

Prognosis of Anaemic Pregnant Women at the Gabriel Touré University Hospital in Bamako (Mali)

Sylla Cheickna^{1*}, Sanogo Siaka Amara¹, Fané Seydou¹, Bocoum Amadou¹, Adiawiakoye Adane¹, Séma Kéita², Dembéle Sitapha³, Dao Seydou, Z⁴, Tégueté Ibrahima¹, Traoré Youssouf¹

¹Obstetrics and Gynecology Department of the Gabriel Touré University Hospital in Bamako, Mali

²Obstetrics and Gynecology Department of the Fana Reference Health Centre, Koulikoro, Mali

³Obstetrics and Gynecology Department of the Point G University Hospital, Bamako, Mali

⁴Department of Obstetrics and Gynecology of the Hospital of Kayes, Mali

⁵Obstetrics and Gynecology Department of the Reference Health Center of Commune II, Bamako, Mali

DOI: <https://doi.org/10.36348/sijog.2024.v07i09.007>

Received: 08.07.2024 | Accepted: 10.09.2024 | Published: 14.09.2024

*Corresponding author: Sylla Cheickna

Obstetrics and Gynecology Department of the Gabriel Touré University Hospital in Bamako, Mali

Abstract

The aim was to assess the prognosis of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali). **Materials and Methods:** This was a cross-sectional, descriptive and analytical study. It covered a period of 6 months and involved 432 patients. **Results:** the frequency of anaemia associated with pregnancy was 28.7% or 432 cases of anaemia among 1505 pregnant women. The mean age was 25.99 years with extremes of 15 and 45 years. Among them, the majority were housewives and constituted 77.8% of the workforce compared to only 4.9% of civil servants. The etiological factors often associated were: gestationity (3.52 with extremes of 1 and 11); primiges (29.20%); parity (3.26 with extremes of 1 and 11). The mean birth interval was 24.4 months with extremes of minus 6 months and 158 months. In 78.7% of cases, patients were transfused. The prognosis was characterized by a maternal mortality rate of 4.4% and a neonatal mortality rate of 33.3%. The mean length of hospital stay was 5.21 days. **Conclusion:** Anaemia in pregnant women is a pathology that causes maternal and neonatal mortality. The unavailability of blood products worsens the prognosis.

Keywords: Pregnant woman, hemoglobin, iron supplementation, blood count, mother-child prognosis.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

Anaemia is a global public health problem affecting both developing and developed countries with major consequences for human health as well as social and economic development [1]. It occurs at all stages of the life cycle, but is more common in pregnant women and young children. Anaemia in pregnant women is common and depends in part on the nutritional status of the population. It affects half a billion women of reproductive age worldwide. This is one of the most common problems in obstetrics. It is the ultimate expression of iron deficiency, which is the cause in more than 50% of cases [2, 3]. For example, the WHO recommends iron supplementation during pregnancy in areas affected by this condition, especially in developing countries [4]. In addition, the other causes of anaemia in pregnant women are dominated by infectious causes

(malaria and other parasitic infections), nutritional deficits, anaemia with sickle cell red blood cells, aplastic red blood cells, inflammation and anaemia due to blood loss; Very often, the origin is multifactorial [5, 6].

Iron requirements during pregnancy are significantly increased, especially during the second half of pregnancy. This is related to the increase in the mother's blood mass, the needs of the fetus and the placenta, as well as blood loss during childbirth. The response to these needs depends on the state of the reserves before pregnancy. Also, many studies in endemic areas have highlighted the role of malaria on anaemia during pregnancy in tropical Africa. Sometimes, 70 to 80 percent of pregnant women in malaria-endemic areas are anaemic [7].

According to the WHO in 2011, 29% (496 million) of non-pregnant women and 38% (32.4 million) of pregnant women aged 15 to 49 years were anaemic [8]. It is a disorder of varying severity to which 17 to 31% of pregnant women in developed countries and 52.8 to 61.3% in sub-Saharan Africa are exposed [5]. Literature data report prevalences of 16.8%, 22.1%, 24.4%, 32.8%, 41.6% and 100% respectively in Iran, Uganda, Great Britain, Ethiopia, Turkey and India [9-12]. In Mali, according to the DHS VI, 6 out of ten women aged 15 to 49, or 63%, suffer from anaemia, 4% of whom suffer from severe anaemia [13]. A recent study carried out at the CHU GT found a prevalence of 12.7% over a period of 11 years in the gynaecological-obstetrics department [14]. The risk factors for anemia in pregnancy vary considerably from one setting to another. In the study by Taner *et al.*, [12], the factors found were multiparity, low level of education, low monthly income, late antenatal consultation and short duration of iron supplementation during pregnancy. In the British study by Barroso *et al.*, [11], the risk factors were young age, non-white ethnicity and multiparity.

Anaemia is a significant risk factor for maternal and especially fetal morbidity (in utero growth retardation, prematurity and perinatal mortality) [14]. The CHUGT is a 3rd reference structure that receives all gynecological-obstetric emergencies in the District of Bamako, but also in the interior of the country, thus ensuring the management of obstetric pathologies. It was therefore necessary to determine the prevalence of anaemia in pregnant women, particularly in our 3rd level health structure, and to recommend a therapeutic strategy. It is with this aim in mind that we have conducted this study, through which we will try to:

Objectives

The aim was to evaluate the epidemiological, clinical, therapeutic and prognostic aspects of anaemic

pregnant women at the Gabriel Toure University Hospital in Bamako (Mali).

MATERIALS AND METHODS

It was a cross-sectional, descriptive and analytical study with prospective data collection from January 01, 2020 to June 30, 2020, i.e. a period of 06 months in the gynecological-obstetrics department of the GABRIEL TOURE UNIVERSITY HOSPITAL. The sampling was exhaustive. All patients who had a complete blood count with a haemoglobin level of less than 11.5g/dl were included in this study; 10.5g/dl and 10g/dl respectively in the 1st, 3rd, 2nd trimester and postpartum regardless of the outcome of the pregnancy. Patients with clinical anaemia without biological evidence. The source of the data was: obstetric records, mother's health record, partograph, delivery register, hospitalization records, operative reports. Data were analyzed and entered into SPSS 20 software, and Word 2016. The Chi² and Fischer tests were used to compare the proportions and the significance threshold was set at 0.05%. The variables studied were: age, ethnicity, marital status, iron supplementation, gestational age, clinical signs, Rhesus group, severity of anemia, type of anemia, etiology, transfusion, blood products, pregnancy outcome, Apgar, birth weight, cause of newborn referral, patient survival, length of hospitalization.

RESULTS

Epidemiological Aspects

During our study period, we collected 432 cases of anemia among 1505 pregnant women, i.e. a frequency of 28.7%. The mean age was 25.99 years with extremes of 15 and 45 years. Housewives made up 77.8% of our study compared to 4.9% of civil servants. The Bambara ethnic group was the most dominant with 37.70% of women in labour. These epidemiological aspects are presented in Figure 1 and Table 1.

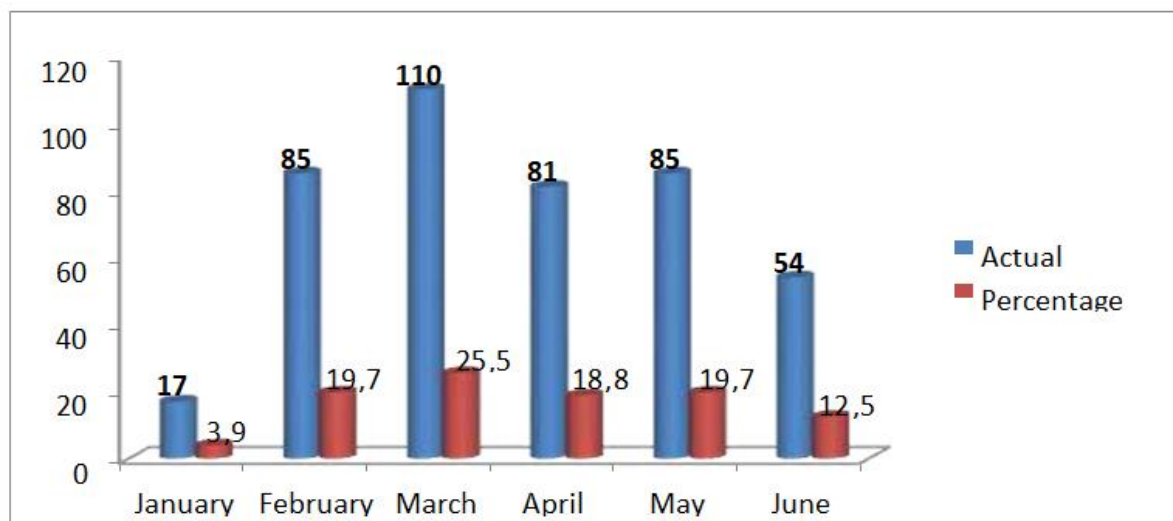


Figure 1: The monthly frequency of cases of anaemia

Table 1: The epidemiological aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020

Variables measured		Workforce (N)	Percentage (%)
Age	Age < 19	94	21,8
	20 to 34 years old	270	62,5
	35 and over	68	15,7
Marital status	Bride	409	94,7
	Bachelor	23	5,3
Level of education	Not in school	276	63,9
	Primary	66	15,3
	Secondary	62	14,4
	Upper	22	5,1
	koranic school	6	1,4
Profession	Official	32	7,4
	Student	31	7,2
	Shopkeeper	21	4,9
	Housewife	336	77,8
	Other*	12	2,8
Husband's Profession	Security guard	6	1,4
	Artist	6	1,4
	Driver	23	5,3
	Trader/Salesperson	91	21,1
	Farmer	59	13,7
	Official	49	11,3
	Mason	20	4,6
	Quranic teacher	13	3
	Mechanic/repairer	10	2,3
	Carpenter	6	1,4
	Gold Digger	10	2,3
	Worker	95	22
	Tailor	12	2,8
	Other	32	7,4
Ethnic group	Senufo	7	1,60
	Bozo	9	2,10
	Bobo	14	3,20
	Sonrhahi	14	3,20
	Mianka	15	3,50
	Dogon	28	6,50
	Malinké	42	9,70
	Soninke	50	11,60
	Fulah	69	16,00
	Bambara	163	37,70
	Other	21	4,90

Clinical and biological aspects

The mean height was 3.52 with extremes of 1 and 11. First-time mothers were the most represented with 29.20%. The mean parity was 3.26 with extremes of 1 and 11. The mean birth interval was 24.4 months with extremes of minus 6 months and 158 months. The history of anaemia represented 19.2%, of which 21.7% benefited from a transfusion. Among the patients, 13.4% had not had an antenatal consultation and the average number

was 2.7 antenatal consultations. The average age of pregnancy was 35 weeks. Elsewhere, the reticulocyte assay was done in 2 patients, ferritin was measured in 4 patients and the myelogram was performed in 5 patients. Other reasons for admission were hepatocellular insufficiency, snakebite, neuropathy, intestinal obstruction, stroke. These clinical aspects are summarized in Tables 2, 3, 4 and 5.

Table 2: The clinical and paraclinical aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020

Variables measured		Workforce (N)	Frequencies (%)
Gesturity	Primitest	126	29,2
	Paucigeste	125	28,9
	Multi-gesture	80	18,5
	Great multi-gesture	101	23,4
Parity	Nulliparous	5	1,2
	Primiparous	135	31,3
	Paucipare	124	28,7
	Multiparous	80	18,5
	Large multiparous	88	20,4
Birth interval	< 12	32	7,4
	12 – 24	104	24,1
	24 and over	170	39,4
Prenatal consultation	0	58	13
	1 to 3	237	53,7
	≥4	137	31,7
Anaemia	Yes	83	19,2
	No	349	80,8
Transfusion	Yes	18	21,7
Age of pregnancy (SA)	<16	1	0,2
	16 to 28	20	4,6
	28 to 36	163	37,7
	≥ 37	248	57,4

Table 3: The clinical and paraclinical aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020 (continued)

Reason for admission	Actual	Percentage
Anaemia	21	4,9
Ascites	3	0,7
Occupied Block	8	1,9
Caesarean section	9	2,1
Vaso-occlusive crisis	4	0,9
Uterine contractions	49	11,3
Induction of labour	3	0,7
Dyspnoea	2	0,5
Eclampsia	71	16,4
Pregnancy terminated	4	0,9
Haemorrhage	7	1,6
HRP	104	24,1
HTA	84	19,4
MAP	5	1,2
Metrorrhagia	11	2,5
Placenta previa Hemorrhagic	4	0,9
RPM	5	1,2
Transfers in utero	18	4,2
Other	20	4,6
Total	432	100,0

Table 4: The clinical and paraclinical aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020 (continued)

Variables		Hemoglobin Level (g/dl)		
		< 7	7 to 9	9 to 11
Age (years)	≤ 19	25 (18,4)	36 (28,6)	33 (19,4)
	20 to 34	85 (62,5)	76 (60,3)	109 (64,1)
	≥35	26 (19,1)	14 (11,1)	28 (16,5)
Marital status	Bride	132 (97,1)	118 (93,7)	159 (93,5)
	Bachelor	4 (2,9)	8 (6,3)	11 (6,5)
Level of education	Uneducated	97 (71,3)	80 (63,5)	99 (63,9)
	Primary	24 (17,6)	17 (13,5)	25 (14,7)
	Secondary	12 (8,8)	21 (16,7)	29 (17,1)
	Upper	2 (1,5)	5 (4,0)	15 (8,8)
	Koranic school	1 (0,7)	3 (2,4)	2 (1,2)
Gesturity	Primary	24 (17,6)	44 (34,9)	58 (34,1)
	Paucigeste	43 (31,6)	36 (28,6)	46 (27,1)
	Multi-gesture	25 (18,4)	20 (15,9)	35 (20,6)
	great Multi-gesture	44 (32,4)	26 (20,6)	31 (18,2)
IIG (months)	<12	6 (5,4)	11 (13,4)	15 (13,4)
	12 to 24	45 (40,2)	24 (29,3)	35 (31,2)
	> 24	61 (54,5)	47 (57,3)	62 (55,4)
ATCD Anemia	Yes	33 (24,3)	20 (15,9)	30 (17,6)
	No	103 (75,7)	106 (84,1)	140 (82,4)
Number of ANC's	0	18 (13,2)	21 (16,7)	19 (11,2)
	1 to 3	88 (64,7)	67 (53,2)	82 (48,2)
	≥ 4	30 (22,1)	38 (30,2)	69 (40,6)
Maternal Supplementation	Yes	109 (80,1)	96 (76,2)	146 (85,9)
	No	27 (19,9)	30 (23,8)	24 (14,1)
Deworming	Yes	1 (0,7)	2 (1,6)	7 (4,1)
	No	135 (99,3)	124 (98,4)	163 (95,9)

Table 5: The clinical and paraclinical aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020 (continued)

Etiology of anemia	Actual	Percentage
B12 deficiency	4	0,9
Folate deficiency	7	1,6
Iron deficiency	124	28,7
Mixed deficiency	31	7,2
Hemoglobinosis	13	3,0
Liver disease	7	1,6
HTA	90	20,8
Urinary tract infection	5	1,2
Malaria	6	1,4
Bleeding	135	31,3
Tumour	2	0,5
HIV	8	1,8
Total	432	100,0

Therapeutic aspects

We observed that only 78.7% of women with a haemoglobin level < 7 g/dl had a blood transfusion. The same frequency was observed in women with haemoglobin levels ranging from 7 to 10 g/dl (Table 19).

NB : Elsewhere 5 patients were transferred to the haematology department, 4 of whom were put on vitamin B12. These therapeutic aspects are summarized in Table 6.

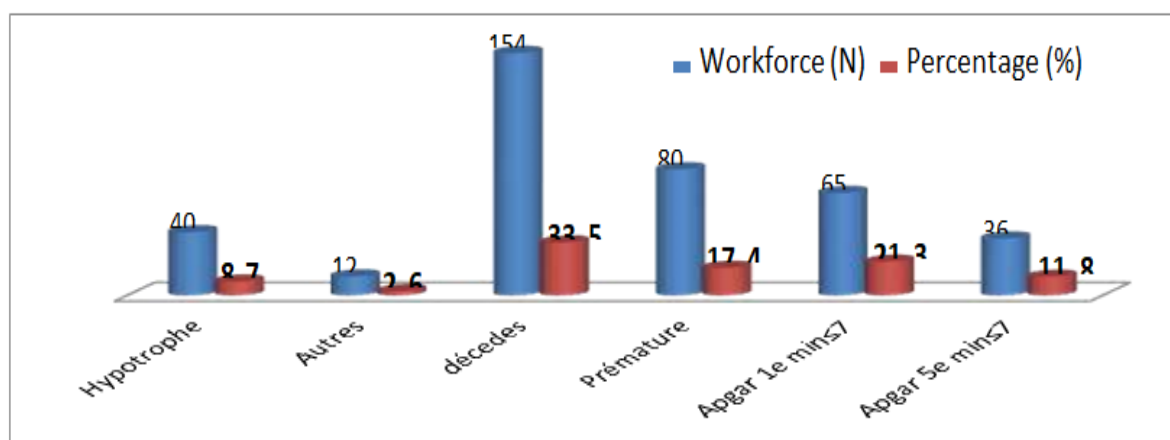
Table 6: The therapeutic aspects of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020 (continued)

Variables		Workforce (N)	Percentage (%)	
Transfusion	Yes	133	30,8	
	No	299	69,2	
Type of blood product	THAT	288	82,1	
	ST	44	12,5	
	PFC	19	5,4	
Iron, Folic Acid	120 mg/day	113	26,2	
	200 mg/day	319	73,8	
Malaria		20	4,6	
Anti hypertension		177	56,5	
ARV		13	4,2	
Folate Vit B12		15	4,8	
Type of anemia	Variables	Hemoglobin Level	(g/dl)	
		< 7	7 to 9	
		9 to 11		
	Normochromic macrocyte	8 (5,9)	7 (5,6)	8 (4,7)
	Hypochromic microcyte	58 (42,6)	47 (37,3)	49 (28,8)
Normocyte normochrome	70 (51,5)	72 (57,1)	113 (66,5)	
Transfusion	Yes	107 (78,7)	17 (13,5)	9 (5,3)
	No	29 (21,3)	109 (86,5)	161 (94,7)

Aspects of the maternal-fetal prognosis

In our study population: 0.3% (03) ruptured uterine, 4.4% of patients died, 2.3% lost to follow-up and/or discharged against medical advice. The mean length of hospital stay was 5.21 days with extremes of 1 and 30 days. Of the 460 newborns, 33.3% were not alive

at the time of delivery, the majority of whom were in an HRP setting. These prognostic aspects are presented in Figure 2 and Table 7.

Fetal prognosis:**Figure 2: Distribution of newborn newborns by mortality and morbidity born to anemic mothers****Table 7: aspects of the prognosis of anaemic pregnant women at the Gabriel Toure University Hospital in Bamako (Mali) from January 1, 2020 to June 30, 2020 (continued)**

Variable		Hemoglobin levels (g/dl)		
		< 7	7 to 9	9 to 11
Route of delivery	Low Lane	53 (39,0)	66 (52,4)	93 (54,7)
	Caesarean section	76 (55,9)	55 (43,7)	76 (44,7)
	Other*	7 (5,1)	2 (1,6)	1 (0,6)
	Laparotomy**	0 (0,0)	3 (2,4)	0 (0,0)
Maternal death	Yes	8 (5,9)	5 (4,0)	6 (3,5)
	No	128 (94,1)	121 (96,0)	164 (96,5)
Complications	Yes	10 (7,4)	8 (6,3)	13 (7,6)
	No	126 (92,6)	118 (93,7)	157 (92,4)

Variable	Hemoglobin levels (g/dl)			
Length of hospital stay (days)	≤4	47 (34,6)	77 (61,1)	109 (64,1)
	5 to 10	68 (50,0)	44 (34,9)	55 (32,9)
	>10	21 (15,4)	5 (4,0)	6 (3,5)
Prognosis	Causes of Maternal Death	Workforce (N)	(%)	
	Liver cancer	1	5,3	
	Heart disease	1	5,3	
	Sickle-cell anemia	1	5,3	
	Pulmonary embolism	1	5,3	
	Eclamptic disease	2	10,5	
	Haemorrhage	6	31,6	
	PAO	2	10,5	
	Malaria	1	5,3	
	Peritonitis	1	5,3	
	AIDS/cerebral toxoplasmosis	1	5,3	
	Tancer breast advanced stage	1	5,3	
	Bladder tumor	1	5,3	
	Total	19	100,0	

DISCUSSION

Epidemiological aspects

The frequency of anaemia in pregnant women in the gynaecology and obstetrics department of the CHU-Gabriel Toure is 28.7%. This frequency is lower than those generally encountered in the literature in sub-Saharan Africa. The values vary between 32.5% and 95%, but are nevertheless higher than that of Konaté I [14] at 12.7%. These variations could be due to the difference in population studied. For example, in the study carried out in Tanzania [15], where the reported prevalence is the highest, most of the participants were in their last trimester; whereas our sample was made up of parturients, from the different periods of the gravido-puerperium (1st, 2nd and 3rd trimesters, childbirth and postpartum). The very high frequency of anaemia in pregnant women in our country hides a low rate of health coverage of 3% of health insurance according to the DHS VI.

The mean age of the patients was 25.99 years with extremes of 15 and 45 years. These results are similar to the data in the literature. In the Afifi O study [25] the mean age was 27.5 years with extremes at 16 years and 39 years. This age group represents the population with the highest reproductive rate in our socio-cultural context, as confirmed by DHS VI, with an overall overall fertility rate estimated at 214‰ in the population of women of childbearing age aged 15 to 49. Regarding marital status, in our study brides represented 94.70% of the population. Our study agrees with those of Dogoni L [23], Sagara S [30] and Guindo S [24] found 95.83%, 90.0% and 96.6%, respectively. The majority of our patients were married to manual workers 22.0%. This fact could be at the origin of the low attendance of health facilities for the monitoring of pregnancy and childbirth, since in our society the care of women and children is taken care of by men. This result is close to that of Guindo S [24], who find 88.6% of women married to peasants. The majority of our patients (63.90%) were

uneducated compared to only 5.10% who had a higher level of education; this result is in agreement with those of Konaté I [14] (60.6%, 67.2%) in the study by NguefackTchente C [31]. These figures are supported by the EDSV, which is (21%) for women aged 15-49. The majority, 77.8% of our patients were housewives. Among our patients, 13.4% had not had an antenatal consultation, the 53.7% who only performed between 1 and 3 ANC's, which is far behind the global level, during the period 2007 – 2014, when 64% of pregnant women made the four prenatal contacts recommended by the WHO [32]. This could be explained on the one hand by the lack of knowledge of the importance of the prenatal consultation, the fear of prescriptions issued during the prenatal consultation, but by the fact that the majority of our patients are 84% referrals/evacuations by the level III structure, sometimes via the reference health centers. Our result is lower compared to that of Guindo S [24], Sagara S [23] and Tounkara M D, which describe respectively 56.80%; 40.83%; 68.3% of women who did not have ANC. In our study, we did not study the relationship between the occurrence of anaemia and the course of pregnancy, but we find that the prevalence of anaemia during the pregnancy state increases with the age of pregnancy. Indeed, 0.2%, 4.6%, 37.7% and 57.4% were respectively noted in less than 16 weeks, 16 weeks -28 weeks, 28 weeks-36 weeks and more than 37 weeks. The increase in the prevalence and severity of anaemia during the course of gestational age is evidenced by several studies all stating the same facts. In the United States, for example, the prevalence of anaemia among pregnant women is estimated at 1.8% in the first trimester, 8.2% in the second trimester, and 27.4% in the third trimester. Afifi O [25] had respectively noted .17.83%, 41.40%, and 40.76% in the first quarter, 2nd quarter, and third quarter.

The increase in the prevalence of anaemia according to the age of pregnancy is due to the increase in the needs of the fetus, especially in the last two

trimesters. This increase is consistent with the increase in physiological needs during pregnancy: on the one hand, the usual haemodilution of pregnancy begins around the 8th week and reaches its maximum between the 34th and 36th week of amenorrhea; on the other hand, the gradual decrease in iron and folic acid capital

following the excessive increase in requirements during pregnancy. There is a very highly significant dependence of hemoglobin levels on gestational age.

Discussions on these epidemiological aspects are summarized in Tables 8 and 9.

Table 8: Frequency of anaemia in pregnant women in the African literature

Authors, year, reference	Country	Study Type	Population Type	Frequency
Sholeye, OO <i>et al.</i> , 2017 [16]	Nigeria	Transverse	Random selection of 400 pregnant women: a multicenter study	32,5%
Gedefaw, L <i>et al.</i> , 2015 [17]	Ethiopia	Transverse	Random selection of 323 at a prenatal follow-up clinic.	39,9%
Msolla, MJ <i>et al.</i> , 1997 [15]	Tanzania	Transverse	20 pregnant women at the end of their pregnancy	95%
Uneke, CJ <i>et al.</i> , 2007 [18]	Nigeria (South –East)	Transverse	823 pregnant women selected from two public hospitals	76,9%
Haggaz, AD <i>et al.</i> , 2010 [19]	Sudan	Transverse	430 pregnant women selected from a hospital in Sudan	70,0%
Ouma, P <i>et al.</i> , 2007 [20]	Kenya	Transverse	685 pregnant women selected from antenatal care clinic in Kenya	69,1%
Mbule MA <i>et al.</i> , 2013 [21]	Uganda	Transverse	Pregnant women	63,1%
Toukara, MD. 2011 [22]	Mali	Transverse	617 pregnant women hospitalized in a hospital in Kayes	32,7%
Konaté I MD 2018 [14]	Mali	Transverse	5465 pregnant women in the GT University Hospital of Bamako	14,1%
Dogoni. L MD 2014 [23]	Mali	Transverse	103 pregnant women hospitalized in the CSRef of Kadiolo	10,26%
Goldberg. S MD 2015 [24]	Mali	Transverse	88 anaemic pregnant women at the CSRéf in Bougouni	33,20%

Table 9: Distribution of the age group reached according to some studies

Authors and Authors	Countries/Cities	Age range Predominant	Percente	Reference
Amani Waleed M A 2007	Nablus (Palestine)	25-35 years old	39,6%	[26]
OKEKE P U 2011	Cape Verde	20-35 years old	66.13%	[27]
Konaté I MD 2018	Bamako (Mali)	20-34 years old	65,7%	[14]
Mrs. Dia N S 2011	Fez (Morocco)	16-25 years old	46.1%	[28]
Dogoni. L MD 2014	CSRef. Kadiolo (Mali)	24-33 years old	49.5%	[23]
Adebo, A. A., Yessoufou, A. G 2018	Benin	19 to 35 years old	90%	[29]
2020	Our study	<25 years	47%	

Clinical and biological aspects

The CBC is an essential assessment for the diagnosis, the etiological orientation and in the effective management of anemia, it has allowed us to have a diagnostic orientation with the classification of anemia. In our series, 31.5% and 29.2% of women had an Hb level of less than 7g/dl of blood (severe anemia) and between 7 and 9 g/dl (moderate), respectively. The literature there is a great difference from one study to another from one geographical point to another, such as Konaté I [14], Sagara S [30], Guindo S [24] found severe anemia 69.9%, 29.20% and 61.4% respectively. According to the 2011 DHS Cameroon, severe anaemia represents 1.1% and moderate 25.5% in women. In the Kolda region (Senegal) the prevalence of anaemia

among pregnant women of childbearing age is 55.2% (or 534 women), 51% with moderate anaemia, 36.8% with mild anaemia and 12.2% with severe anaemia [33]. According to the current 2010-2011 DHS, in Senegal, the prevalence of anaemia among women is 54%, including 61% in pregnant women and 49% in breastfeeding women [32]. Overall, 46% of women in Guinea Conakry suffer from anaemia, 65% of pregnant women and 2% in severe form and 22% in moderate form [33]. In Côte d'Ivoire, the 2011-2012 DHS-MICS recorded 54% of anaemic women, 64% of pregnant women and 55% of breastfeeding women [34] compared to 1% of severe anaemia and 14% of moderate anaemia according to the EDS VI. Thus, the type of normocytic anemia was the most represented with 59.0% of cases.

Hypochromic microcytic anemia was in 35.6% of cases and 5.3% of patients had normochromic macrocytic anemia. In the Sagara S literature [30] 62.0%, 27% and 11% respectively.

Therapeutic Aspects

During our study, 30.8% of the patients benefited from blood transfusion with globular concentrates, iso group iso Rhesus at 82.1%. Transfusion is done on the one hand on the basis of clinical tolerance of anaemia and on the other side on the basis of Hb level. Thus, an Hb level of less than 7 g/dl, even in the face of good tolerance of anaemia, the pregnant woman was transfused in order to ensure a good perfusion of the fetus and to prevent complications. Iron and folic acid as a curative treatment: this treatment is for anaemic pregnant women whose condition does not require a blood transfusion. It normally depends on the type of anaemia: anaemia due to iron deficiency, microcytic anaemia in the absence of an etiological assessment by upstream transfusion and haemorrhages. The first-line treatment of mild to moderate anaemia, by far the most common, is the administration of iron salts, in effective doses (120 to 200 mg per day), combined with folic acid (0.4 mg per day) for up to one month after the iron reserve has been restored and the anaemia has been corrected. In some situations, it may be advantageous to switch to intravenous iron therapy, in particular if oral treatment is not possible to carry out oral treatment correctly for pronounced anaemia (Hb level below 9 g/dl), in case of poor compliance, digestive intolerance, need for rapid correction of anaemia in the case of advanced gestational age and delivery with a risk of bleeding. In the immediate postpartum period, injectable iron offers the possibility of faster and better tolerated treatment on the digestive level than iron salts [36]. Indeed, the curative treatment to concern 73.8% and the use of injectable iron was done only in 05 patients; according to the recommended dosage in adults, which is on average 100 to 200 mg per infusion (for 100 mg of iron, dilution in 100 ml of isotonic saline and slow IV infusion (intravenous injection) over 30 minutes), one to three times a week, respecting an interval of 48 hours between each injection and not exceeding 300 mg per injection [37]. Treatment with vitamin B12 at a rate of 1 ampoule per day for 7 days, 1 ampoule per week for 1 month and then one ampoule per month for life; concerned 5 of our patients. In comparison in the literature review, Sagara S [30] 43.33% of patients by transfusion. In the study, 57.96% of pregnant women had benefited from blood transfusion compared to 42.03% who received iron by intravenous injection Afifi O [25]. As for the study by S Guindo [24], 61.4% of patients have at least one unit of blood transfused.

Aspects of the maternal-fetal prognosis

Vaginal delivery was slightly higher than 49.1% compared to caesarean section 47.9%. We deplored 19 maternal deaths, or 4.4%. These deaths could be explained by the non-availability of compatible

blood products on the one hand, the complications of the clinical presentation of HTA, HRP, PP, HELLP syndrome and or a pre-existing pathology in the patient. Tounkara MD [22] had a 4.5% maternal death, in the Nemtchuenten D study [37]. Anemia was the third highest with 15.6% death. According to DHS VI [13], the overall percentage of female deaths that are related to maternity is 21%. For example, the percentage of female deaths related to maternal causes is lower among women in the 40-44 age group (9%) and among those aged 45-49 (6%). However, since the total number of maternal deaths (84) among women of childbearing age is relatively small, age-specific variations should be interpreted with caution. As far as newborns are concerned, prematurity accounted for 17.4% of births. This rate is slightly higher than those reported by Dogoni L [23] and Tounkara MD [22] who had respectively found 15.3%, 15.5%. This could be explained by the fact that 84% of our patients were evacuations/referrals, sometimes requiring imminent deliveries. The majority of newborns, 21.3%, had an Apgar score of less than 7 at the 1st minute compared to 33.5% of stillbirths; by the 5th minute 11.8% of the newborns had an Apgar score lower than 7. This could be explained by the severity of maternal anaemia.

Strengths and limitations of the study

We were confronted with difficulties, namely: this methodological pitfall did not allow us to take an analytical approach to identify the main risk factors for anaemia during pregnancy due to the absence of a comparison group. The inadequacy of the technical platform for the performance of certain analyses (ferritinemia, serum iron, saturation coefficient, hemoglobin electrophoresis, reticulocyte count, etc.) at the GT University Hospital. Some patients did not have the means to carry out the additional examinations requested. The compatible blood product was not always available. These difficulties have had the following consequences: to limit ourselves in order to properly support the diagnostic orientation; the evolution to serious complications, sometimes even death.

CONCLUSION

Anaemia in pregnant women is a pathology that is easy to prevent and cure, at a modest cost through a well-established therapeutic treatment protocol.

Conflict of Interest: None

BIBLIOGRAPHY

1. Sullivan, K. M., Mei, Z., Grummer-Strawn, L., & Parvanta, I. (2008). Haemoglobin adjustments to define anaemia. *Tropical Medicine & International Health*, 13(10), 1267-1271.
2. Milman, N. (2008). Prepartum anaemia: prevention and treatment. *Ann Hematol*, 87, 949-959.
3. World Health Organization/United Nations University/UNICEF. (2001). Iron deficiency

- anemia, assessment. In: prevention and control: a guide for program managers. Geneva: WHO, p. 132.
4. World Health Organization. (2001). Iron Deficiency Anaemia: Assessment, Prevention and Control. A Guide for Programme Managers. WHO Geneva.
 5. WHO/CDC. (2008). Worldwide Prevalence of Anemia 1993-2005 WHO Global Data base on Anemia, WHO Press, Geneva, Switzerland. http://apps.who.int/iris/bitstream/10665/43894/1/9789241596657_eng.pdf. Accessed July 21, 2016.
 6. Tolentino K, Friedman JF. An update on anemia in less developed countries. *Am J Trop Med Hyg*. 2007 Jul; 77(1):44-51.
 7. Brabin, B. J., Ginny, M., Sapau, J., Galme, K., & Paino, J. (1990). Consequences of maternal anaemia on outcome of pregnancy in a malaria endemic area in Papua New Guinea. *Annals of Tropical Medicine & Parasitology*, 84(1), 11-24.
 8. WHO. (1982). The Prevalence of Nutritional Anaemia in Pregnant Women in Developing Countries: Critical Studies, World Health Statistics Quarterly Report No. 2, Pp 34.
 9. Global nutrition targets 2025: anaemiapolicybrief. Geneva: World Health Organization; 2017 (WHO/NMH/NHD/14.4).
 10. Obai, G., Odongo, P., & Wanyama, R. (2016). Prevalence of anaemia and associated risk factors among pregnant women attending antenatal care in Gulu and Hoima Regional Hospitals in Uganda: A cross sectional study. *BMC pregnancy and childbirth*, 16, 1-7.
 11. Bekele, A., Tilahun, M., & Mekuria, A. (2016). Prevalence of anemia and its associated factors among pregnant women attending antenatal care in health institutions of Arba Minch town, Gamo Gofa Zone, Ethiopia: A cross-sectional study. *Anemia*, 2016(1), 1073192.
 12. Taner, C. E., Ekin, A., Solmaz, U., Gezer, C., Çetin, B., Keleşoğlu, M., ... & Özeren, M. (2015). Prevalence and risk factors of anemia among pregnant women attending a high-volume tertiary care center for delivery. *Journal of the Turkish German Gynecological Association*, 16(4), 231-236.
 13. Demographic and Health Survey VI MALI 2018 (DHS VI) p.
 14. Konaté I clinical and epidemiological study of the association of anemia and pregnancy in the obstetrics and gynecology department of the Gabriel Touré University Hospital.
 15. Msolla, M. J., & Kinabo, J. L. (1997). Prevalence of anaemia in pregnant women during the last trimester. *International journal of food sciences and nutrition*, 48(4), 265-270.
 16. Sholeye, O. O., Animasahun, V. J., & Shorunmu, T. O. (2017). Anemia in pregnancy and its associated factors among primary care clients in Sagamu, Southwest, Nigeria: A facility-based study. *Journal of family medicine and primary care*, 6(2), 323-329.
 17. Gedefaw, L., Ayele, A., Asres, Y., & Mossie, A. (2015). Anaemia and associated factors among pregnant women attending antenatal care clinic in Walayita Sodo town, Southern Ethiopia. *Ethiopian journal of health sciences*, 25(2), 155-164.
 18. Uneke, C. J., Duhlińska, D. D., & Igbinedion, E. B. (2007). Prevalence and public-health significance of HIV infection and anaemia among pregnant women attending antenatal clinics in south-eastern Nigeria. *Journal of health, population, and nutrition*, 25(3), 328-335.
 19. Haggaz, A. D., Radi, E. A., & Adam, I. (2010). Anaemia and low birthweight in western Sudan. *Transactions of the Royal Society of Tropical Medicine and Hygiene*, 104(3), 234-236.
 20. Ouma, P., Van Eijk, A. M., Hamel, M. J., Parise, M., Ayisi, J. G., Otieno, K., ... & Slutsker, L. (2007). Malaria and anaemia among pregnant women at first antenatal clinic visit in Kisumu, western Kenya. *Tropical Medicine & International Health*, 12(12), 1515-1523.
 21. Mbule, M. A., Byaruhanga, Y. B., Kabahenda, M., & Lubowa, A. (2013). Determinants of anaemia among pregnant women in rural Uganda. *Rural and remote health*, 13(2), 1-15.
 22. Tounkara, M. D. (2011). Severe Anemia On Pregnancy At The Fousseyni Daou Hospital In Kayes, thesis presented and defended publicly on /26/05/2011 before the Faculty of Medicine, Pharmacy and Odonto-Stomatology of the University of Bamako.
 23. Dogoni, L. (2014). Epidemio-clinical and therapeutic study of anaemia in pregnancy at the CSRef of Kadiolo. [Thesis: Med]. Bamako: USTTB. www.keneya.net/fmpos/theses/2014/med/pdf/14M145.pdf. Accessed on 24.01.2019
 24. Guindo, S. (2015). Maternal-fetal prognosis of anemia associated with pregnancy in the gynaecological-obstetrics department of the CSRef of Bougouni. [Thesis: Med]. Bamako: USTTB; 145. www.keneya.net/fmpos/theses/2015/med/pdf/15M285.pdf. Retrieved on 24.01.2019
 25. Oumaima, A. (2019). Anemia and pregnancy; Mohammed V University Rabat Faculty of Medicine and Pharmacy. Thesis 2019.
 26. Abu-Hasira, A. W. M. (2007). "Iron Deficiency Anemia among Pregnant Women in Nablus District; Prevalence, Knowledge, Attitude and Practices» An-Najah National University Faculty of Graduate Studies Nablus, Palestine, 27/03/2007.
 27. Okeke Peter, U. (2011). Anemia in pregnancy- is it a persisting public health problem in porto novo-cape Verde?. Medical Technologist, Dept. of Medical laboratory Clinic, Hospital of Porto Novo-Cape Verde, P. 1-16.
 28. Dia Ndeye, S. (2011). Prevalence of anemia during the gravidopuerperal state: Sidi Mohamed Ben Abdellah University, Faculty of Medicine and Pharmacy of Fez, thesis N°106, year 2011.

29. Adebo, A. A., & Yessoufou, A. G. (2018). Anemia and associated factors in pregnant women received in consultation at the Ekpè Health Center (South of Benin). *Antropo*, 40, 35-41. www.didac.ehu.es/antropo
30. Sagara, S. (2019). Epidemiology and prognosis of anemia in pregnant women at the CSRef of Koro. [Thesis: Med]. Bamako: USTTB; M93 www.keneya.net/fmpos/theses/2019/med/pdf/19M93.pdf
31. Charlotte Nguéfactchente, Eveline NgouadjeuDonghoTsakeu, [...], and Eugene Belley PrisoPrevalence and Factors Associated with Anaemia in Pregnancy at the Douala General Hospital 2013.
32. WHO recommendations on antenatal care for a positive pregnancyexperience. Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO. Available at <http://apps.who.int/iris>.
33. Diégane, T. J. (2018). A Study of the factors associated with anaemia in women of childbearing age in Kolda (Senegal) Department of Preventive Medicine and Public Health of the Cheikh Anta Diop University of Dakar (UCAD), Institute of Health and Development (ISED), UCAD, Dakar, Senegal OJOG, 8(7).
34. Multiple Indicator Demographic and Health Survey Senegal (DHS-MICS) 2010-2011.
35. Demographic and Health Survey (DHS V) 2018; National Institute of Statistics Ministry of Planning and Economic Development Conakry, Guinea.
36. Demographic and Health Survey and Multiple Indicators (EDS VI-MICS) Côte d'Ivoire 2011-2012.
37. Beucher, G. (2011). Anemia due to iron deficiency and pregnancy. Prevention and treatment. *Caen University Hospital; Department of Obstetrics and Gynaecology, hospital group* definitively accepted on 11 January 2011 Available on the Internet on 17 February 2011.
38. French Agency for the Safety of Health Products. Transfusion of homologous red blood cells: products, indications, alternatives, 2002.