Incidence, Risk Factors, and Associated Complications of Eclampsia

Oumar bah[1,3], Ahmed salem Dou[1], Mohamed Kah[2,3], Tfeil Yahya[3, *]

SUMMARY

Objective:
The aim of this study was to analyze the incidence, morbidity, and mortality factors associated with eclampsia at the Cheikh Zayed Hospital Centre of Nouakchott (CHCZ).
Materials and methods:
This is a retrospective, descriptive study of 108 patients hospitalized for eclampsia in the gynecology-obstetrics unit and/ or intensive care of the CHCZ in Nouakchott over a two-year period, from 1 January 2022 to 31 December 2023.
Results:
Of the 15,540 deliveries during the study period, 108 cases of eclampsia were recorded, representing a frequency of 0.69%. The average age of the patients was 25.14 years, with the majority in the 20-25 age group (32.3%).
The average was 2.9, with 60.2% being primiparous. As regards previous history, 18.5% of patients had arterial hypertension. Antenatal follow-up was inadequate in 88% of cases. The mean gestational age at onset of eclampsia was 34 weeks' gestation, with 68.4% of cases occurring before term. Eclampsia occurred gestation antepartum in 64.8% of cases. The main symptom described was headache (75.2%). On admission, 72.9% of patients presented with consciousness disorders, and severe arterial (≥160/110 hypertension mmHg) was noted in 76.8% of cases. Proteinuria was greater than or equal to 3 crosses in 81.6% of cases.
Paraclinical findings included anemia in 80.5% of cases, thrombocytopenia in 38% and hyperuricemia in 29.6%. Liver cytolysis was observed in 24% of patients, associated with HELLP syndrome in 13%.
The most used antihypertensive treatment was nicardipine (61%). All patients had received magnesium sulphate as an anticonvulsant according to the protocol Zuspan. Pregnancy was terminated by caesarean section in 83.3% of cases. Complications were dominated by renal (31.8%), followed by failure help syndrome (29.5%), coagulation disseminated intravascular 6%) and acute lung oedema (9.1%).

Conclusion:
The average length of hospitalization was 5 days. Maternal mortality was 0.45‰, with acute renal failure being the leading cause of death (42.9%).
Perinatal mortality was 12.9%, most of which occurred in the early neonatal period.

Key words: *Pronostic, Maternal, Fetal, Eclampsia, Unsealed Pregnancy, Nouakchott.*

Competing interests: *The authors have declared that no competing interests exist.*

I. Introduction

Eclampsia is one of the most serious complications of hypertensive disorders of pregnancy, with a maternal mortality rate of 0 to 1.8% in developed countries and 14 to 15.6% in developing countries, causing around 50,000 deaths a year worldwide.[1]
This accident is a paroxysmal with a dominant neurological expression of unrecognized or mistreated hypertensive disorders in pregnancy. It is defined by the occurrence of one or gravido-puerperal more generalized convulsive seizures and/or disorders of consciousness that cannot be related to a pre-existing neurological problem.[2]

Eclampsia is an obstetric complication whose incidence varies from region to region. In developed countries, it affects between 1.6 and 10 women per 10,000 deliveries, compared with 50 to 151 cases per 10,000 in developing countries [2][3] . In sub-Saharan Africa, it affects around 1.5% of pregnancies, with a mortality rate of up to 16% [4] , much higher than the 0 to 1.8% observed in developed countries[5] . In Mauritania, studies carried out at the National Hospital Centre (CHN) in Nouakchott revealed a prevalence of 2.18% in 2017 and 1.26% in 2022[6][7]

It is crucial for healthcare professionals to step up their efforts to combat this condition. As a result, significant progress has been made in the treatment of eclampsia, in terms of both pathophysiology and therapy.

The aim of our study was to analyze the specific epidemiological features of eclampsia to identify the factors that may explain its constant frequency, to evaluate the management practices in our facility and to assess the prognosis maternal-fetal by highlighting the determinants of the associated morbidity and mortality.

II- PATIENTS AND METHODS

Our study was conducted in the gynecology-obstetrics and intensive care unit of the Hospital Sheikh Zayed in Nouakchott (CHCZ).

This was a retrospective, descriptive study of a series of 108 patients hospitalized in the obstetrics gynecology and intensive care units of the Cheikh Zayed Hospital in Nouakchott (CHCZ) over a two-year period from 1 January 2022 to 31 December 2023.

The diagnosis of eclampsia was made in the event of convulsive seizures in a pregnant woman, when the history and clinical examination revealed no other cause of convulsions.

All cases of eclampsia were recorded and analyzed using registers from the intensive care unit, maternity unit, neonatology unit and hospital records.

Socio-demographic, clinical, biological and radiological data, as well as therapeutic management methods and outcomes, were examined for each case during the study period. An evaluation form was created for each patient to collect these data.

We used: SPSS software for data entry, processing and analysis. Excel 2016 for tables and graphs and Word 2019 for processing and entering text.

III. RESULTS

During the study period, we recorded 108 cases of eclampsia out of 15540 deliveries, giving a hospital frequency of 0.69%. This represents 1 case of eclampsia for every 143 deliveries.

The mean age of patients was 25.14 years, with ages ranging from 15 to 44 years. The 20-25 age group accounted for 32.3% of cases, followed by patients under 20, who made up 27.7% of cases **(Figure 1).**

The mean age was 2.9, with extremes of 1 and 12. The mean parity was 1.82, with extremes of 1 and 9 gestational. 60.2% of patients were primiparous **(Table I).**

The mean gestational age at onset of eclampsia was 34 weeks' amenorrhea (SA), with extremes of 24- and 40-weeks' amenorrhea **(Figure 2)**.

Eclampsia occurred before term in 68.4% of cases.

Eclampsia occurred antepartum in 70 patients, a rate of 64.8%, compared with 11.1% per partum and 24.1% postpartum, with extremes ranging from 20 minutes after delivery to day five.

The number of PNCs was greater than or equal to 4 in 12% of cases and less than 4 in 88% of cases. In 60.2% of cases, our patients had been referred by various health centres, and in 39.8% of cases had come directly to the clinic on their own.

December and January accounted for 14% and 19% respectively **(Figure 3.)**

The most frequently identified antecedents were chronic in arterial hypertension 18.5% and type 2 diabetes in 7.4%.

Headache was the primary symptom, described in the history of the disease in 81 patients (75.2% of cases). Other symptoms included vertigo and ringing in the ears (42.6%), visual blur (12%), epigastric pain (7.4%) and epistaxis (2.8%).

Mean systolic blood pressure was 171.41 mm Hg, with extremes of 130 mm Hg and 240 mm Hg.

Mean diastolic blood pressure was 100.97 mm Hg, with extremes ranging from 80 mm Hg to 140 mm Hg.

Blood pressure was elevated in 98.14% of cases, with two patients having blood pressure normal on admission. Hypertension was severe (PAS 160 mm hg and PAD 110 mm Hg) in 83 patients, i.e. 76.8% of cases.

Dipstick albuminuria was measured and positive in all patients and was greater than or equal to 3 crosses in 81.6% of cases.

In our series, 72.2% of patients had presented with consciousness disorders such as obnubilation, 2.8% had presented with a coma and 25% had regained clear consciousness on admission.

Anemia was diagnosed in 80.5% of cases, with an average hemoglobin level of 8.5 g/dl.

Thrombocytopenia was observed in 38% of cases and was severe in 23.1% of cases (platelet count below 50,000).

Uricemia was measured in 48.1% of patients, and hyperuricemia was diagnosed in 29.6% of cases.

Hepatic cytolysis was observed in 26 patients (24%) and was associated with help syndrome in 12% of cases.

Renal function was impaired in 14 patients (13%), and dialysis was performed in 5 patients (4.6%) who presented with renal failure oligo-anuric.

Chest X-rays were taken in 18 patients (16.7%). It showed acute pulmonary oedema (APO) in 4 cases (3.7%).

All patients had received antihypertensive treatment.

Nicardipine was the only antihypertensive agent administered intravenously in 61.1% of cases, followed by oral, and alpha-methyldopa alpha-methyl dopamine was the only antihypertensive agent in 31.5%.

Combination therapy with nicardipine and alpha methyl dopamine was introduced in 5.7% of cases.

Two patients were started on. triple therapy alpha-methyl dopamine-nicardipine-acebutolol

Anti-seizure treatment was systematically introduced in all patients, and the drug used was magnesium sulphate (SO4Mg).

The protocol used is that of Zuspan, which consists of administering a loading dose of 4 g of SO4Mg over 20 minutes during the first eclampsia attack, followed by 1 g/hour using an electric syringe pump. Administration of magnesium sulphate was continued for at least 24 hours after the last attack.

They were used in 19 patients (17.5%). The main indications were oliguria in 9 cases, anuria in 6 cases, and PAO in 4 cases.

Furosemide was the only diuretic used.

Iso-group iso-rhesus blood transfusion was performed in 22 patients (20.4%) and the average number of blood bags used was four (4) with extremes of one (1) bag and six (6) bags.

The main indication was the correction of severe anemia following coagulopathy.

Termination of pregnancy was performed by caesarean section in 90 patients (83.3% of cases), the main indications being maternal rescue (90%) and rescue fetal (10%).

Vasectomy delivery was performed in 18 patients (16.7% of cases), including two forceps deliveries.

The outcome was favorable in 72 patients (67.7%). However, 36 patients (33.3%) had complications (**Table II).**

The average length of hospitalization was 5 days, with extremes of 2 days and 25 days.

We deplore 7 cases of maternal death, i.e. a mortality rate of 0.45‰.

Acute renal failure was the cause of death in 42.8% of patients **(Table III)**

In our study, the number of live births was 103, or 95.4% of cases.

Fetal death in utero was observed in 5 cases, i.e. 4.6% of cases, and the number of neonatal deaths was 9, i.e. 8.3%, the majority of which occurred in the early neonatal period.

The average APGAR score was 7.5, with extremes ranging from 0 to 10, and was above 7 in 76% of cases at 5th minute.

IV. DISCUSSION

IV.1 data Epidemiological

IV.1.1. Prevalence

In this study, the incidence of eclampsia was estimated at 0.69%. National studies show a gradual decrease in prevalence over the years. BONAHY A. reported a rate of 21.8 ‰ in the CHN of Nouakchott in 2017, while AMOU H. observed 12.6 ‰ in the same structure in 2022.

This reduction could be linked to an increase in the number of healthcare professionals, improved perinatal consultations, screening for high-risk pregnancies, optimized management of pre-eclampsia and developments in obstetric and neonatal care.

However, our results are comparable to other African series, but are still higher than those from developed countries, where the prevalence is estimated at between 0.02 and 0.05% of deliveries.

This high prevalence in our regions compared to the series in developed countries could be explained by various reasons:

- Poor quality of antenatal consultations, resulting in a lack of use of obstetric care services by pregnant women.
- Delays in the early management of severe forms of pre-eclampsia.
- Lack of follow-up, protocol and decision tree for the early management of patients with pre-eclampsia.
- The delay in starting prenatal consultations (CPN) by our patients, who wait until after 3 months to start their prenatal care for socio-cultural reasons.
- Late admission of patients to specialist centers.

Low socio-economic status.

IV.1.2. Maternal age

Eclampsia is a disease of young women. In our series, the mean age was 25.14 years, and 60% of patients were under 25.

Similar results were found by various authors showing that young parturient were most at risk of eclampsia.

At national level, studies had found that eclampsia was more frequently encountered in the under-25 age group [6][7].

In Morocco, **HIND** [14] reports that (79%) of patients were younger than

28 years. Similarly, in Gabon **TSONGA** [15] noted that in 66.67% of cases, eclampsia occurred in young patients aged between 17 and 25 years.

These results confirm that young age was a risk factor for the onset of eclampsia.

This could be explained by the fact that this age group corresponds to the period of life when women's reproductive activity is at its peak. In addition, socio-cultural factors contribute to early marriage, often resulting in a first pregnancy at a very young age.

IV1.3. Parity

In our series, primiparous dams were predominant (60.2%).

In contrast, eclampsia affected only 13% of multiparous women. However, no link was found between parity and prognosis maternal-fetal.

Our results are in line with those of regional series [6][16] which found rates of between 59.3% and 70% [6][11][16][17] of primiparous women and which estimated that pre-eclampsia and eclampsia are twice as common in primiparous women as in pauci parous and multiparous women.

Many other authors who have studied the subject agree that eclampsia, a major complication of pre-eclampsia, is a condition that affects low parity women.

These results confirm that primiparity appears to be a risk factor for pre-eclampsia and eclampsia and that this risk is linked to the phenomenon histo-compatibility and the paternal factor. [18, 19]

IV.1.4. Gestational age.

In our series, eclampsia occurred before term in 68.4% of cases, and in most cases (38.7%) it occurred between 34-36 weeks of amenorrhoea, which raises the problem of prematurity.

Comparable have been published African results noting that between 37% and 58% of her patients presented with eclampsia attacks before 37 SA [11][20] .

On the other hand, other African series had noted that eclampsia occurred after 36-37 SA in 62.27% to 80.83% of cases [6] [7] .

Our results could be explained by the fact that eclamptic patients arrived at hospital with an obstetric emergency requiring extraction fetal as soon as possible. Most patients were seen in the context of a pregnancy that was not full term, which would explain the high rate of prematurity.

IV.1.5. Mode of onset

In our series, eclampsia occurred ante-partum in 64.8% of cases, 11.1% per partum and 24.1% post-partum.

Our study is in line with most African series, which confirm that eclampsia occurs more frequently in the periods ante- and per-partum (67.5% to 72.5%) than in the post-partum period [6][21]).

In France, **POTTECHER** [22] found that eclampsia occurs in 50% of cases before the onset of labor and in 30% of cases in the post-partum period.

These results confirm that the prevention of eclampsia requires early diagnosis and severe forms of pre-eclampsia appropriate management.

IV.1.6. Antenatal monitoring

In our series, only 12% of cases had received more than 4 prenatal consultations deemed to be correct. This low level of antenatal care was highlighted by many authors [7][23][24][25] as a risk factor for eclampsia.

In Mauritania**, AMOU**[7] found in her study that over 80% of patients were not properly monitored. Similarly, in Morocco, **LABIB**[23] noted that 81.7% of eclampsia patients were not monitored during their pregnancy.

However, our rate is much higher than the figure reported in the Burkina Faso series by **LANKOANDE**[11] , who recorded a prenatal coverage rate of 57%.

The low antenatal coverage observed in our study could be explained by the late start of antenatal consultations in most of our patients, often linked to factors such as low socio-economic status and lack of education. In addition, inadequate use of obstetric services may prevent early identification and management of high-risk pregnancies. Prenatal surveillance therefore plays a crucial role in preventing eclampsia. Appropriate management of antenatal consultations and effective patient follow-up could significantly reduce the incidence of eclampsia.

IV.1.7 Admission procedures

Admission procedures

In this study, the rate of eclampsia was significantly higher in referred patients, representing 60.2% of cases. The majority of these patients came from the health centers where they were being monitored. However, 39.8% of patients arrived directly from home. Some of these patients had already been made aware of the disease and its unpredictable course through hospital care, while others had been referred to hospital by their GP because of the seriousness of their condition.

Eclampsia, a critical obstetric emergency, is life-threatening for both mother and foetus because of its unpredictable complications and rapid progression. Appropriate treatment requires a health facility with advanced technical facilities, intensive care units and a well-equipped neonatal intensive care unit. This is the case at the Sheikh Zayed Hospital in Nouakchott, a level 3 facility, where care must be organised without delay, which justifies the high rate of patients referred (60.2%).

IV.2 Clinical

IV.2.1. Blood pressure

In our series, we observed that the figures higher the (PAS ≥160 mm hg and PAD ≥110mmhg), the rate of complications blood pressure higher. fetal

The mean systolic blood pressure (SBP) was 171.41 mmhg and the mean diastolic blood pressure (DBP) was 100-97 mmhg.

These results were similar to those of other African authors who found that the mean PAS was≥ 160 mm hg and the mean DBP was≥ 110 mm hg [16][17] .

Our results show that arterial hypertension is the main symptom. In our series, eclampsia occurs in the majority of cases in a context of severe pre-eclampsia (76.8% in our series) and is therefore prevented by screening for hypertension and correct management of its severe forms.

IV.3.2. Albuminuria

Albuminuria was measured in all patients and was greater than three crosses in 81.6% of cases. This is in line with many authors who have concluded that eclampsia occurs more frequently in cases of massive proteinuria [14][17] .

IV.3. Paraclinical

IV.3.1. Biological data

The role of paraclinical examinations in the management of eclampsia is vital, as they enable the severity of the disease to be assessed and the prognosis to be determined.

In our series, anemia was diagnosed in 80.5% and was severe in 18% of cases. Comparable results were described by **AMOU**[7] in her series, which showed that anemia was present in 75% of patients, while other authors found a lower rate of 41% to 50.5% .[14][21]

Anemia is often associated with eclampsia in our regions, sometimes because of inadequate prenatal monitoring of women, leading to a lack of medicated iron supplementation.

Thrombocytopenia was diagnosed in 38% of cases and was severe in 9 patients, a rate of 22%. In our series, severe thrombocytopenia was associated with DIC in 66.7% of patients.

Uricemia was measured in 48.1% of cases, was elevated in 29.6%, and indicated fetal distress in most cases. In contrast, **CISSE** [16] found in his series that uricemia was normal in almost all cases.

IV.4 Therapeutics

IV.4.1. Antihypertensive treatment

In our series, nicardipine was the most used antihypertensive to control blood pressure in 61.1% of cases, followed by alpha methyl dopamine in 31.3% of cases.

The use of nicardipine as a first-line treatment, although contrary to the joint recommendations of the SFAR and CNGOF experts who favor intravenous for the treatment of hypertension in cases of severe pre-eclampsia due to its limited maternal and fetal effects labetalol [31], may be justified by the unavailability of this compound in our country.

Our results are comparable to those of **BONAHY A.** [6] who noted in his series that nicardipine was used as monotherapy in 73.5% of patients.

Our experience of the use of antihypertensive agents is consistent with Frydman's approach [26], which favors calcium channel blockers, particularly nicardipine and nifedipine, as first-line agents. This preference is widely shared by many authors, who emphasize their efficacy and good tolerability, provided the contraindications are respected.

However, several recommendations indicate that no antihypertensive agent is significantly superior to the others [13].

IV.4.2. Mode of delivery

Childbirth is imperative after an eclampsia attack, as in most cases neurological improvement is rapid after the birth of the child.

In our series, the mode of delivery was mainly caesarean section.

(83.3%), whereas 16.7% of patients gave birth vaginally. Boudaya [67] 71.4% Ezzerouqui [69] 80.8%.

Our result is comparable to that of sub-Saharan series [6] [33] [69] which found rates of 71.4% to 87.5%. On the other hand, other [16] had noted in their series a lower rate of 50% [16][27] .

Eclampsia is an obstetric emergency whose only real treatment is uterine evacuation. Because of its particularly unpredictable nature and the potentially rapid course of the condition, which can be life-threatening for both mother and fetus, treatment must be organized and immediate.

IV.4.3 Anti-seizure treatment

Magnesium sulphate is the reference anti-seizure treatment for eclampsia and is prescribed to all patients to prevent recurrence.

Only 2 cases of overdose involving behavioral disorders and respiratory distress were reported, requiring the use of calcium gluconate.

In our study, the combination of magnesium sulphate and nicardipine was prescribed in most cases (61.6%) with satisfactory results and good drug tolerance despite the risk of potentiation of magnesium sulphate on calcium antagonists described in the literature.

Recently, **GIRARD** [28] showed in his series that this association did not present any risk, which is the same as in our study.

IV.5. Prognostic and evolutionary aspects

IV.5.1. Maternal prognosis

In our study, there were 7 deaths, corresponding to a maternal frequency rate of 0.45%. This rate is comparable to the national series reported by **BONAHY A**. [6] (7.22%) and **AMOU H.**[7] (7%), and much lower than African studies such as **ATTADE**[29] (28%), **LANKOANDE**[11] (15%) and **BROUGHT**[20] (16%).

However, our mortality rate remains significantly higher than that observed in the study **DUCARME** [18]in France, which achieved the target of 0% mortality among the 16 cases studied.

A study of the factors associated with this mortality led to the conclusion that it was correlated with the occurrence of complications.

The occurrence of acute renal failure (42.9% death rate) was a factor in maternal mortality, especially if it was associated with other complications such as Help syndrome, DIC or other factors such as a delay in care, a long journey by non-medical transport, especially as the patients referred came from centers health in the inland wilayas.

IV.5.2. prognosis Fetal

In our series, we recorded a perinatal mortality rate of 12.9%.

Our rate was higher than that of **BONAHY A**. in the CHN, who found a perinatal mortality rate of 8.42% .[6]

However, our figure was lower than in most African series, where the rate was between 35% and 42.8% .[16][27][30]

Fresh stillbirths accounted for 4.6%. In most cases, they were due to a delay in care, in extraction fetal and above all to the long journey between the evacuating and receiving facilities.

Prematurity was 68.4% and was induced in most cases by maternal rescue or fetal complications during monitoring of parturient pre-eclamptic in labor by fetal heart rate recording (fHRR).

In our series, the prognosis fetal was strongly correlated with certain factors, in particular age gestational, prenatal follow-up, fetal lung maturation, and the patient's long journey.

V. CONCLUSION

Eclampsia remains a formidable complication of pregnancy-related hypertensive disorders is a obstetric emergency and life-threatening.

It has become a rare disease in developed countries, but remains a major concern in developing countries, where it constitutes a major public health problem because it is associated with high maternal and fetal mortality and morbidity.

Table I: Breakdown of patients by parity

Parity	Workforce	Percentage (%)
Primipare	65	60,2
Paucipare (2-3 Childbirth)	24	22,2
Multiparous (4-5 births)	14	13
Large multiparous	5	4.6

Table II: Distribution of patients according to complications

Complication	Workforce	Percentage (%)
Renal insufficiency	14	31,8
Hellp syndrome	13	29,5
DIC	6	13,6
OAP	4	9,1
Post-partum haemorrhage(PPH)	4	9,1
foetal distress	3	6,8

Table III: Breakdown of patients by cause of death

Cause of death	Workforce	Percentage (%)
Renal insufficiency	3	42,9%
HRP /CIVD	2	28,6%
Acute lung oedema	1	14,2%
Hellp syndrome/ Anemia	1	14,2%

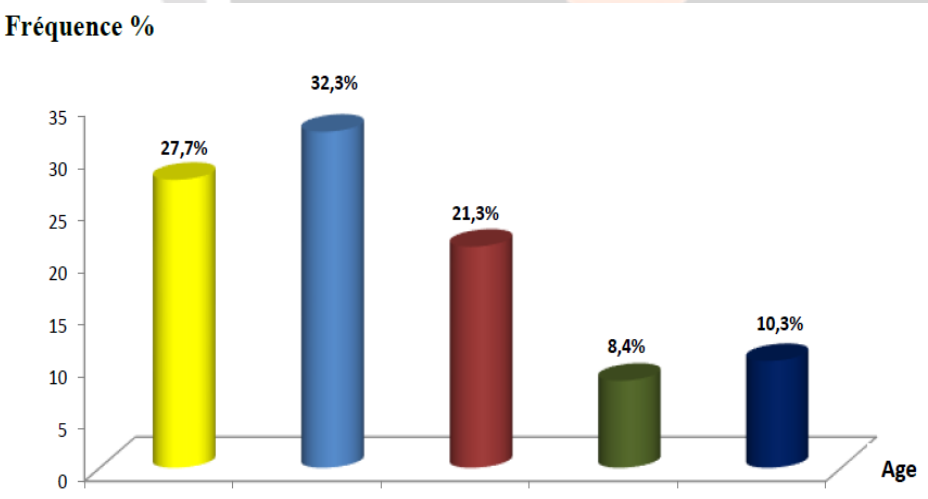

Figure 1 : Répartition des patients selon les tranches d'âge

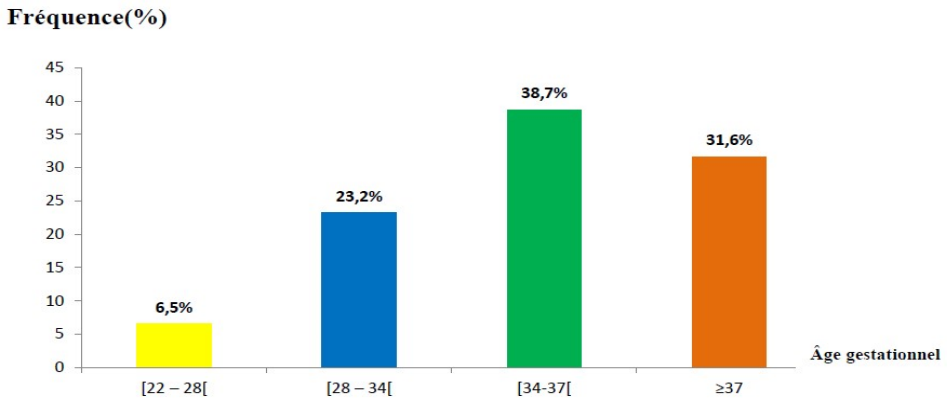

Figure 2: Distribution of patients by gestational age on admission

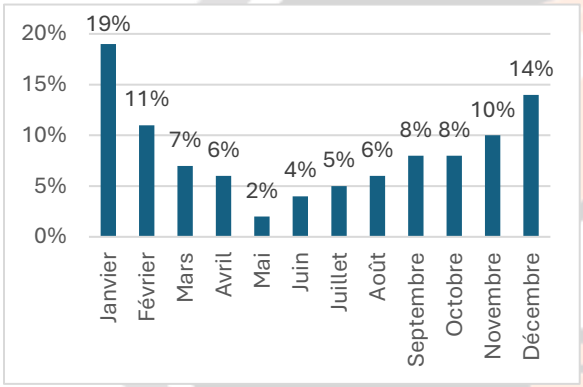

Figure 3: Distribution of onset of eclampsia over time

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