of anemia (OR = 3.43 [1.04-11.28]). From these observations, it appears that age alone can not explain anemia, suggesting the involvement of several other factors associated with anemia during pregnancy and childbirth.

Thus, the influence of certain cultural considerations such as the marriage of adolescent girls, culinary habits were mentioned [5, 6, 8, 9, 12-4].

Similarly, low educational and socioeconomic levels have been associated with anemia in the literature [8-10, 15]. Thus, the origin of a rural area increases the risk of anemia by a factor of three [9, 10], the absence of employment increases this risk by a factor of five according to Ahenkorah in Ghana [10] and by a factor of 2 according to Taner in Turkey [15]. The latter reports an increase in the risk of anemia twice more in non-school-going pregnant women (ORa = 2.23 [1.35-3.45]). These observations remain a reality in low-income countries where a large part of the multi-segment population still lives below the poverty line.

Regardless of poverty, multigestity and multiparity are recognized risk factors for anemia [16], as evidenced by the series of Taner [15], Takele [9] and Ebuy [10]. respectively in Turkey and Ethiopia. Like these studies, other authors note a tendency to multiparity in different proportions [11-4].

With regard to iron supplementation during prenatal contact, it was not different between cases and controls, and involved three quarters of parturient. The therapeutic nonobservance could explain among others the occurrence of the anemia. In contrast, Taner in Turkey [15] reports an

increase in anemia below 5 prenatal consultations (OR = 1.54 [1.05-2.11]). Similarly, in Ethiopia, Ebuy [9] found that the absence of iron supplementation increased the risk of anemia by three times (ORa = 3.29 [1.27-8.48]).

Whatever the circumstance of discovering anemia in the birth room, delivery for the obstetrician is at the top of the list of priorities. The etiological research of anemia is relegated to the background in the postnatal period. The coexistence of anemia and pregnancy increased with the practice of caesarean section, an urgent indication in a context of prematurity and hypotrophy.

As a result, in more than a quarter of the cases, neonates had a poor adaptation to ectopic life; resuscitated and transferred to neonatology.

These results corroborate those of Nair in India [12] who compared parturient with severe anemia to those with mild or non-anemic anemia ; reports a risk of hypotrophy and prematurity respectively multiplied by 6 (OR = 6.16 [1.44-26.71]) and 9 (OR = 8.72 [1.66-45.67]) in case of severe anemia. Similarly Patel in the same country, notes an increased risk of neonatal hypotrophy, stillbirth and neonatal mortality in proportion to the severity of anemia [13].

In this series, the risk of neonatal death was three times higher in maternal anemia.

## 5. Conclusion

The anemic parturient in maternity wards in Brazzaville is a young adult, multiparous, out of school and unemployed, with mild to moderate anemia. Her delivery is more by caesarean section with recourse to blood transfusion. The maternal and neonatal prognosis is poor, the improvement of which requires early detection and case management during prenatal contact. Also, the occurrence of anemia in the parturient despite iron and folic acid supplementation and without any obvious cause of anemia, suggests that there is a problem in the prescription of iron and folic acid, and insufficient adhesion during pregnancy, thus requiring a large-scale cohort study.

## Conflicts of Interest

All the authors do not have any possible conflicts of interest.

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