Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2025, 15(10), 1737-1747
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Evolution of Signs of Preeclampsia after Delivery in Patients Managed at Centre Hospitalier Universitaire Yalgado Ouedraogo

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How to cite this paper: Kiemtoré, S., Ouédraogo, I., Sawadogo, Y.A., Ouattara, A., Dembélé, A., Ouédraogo, R.M.C., Ouédraogo, A. and Millogo, D.F. (2025) Evolution of Signs of Preeclampsia after Delivery in Patients Managed at Centre Hospitalier Universitaire Yalgado Ouedraogo. *Open Journal of Obstetrics and Gynecology*, **15**, 1737-1747.
https://doi.org/10.4236/ojog.2025.1510147

Received: September 22, 2025
Accepted: October 26, 2025
Published: October 29, 2025

Abstract

Objective: The aim of this study was to evaluate the evolution of signs of preeclampsia after delivery at the CHUYO. **Patients and Method:** The study involved 146 women diagnosed with preeclampsia, using a descriptive prospective cohort design to collect data on their socio-demographic, clinical and paraclinical status at different times after delivery. **Results:** The percentage of patients with proteinuria greater than 0.15 g/24 hours was initially 96.7% on the day of delivery, before dropping to 43.7% on the seventh day, 22.6% at 45 days, and finally 2.9% at three months after delivery. The proportion of patients with diastolic blood pressure above 90 mmHg also fell, from 58.5% one week after delivery to 7% three months later. As for creatinine levels, 6.2% of patients had values above 90 µmol/L on D0, but only 2.9% still had this abnormality at three months. With regard to diastolic blood pressure, 58.5% of patients had a pressure greater than 90 mmHg one week after delivery, this figure being reduced to 7% three months later. Liver enzyme parameters, such as AST and ALT, showed complete normalization in all patients three months after delivery. **Conclusion:** This study demonstrates the importance of ongoing follow-up for women with preeclampsia to identify and manage persistent signs. Future research could explore the long-term effects of preeclampsia on the health of

women and children.

Keywords

Signs Evolution, Preeclampsia, Burkina Faso

1. Introduction

Preeclampsia is a hypertensive disorder of pregnancy characterised by high blood pressure and signs of organ dysfunction, such as kidney and liver dysfunction [1]. Preeclampsia poses a significant threat to maternal health and is associated with high maternal and perinatal morbidity and mortality, especially in Africa. In Europe, the prevalence and consequences of preeclampsia vary. In France, studies report that preeclampsia affects approximately 2% to 8% of pregnancies, often associated with premature births and reduced maternal mortality thanks to effective management [2] [3]. In Switzerland, a recent study reveals a prevalence of 2.42% of pregnancies affected by preeclampsia, contributing to a low maternal mortality rate thanks to rigorous medical monitoring [4]. According to the study by Diguisto *et al.* [5], hypertensive disorders of pregnancy were responsible for 2% of maternal deaths in France and 9.7% of maternal deaths in Slovakia.

In Sub-Saharan Africa, the contrast is striking. In Ghana, preeclampsia affects approximately 8.2% of pregnancies, accompanied by a high maternal mortality rate due to limited access to care [6]. In Nigeria, the prevalence is even higher, reaching 12% of pregnancies, with significant maternal morbidity and mortality due to delays in diagnosis and treatment [7].

In Burkina Faso, there are no national figures, but a study conducted at the Centre Hospitalier Universitaire Yalgado Ouedraogo (CHUYO) reported that preeclampsia was responsible for 16% of maternal deaths [8]. The signs usually regress after the end of pregnancy. However, the rate of regression of these signs is not known in the Burkinabe context due to insufficient follow-up after delivery. This context highlights the need to deepen our understanding of the evolution of clinical and paraclinical signs of preeclampsia after the end of pregnancy in order to optimise patient follow-up. Such a study could not only alleviate concerns surrounding the onset of postpartum complications, but also inform health policies aimed at reducing morbidity and mortality associated with this severe condition, particularly in the most vulnerable regions.

2. Patients and Method

This descriptive prospective cohort study was conducted at CHUYO between 1 June and 31 October 2023, with the aim of assessing the evolution of signs of preeclampsia after delivery. Participants were all patients hospitalised during this period for preeclampsia. Preeclampsia was defined as new-onset hypertension at ≥20 weeks' gestation (systolic ≥ 140 mmHg and/or diastolic ≥ 90 mmHg on two occasions) with at least one of the following: proteinuria ≥ 300 mg/24 h (or ≥2 + dipstick),

renal dysfunction (creatinine ≥ 90 μmol/L or rise from baseline), liver involvement (elevated AST/ALT), thrombocytopenia, neurological symptoms, or uteroplacental dysfunction.

All women admitted for preeclampsia who died during pregnancy were excluded from the study. Patients with chronic hypertension or superimposed preeclampsia were also excluded from the study. The sample size was determined using Schwartz's formula. Taking p at 7%, corresponding to the proportion of persistent high blood pressure three months after delivery, according to a previous study conducted by Kaboré in 2022 in Ouagadougou [9]. The minimum sample size required was 130 patients. We ultimately included 146 patients. Clinical and paraclinical data were collected before the end of pregnancy, then one week, 45 days and three months after delivery.

Among the socio-demographic data, we collected information such as the patients' age, their occupation, their spouse's occupation, their level of education, their marital status, their place of residence, their socio-economic status, as well as the number of previous pregnancies and living children. With regard to clinical data, various aspects were taken into account, such as pregnancy monitoring, including the number of prenatal consultations and cases of pathological pregnancies, as well as the reason for admission, the term of the pregnancy, and the results of the physical examination on admission, including the general examination, vital signs, and obstetric examination. We also included paraclinical aspects in our analysis, such as blood count results, including platelets and haemoglobin levels, 24-hour proteinuria, proteinuria measured by urine dipstick, and several biochemical parameters such as creatinine, glucose, uric acid, and blood transaminases.

The data collected on physical media were entered and analysed on a laptop equipped with Epi Info 7 software. Epi Info 7, Excel 2013 and Office 2019 software were used for word processing, analysis and graph creation.

Measures were taken to ensure the confidentiality of the information collected from patients. Authorization to collect data was obtained from the Director General of CHU-YO after approval from the institutional ethics committee number 2023/1073.

3. Results

3.1. Patient Characteristics

3.1.1 Socio-Demographic Characteristics

The average age of the 146 patients was 27.06 ± 6.26 years, ranging from 17 to 43 years. The average number of pregnancies was 2.5 ± 1.6, ranging from 1 to 7 pregnancies. The average parity was 2.3 ± 1.4, ranging from 0 to 6. Married women accounted for 83.6% of our sample. Patients with no schooling accounted for 24.0% of the sample. Patients who were housewives accounted for 47.3% of the sample. **Table 1** provides details on the socio-demographic characteristics of the patients.

Table 1. Patient characteristics (n = 146).

Characteristics	
Age	
Average ± standard deviation	27.06 ± 6.26 years
15 - 20 years	17 (11.7)
20 - 25 years	41 (28.1)
25 - 30 years	34 (23.3)
30 - 35 years	32 (21.9)
35 - 40 years	18 (12.3)
40 - 45 years	4 (2.7)
Gravidy: n (%)	
Primigravida	63 (67.8)
Multigravida	47 (32.2)
Level of education: n (%)	
No schooling	35 (24.0)
Primary	42 (28.8)
Secondary	57 (39.0)
Superior	12 (8.2)
Marital status: n (%)	
Married	122 (83.6)
Cohabitation	18 (12.3)
Single	3 (2.1)
Divorced	1 (1.0)
Statut socio-professionnel: n (%)	
Housewife	69 (47.3)
Woman with an income-generating activity	61 (41.8)
Student	16 (10.9)

3.1.2. Clinical Characteristics

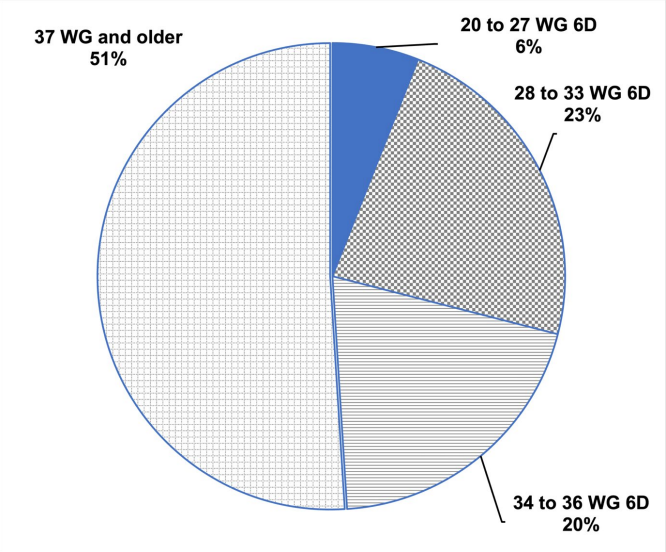

Figure 1. Distribution of patients according to gestational age (n = 146).

The mean gestational age of the patients was 33.8 ± 4.2 weeks of gestation (WG), with extreme values of 20 and 42 WG. Notably, 51% of patients had a gestational age greater than 37 WG.

Figure 1 illustrates the distribution of patients according to gestational age.

Among the 146 patients, 19.8% had eclampsia as a complication. Table 2 shows the frequency of different maternal complications at admission.

Table 2. Frequency of preeclampsia complications upon patient admission (n = 146).

Complications	Number	Percentage
Eclampsia	29	19.8
Retroplacental hematoma	12	8.2
Anemia	10	6.8
Acute renal failure	5	3.4
Hellp syndrom	4	2.7
Acute pulmonary edema	3	2.0

Of the 146 patients, uterine evacuation was performed by cesarean section in 71.9% of cases and by vaginal delivery in 28.1% of cases.

As for the outcome of the pregnancy, a live birth was observed in 84.9% of cases. Table 3 illustrates the distribution of patients according to pregnancy outcome.

Table 3. Distribution of patients according to pregnancy outcome.

Pregnancy outcome	Number	Percentage
Live birth	124	84.9%
Stillborn	15	10.3%
Therapeutic abortion	7	4.8%
Total	146	100%

3.2. Evolution after Delivery

3.2.1. Maternal Deaths

We also observed 4 cases (2.7% of patients) of death, all related to eclampsia. One maternal death occurred on day 2, two maternal deaths on day 4, and one maternal death on day 5.

3.2.2. Changes in Clinical Signs

On the 7th day, 45th day, and 3 months after the delivery, the percentage of patients with a diastolic blood pressure greater than 90 mmHg was 58.5%, 35.9%, and 7.0% respectively. In addition to diastolic trends, the proportion with systolic blood pressure ≥ 140 mmHg decreased across follow-up and persisted in 7.8% at 3 months postpartum. Figure 2 shows the changes in clinical signs after delivery.

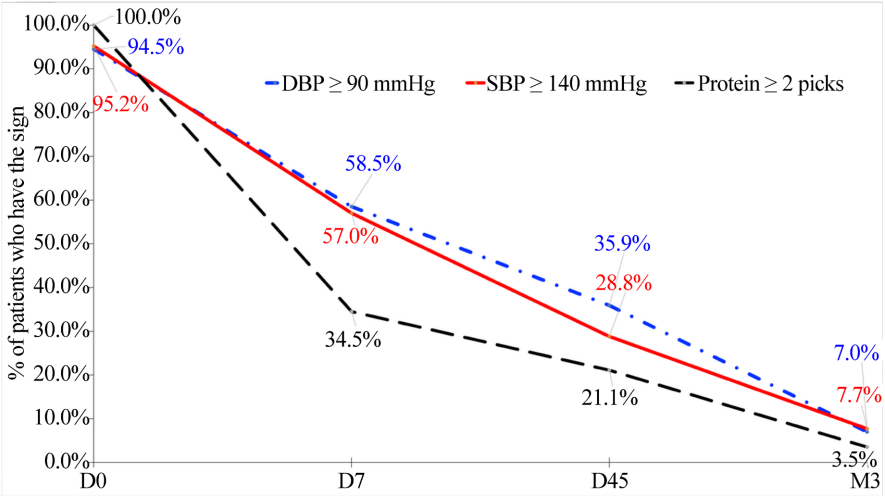

Figure 2. Change over time in the percentage of patients with clinical abnormalities after delivery (n = 146 on D0; n = 142 on D7, D45, and M3). Abbreviation: M3 = 3 months after the end of pregnancy. D7 = 7th day; D45 = 45th day.

3.3. Evolution of Paraclinical Signs

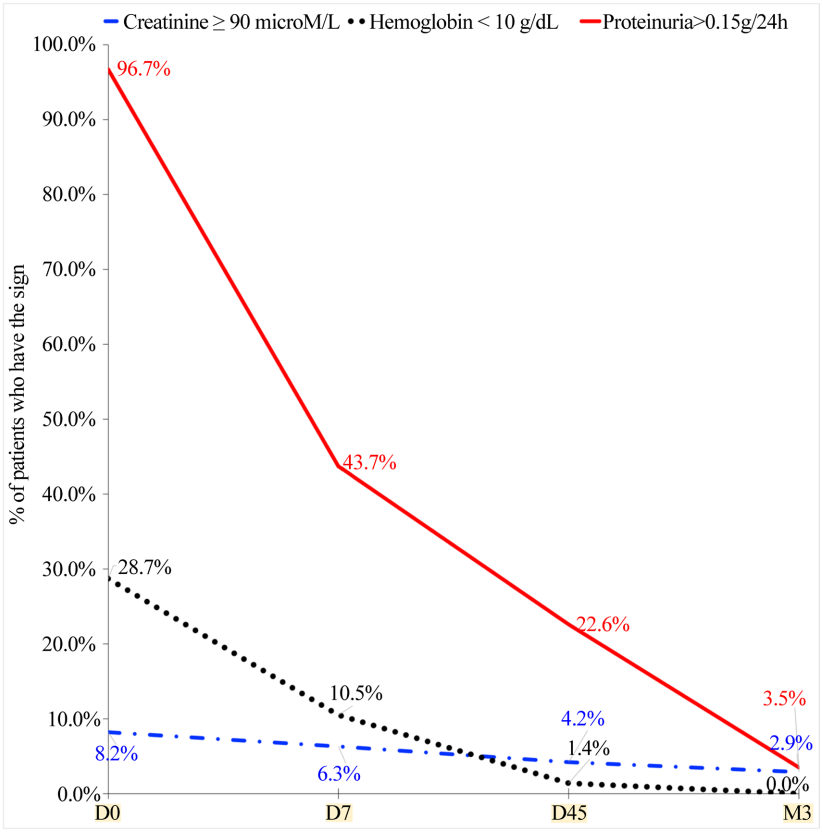

Figure 3. Change over time in the percentage of patients with proteinuria ≥ 0.15 g/24 hours, serum creatinine ≥ 90 µmol/L, and hemoglobin < 10 g/dL after delivery (n = 146 at D0; n = 142 at D7, D45, and M3).

The percentage of patients with proteinuria greater than 0.15 g/24 hours was 96.7%

on the day of delivery, falling to 43.7%; 22.6% and 2.9% respectively on the 7th day, 45th day and 3 months after delivery (Figure 3). The percentage of patients with thrombocytopenia and those with elevated blood levels of liver enzymes gradually decreased (Figure 4).

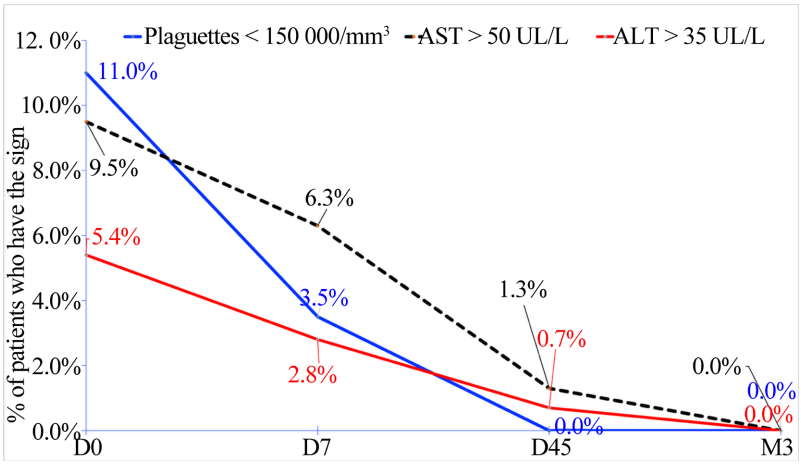

Figure 4. Change over time in the percentage of patients with platelet counts < 150,000/mm³, AST > 50 IU/L, ALT > 35 IU/L after delivery (n=146 on D0; n=142 on D7, D45, M3).

4. Discussion

4.1. Limitations and Biases of the Study

The variability in the criteria used to define and diagnose preeclampsia may affect the comparison of our results with those of other studies. We used the new definition of preeclampsia adopted by FIGO, whereas most published studies used the old WHO definition, which included proteinuria as a mandatory criterion. In addition, we did not follow up with patients beyond 3 months after the end of pregnancy to obtain data on long-term outcomes. Blood pressure was measured each time in the hospital and may have been skewed by the white coat effect.

4.2. Changes in Clinical Signs after Delivery

In our study, we observed a mortality rate of 2.7% after delivery, a figure that exceeds the threshold tolerated by the World Health Organization (WHO), which recommends that hospitals organize their services in such a way as to limit the mortality rate from obstetric complications to less than 1% [10] [11]. A study conducted in Ghana also reported a 2.7% mortality rate from preeclampsia during pregnancy and postpartum [12]. These results raise concerns about the quality of obstetric care and the management of complications. Several factors may contribute to this high mortality rate, including delays in the management of complications and insufficient resources within health facilities. It is therefore important to mobilize resources to ensure continuous care, which will enable health facilities to align their performance with WHO guidelines for improving maternal outcomes.

In our study, the average gestational age of patients was 33.8 ± 4.2 weeks of amenorrhea (WA), ranging from 20 to 42 WA. Notably, 51% of patients had a gestational age greater than 37 weeks, which suggests predominantly late-onset disease in this cohort. In addition, we observed that 6% of patients had a gestational age below the viability threshold of 28 GA accepted in the Burkinabe context. By way of comparison, a study conducted in China in 2021 found 17.98% of preeclampsia cases before 28 weeks of gestation [13]. This figure is significantly higher than ours, but hospitals are undoubtedly relatively better equipped to manage these cases of very early preeclampsia.

We observed a gradual regression of the clinical signs of preeclampsia after the end of pregnancy. However, it is important to note that three months after the end of pregnancy, high diastolic blood pressure persisted in 7% of patients and high systolic blood pressure in 7.8% of them. These results suggest that continuous monitoring is necessary, even after delivery, to ensure proper recovery and detect any hypertensive complications. In a study conducted by Berks *et al.* [14] in Netherlands, based on a sample of 205 preeclamptic patients followed for two years, it was observed that three months after delivery, 39% of women still had hypertension, a percentage that decreased to 18% after two years. These results corroborate our observations, highlighting that the resolution of postpartum hypertension can be slow and that factors such as systolic and diastolic blood pressure at the time of delivery influence this process. In fact, for every 10 mmHg increase in maximum systolic blood pressure, the resolution time increased by 60%, while for maximum diastolic pressure, this increase was 40% [14]. This underscores the importance of optimal management of hypertension during pregnancy.

In addition, a study [15] showed that the use of ambulatory blood pressure monitoring (ABPM) revealed that half of patients who had suffered from preeclampsia had persistent hypertension between the sixth and twelfth months after delivery. This finding highlights the importance of prolonged monitoring for this population, preferably by a cardiologist. In fact, a number of women also suffered from white coat hypertension, while others had masked hypertension.

In addition, authors [16] [17] examined the neurological consequences in patients who had experienced eclampsia, following a group of women over a period of several years after childbirth. They observed that a significant proportion of them had persistent neurological disorders, including headaches, mood disorders, and various other neurological problems. These data highlight the long-term impact of eclampsia on patients' quality of life, emphasizing the importance of a multidisciplinary approach and appropriate neurological follow-up.

Finally, it is essential to reduce blood pressure gradually in order to avoid significant maternal hypotension, which could compromise the prognosis and aggravate neurological symptoms [18] [19]. In short, continuous vigilance and appropriate follow-up strategies are necessary to properly manage the blood pressure of women who have suffered from preeclampsia.

4.3. Changes in Paraclinical Signs after Delivery

Anemia was completely corrected three months after the end of pregnancy in all patients. However, persistently high creatinine levels were noted in 2.9% of patients. Twenty-four-hour proteinuria greater than 0.15 g per liter, although gradually decreasing, remained abnormal in 3.5% of patients at three months. It should also be noted that platelet counts and liver enzymes normalized in all patients at the end of this period.

These results are consistent with a study conducted in Côte d'Ivoire [20], which reported a significant improvement in anemia and normalization of liver tests in the months following delivery. However, this study also observed that some patients continued to have abnormal urinary parameters, including persistent levels of proteinuria, highlighting the importance of prolonged monitoring. This finding reinforces the idea that while the majority of patients experience resolution of these complications, a subgroup may require prolonged attention and multidisciplinary, in-depth follow-up.

5. Conclusions

The results of this study show that most clinical and laboratory abnormalities resolved by 3 months postpartum, but a clinically relevant subgroup had persistent hypertension and residual laboratory abnormalities.

We recommend a standardized postpartum follow-up pathway at 7th day, 6 weeks, and 3 months with blood pressure assessment, urinalysis/24-h protein, creatinine, and liver enzymes, with cardiology referral for persistence beyond 3 months and cardiovascular risk counseling.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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