

Immediate Postpartum Hemorrhage at a Type 2 Health Center in Dakar, Senegal (January 2011 – December 2024): Epidemiology, Management, and Maternal Prognosis

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ABSTRACT

Objectives: To evaluate the management of immediate postpartum hemorrhage at the Nabil Choucair Health Center by providing a description of its epidemiological, etiological, therapeutic, and prognostic aspects.

Methodology: This is a retrospective, single-center, analytical, and descriptive study of data collected over a 14-year period, from January 1, 2011, to December 31, 2024. It covers 446 women treated for immediate postpartum hemorrhage at the Nabil Choucair Health Center. Data was collected from patients' hospital records using Google Forms and analyzed using R Studio version 2025.05.

Results: The frequency of IPHH was 0.71%. The epidemiological profile was that of a paucipara (41.1%), aged 27, who came on her own in 74.4% of cases, with the majority having had at least four antenatal care visits. Just over a third of patients (35.4%) had experienced an obstetric or medical complication during pregnancy. During labor, 31.1% of patients had at least one abnormality. Delivery was most often vaginal (82.8%), following a full-term pregnancy (89.6%), with a live and healthy newborn (83.4%). The delay in treatment was relatively long, with an average of 123 minutes. Medical management was initiated with uterotonics, mainly oxytocin (96.5%) and misoprostol (48.1%). More than one-third of patients required blood transfusion (35.0%). Among obstetric procedures, uterine revision was the most frequently performed intervention (93%), followed by uterine massage (59.9%). Only 27.8% of patients required mechanical methods, with intravaginal tamponade being the most commonly used. Surgical management was required in 56.5% of cases. Hemostatic hysterectomy, a radical but life-saving procedure, was performed in 8.9% of patients. Anemia was the most frequent complication (43%). The case fatality rate related to immediate postpartum hemorrhage was 4.9%.

Conclusion: Immediate postpartum hemorrhage remains a frequent and potentially life-threatening obstetric emergency. In this study, it was mainly caused by traumatic lesions, uterine atony, and retained placental tissue.

Keywords

Immediate postpartum hemorrhage, Nabil Choucair, Epidemiology, Management, Maternal outcome.

Introduction

According to the World Health Organization (WHO), in 2020, approximately 800 women died every day from preventable causes related to pregnancy and childbirth—equivalent to one woman every two minutes [1]. Postpartum hemorrhage (PPH) is

an obstetric emergency and remains a leading cause of preventable maternal morbidity and mortality worldwide, particularly in developing countries. It accounts for 8% of maternal deaths in developed regions and 20% in developing regions [2].

In Senegal, as in many developing countries, PPH—occurring within 24 hours of delivery—is the leading cause of maternal mortality; its management presents specific challenges due to limited resources and restricted access to specialized care. In

2015, the maternal mortality ratio in Senegal was 315 deaths per 100,000 live births, well above the target of 127 deaths per 100,000 live births set by the Sustainable Development Goals (SDGs). However, by 2023, this ratio had dropped significantly, reaching 153 deaths per 100,000 live births [3].

This reduction reflects the country's efforts to improve maternal healthcare, particularly through initiatives such as the National Reproductive Health Strategy. Despite this progress, Senegal must continue its efforts to meet the Sustainable Development Goal of reducing the global maternal mortality ratio to fewer than 70 deaths per 100,000 live births by 2030. Audits of deaths linked to immediate postpartum hemorrhage (IPPH) indicate that delays in diagnosis and management were frequently contributing factors. A 2021 study at Pikine Hospital revealed that only 17.3% of patients received care within two hours. The majority—54.7%—waited between two and four hours, reflecting an overall delay in care [4]. Consequently, the rapid detection of immediate postpartum hemorrhage is crucial for improving patient outcomes and enabling timely intervention. Although various medical and surgical treatments are available, their implementation is often challenging in resource-limited settings due to poverty and geographical barriers [5,6].

The main causes identified include uterine atony, responsible for 47.1% of cases, and traumatic injuries, accounting for 26.2%, according to a study conducted by Dieme [7] at a level II health center in Dakar. In response to this concerning situation, Senegal's Ministry of Health and Public Hygiene has implemented prevention strategies, such as the introduction of active management of the third stage of labor (AMTSL) and the use of uterotonics in healthcare facilities. Despite these initiatives, postpartum hemorrhage (PPH) remains a major challenge for maternal health in Senegal. It is therefore essential to strengthen prevention measures and improve patient care in order to reduce maternal mortality and morbidity associated with this complication. The general objective of this thesis is to evaluate the management of PPH at a type 2 health center in the Dakar suburbs over a 14-year period.

Methodology

Study type and period

This research is a retrospective descriptive and analytical study focusing on patients who experienced immediate postpartum hemorrhage and were treated at the CSNC maternity unit between January 1, 2011, and December 31, 2024.

Population

Our study covered all patients who experienced immediate postpartum hemorrhage at the CSNC during the study period.

Inclusion criteria

We included in our study any patient treated at the maternity unit for immediate postpartum hemorrhage following delivery at a gestational age of more than 22 weeks of amenorrhea.

Exclusion criteria

Patients whose medical records contained a significant amount of missing data were excluded from the study, as the records could not be utilized

Parameters studied

For each patient, the parameters studied were:

- Socio-demographic characteristics (age, gravidity, parity);
- Pregnancy history (type of pregnancy, prenatal care);
- Admission data (mode of admission, reasons for admission);
- Labor and delivery data;
- Neonatal data (Apgar score, birth weight, neonatal outcome);
- Data on PPH (time to diagnosis, initial blood loss volume, PPH etiologies, treatment initiated);
- Clinical course and prognosis.

Data collection and analysis

Data were collected from patients' hospital records using Google Forms and analyzed using RStudio version 2025.05. The analysis comprised two parts: descriptive analysis and analytical analysis.

Data analysis

In the descriptive analysis, qualitative variables were described in terms of frequency and percentage, while quantitative variables were described using the mean (with standard deviation), range (extremes), and median.

Definition of parameters studied

- Primigravida → woman pregnant for the first time.
- Paucigravida → woman who has had 2 or 3 pregnancies.
- Multigravida → woman who has had more than 3 pregnancies.
- Primipara → woman who has given birth once.
- Paucipara → woman who has had 2 or 3 deliveries.
- Multipara → woman who has had more than 3 deliveries.
- Grand multipara → woman who has had at least 5 deliveries.

Results

Prevalence

A total of 446 cases of immediate postpartum hemorrhage out of 63,234 deliveries were recorded over a 13-year period—from January 1, 2011, to December 31, 2024—at the Nabil Chouair Health Center, representing a frequency of 0.71%.

Socio-demographic characteristics

Age

The patients' ages ranged from 14 to 45 years. The mean age was 27.6 years, with a standard deviation of 7.0 years. The median age was 27 years, indicating that half of the patients were younger than this.

The majority of postpartum hemorrhage cases occurred in the 20–29 age group, which accounted for 45% (n=193) of the patients (Figure 1).

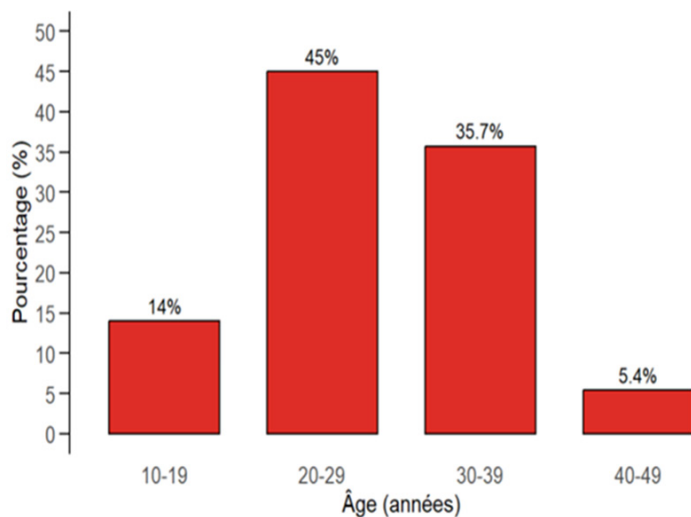


Figure 1: Distribution of patients by age.

Gravidity

Mean gravidity was 2.9 pregnancies, with a median of 2. The number of pregnancies ranged from 1 to 13. Primigravidae accounted for 35.1% (n=151) of cases, representing the largest proportion.

Parity

The mean number of previous deliveries was 1.8, with a median of 1 and a range of 0 to 9 children. Pauciparous women constituted the most represented category, accounting for 41.1% (n=176) of cases.

Marital status

The vast majority of patients were married, representing 98.3% (n=226) of cases. Single women were very poorly represented, accounting for only 1.7% (n=4) of cases.

Data on the diagnosis of immediate postpartum hemorrhage Time interval between delivery and diagnosis of immediate postpartum hemorrhage

The mean interval was 123.8 minutes, with a standard deviation of 161.4 minutes, reflecting significant variability. The median interval was 72.5 minutes, indicating that half of the diagnoses were made within one hour and fifteen minutes of delivery. The minimum interval observed was 1 minute, while the longest reached 1,150 minutes (i.e., more than 19 hours).

Initial blood loss volume

Mean blood loss was estimated at 870 ml, with a median of 750 ml. The minimum observed was 500 ml and the maximum was 1,500 ml.

Chronological record of monitoring data

In 69.8% of cases (n=143), a chronological record of postpartum monitoring was present in the medical chart. Conversely, in 30.2% of cases (n=62), no chronological record was found.

Management

Medical treatment

Oxytocin was administered in almost all cases, used in 96.5% of patients (n=327). Nearly half (48.1%, n=163) also received prostaglandin analogues, either concomitantly or sequentially. Tranexamic acid was used in only 2.4% of cases (n=8).

The mean dose of misoprostol administered was 714.5 micrograms, with a median of 800 µg. The minimum dose observed was 400 µg, and the maximum dose reached 1000 µg. 35.0% (n=145) of patients received at least one blood product, while 65.0% (n=274) were not transfused. Thus, more than one-third of patients required blood replacement therapy for postpartum hemorrhage. Whole blood alone was administered in 67% of cases (n=28). A combination of whole blood and fresh frozen plasma was used in 26% of patients (n=11), while less common combinations included whole blood plus packed red blood cells (2.4%) and packed red blood cells plus fresh frozen plasma (2.4%). Only one case involved a transfusion of fresh frozen plasma alone (2.4%). Regarding the number of units transfused, the majority of patients received a moderate amount: 54% (n=15) received 2 units, while 39% (n=11) received 1 unit. Only 7.1% (n=2) of patients received 3 units, reflecting more severe cases.

Obstetric management

Manual exploration of the uterus was the most frequently performed procedure, observed in 93.0% of cases (n=253). Uterine massage was also widely used, performed in 59.9% of patients (n=163).

Mechanical methods

The use of mechanical methods was reported in 27.8% of patients. Intravaginal packing was the most frequently used method, observed in 65.3% of cases (n=81). Intrauterine packing was also employed in 37.1% of cases (n=46), often as a supplement to or follow-up for other treatments.

Surgical management

Surgical treatment was performed in 56.5% of patients (n=247), while 43.5% (n=190) did not require it. Thus, more than one in two women who experienced severe postpartum hemorrhage (PPH) underwent at least one surgical procedure.

Among the reported interventions, perineorrhaphy was the most common, performed in 43.7% of cases (n=108). Cervical repair was performed in 25.1% (n=62), and laparotomy was reported in 22.3% of cases (n=55). Vulvovaginal repair accounted for 20.2% of procedures (n=50).

Hemostatic hysterectomy was the primary indication for laparotomy, observed in 70.2% of cases (n=40), representing 8.9% of all postpartum hemorrhage cases. Arterial ligation was performed in 17.5% of cases (n=10). Uterine sutures (12.3%, n=7) and uterine compression sutures (8.8%, n=5) were also performed.

Outcome data

Post-PPH complications were reported in 49.1% of patients (n=219), while 50.9% (n=227) experienced none. Anemia was by far the most frequent complication, observed in 43% of patients (n=192). Maternal death occurred in 4.9% of cases (n=22), representing the most severe complication. Shock was reported in 2.5% (n=11), coagulopathy in 2% (n=9), and acute renal failure in 1.6% (n=7).

Discussion

Strengths and limitations of the study

The study addresses the need for local data on a major cause of maternal mortality. Consequently, the findings can be used to adjust care protocols at the Nabil Choucair Health Center and serve as a model for similar facilities.

However, this study has certain limitations. First, its single-center design and the observation period—while relatively long (13 years)—limit the scope of the results and their generalizability to the national level. Second, data collection was hampered by the lack of a computerized system, leading to data loss and affecting the completeness of medical records.

Prevalence

In our study, the frequency of immediate postpartum hemorrhage (PPH) was 0.71%. This figure appears relatively low compared to data from African and international literature.

For instance, Ouattara in Burkina Faso reported a frequency of 9% [8] and Tiruneh in Ethiopia found a similar rate of 8.8% [9]—more than ten times higher than our result. In Senegal, two hospital-based studies by Azzouzi [4] and Kallo [10] reported rates of 2.4% and 2.5% respectively, figures that were also higher than ours. In Morocco, Bouziani [11] reported a frequency of 2.3%, confirming the trend observed in other Maghreb countries.

The incidence of primary postpartum hemorrhage (PPH) in France varies depending on the studies and definitions used. In 2014, Dupont et al. reported a PPH incidence of 6.4% in a large prospective study involving 106 French maternity units [12], with severe PPH occurring in 1.7% of cases. However, in 2016, Vendittelli et al. found lower rates in their HERA study, with a PPH incidence of 3.36% following vaginal delivery and 2.83% following cesarean section, while severe PPH occurred in 1.11% and 1.00% of cases, respectively [13]. These results are significantly higher than those of our study.

This wide variation can be attributed to the lack of a common definition for PPH, as well as the absence of systematic and objective measurement of blood loss; visual assessment tends to underestimate the volume of hemorrhage.

Sociodemographic characteristics

Age

In our series, the mean age of patients was 27.6 years, consistent

with data from the national literature, where most authors report a mean age of around 28 to 30 years—such as Azzouzi [4], Morelle [14], and Dielia [15]. The 20–29 age group accounted for the majority of cases (45%)—a trend also observed by Diarra in Mali (47.1%) [16]—reflecting the overlap between the peak reproductive years and the occurrence of postpartum hemorrhage. However, some studies, such as the one conducted by Yonta in 2019 at Pikine Hospital, found a predominance in the 30–34 age group [88], highlighting variability across obstetric contexts. A study by Lahmiri in France confirms that nearly three-quarters of the women involved were aged 20 to 35, yet also reveals a significant proportion of women over 35 [17]. These results suggest that while young women remain at the highest risk in absolute terms, later pregnancies also require heightened monitoring. Our findings thus align with the general trends described in research conducted in Senegal and the surrounding region.

Parity

In our study, the mean number of prior deliveries was 1.8, with a predominance of pauciparous women (41.1%). This result is comparable to those found by Yonta (80.3% pauciparous) [18] and Bouziani (50%) in Morocco [11]. The high representation of pauciparous women can be explained by the fact that they constitute a significant proportion of the active obstetric population, corresponding to the most fertile age groups. From a pathophysiological standpoint, however, immediate postpartum hemorrhage can affect women of any parity. In primiparous and pauciparous women, certain risk factors—such as labor induction, dystocia, or the use of uterotonics—can predispose patients to uterine atony. Conversely, in multiparous and grand multiparous women, excessive stretching of the myometrium is a recognized factor for uterine inertia, which also increases the risk of PPH. Thus, while our data confirm the predominance of pauciparous women, they also serve as a reminder that PPH is not specific to any single obstetric profile and must be systematically anticipated regardless of parity.

Management

In our series, the mean interval between delivery and the diagnosis of immediate postpartum hemorrhage was 123.8 minutes. This result is comparable to those reported by Yonta [18], who found a mean interval of between 2 and 4 hours; by Dieme [7], who reported 132 minutes; and by Bouziani [11], who reported an interval of 2 hours. This consistency suggests that, across various settings, the diagnosis of immediate PPH is often delayed, which can postpone the initiation of therapeutic measures and worsen maternal outcomes.

Medical management

In our series, oxytocin was administered in almost all cases (96.5%), confirming its central role as the first-line treatment for PPH, in accordance with WHO [19] and FIGO [20] guidelines. Nearly half of the patients (48.1%) also received prostaglandin analogues—either as a follow-up treatment or in combination—reflecting the importance of therapeutic combinations in controlling persistent

hemorrhage. The mean dose of misoprostol administered was 714.5 micrograms, with a median of 800 µg; this remains below recommended levels. Other medications, such as tranexamic acid (2.4%) or colloid volume expanders, were used less frequently, consistent with their targeted indications for severe or refractory PPH. These results are comparable to those reported by Kétévi [21] in Togo, where oxytocin was used in 60.6% of patients, followed by misoprostol (36.9%) and tranexamic acid (2%). A study by Dielia Ka also reported that all patients received oxytocin as the first-line treatment [15]. These findings highlight a universal trend of prioritizing oxytocin as the initial treatment, with the use of prostaglandins and tranexamic acid depending on the severity of the hemorrhage.

More than one-third of the patients (35.0%) required blood replacement, a figure close to the 30.6% observed by Azzouzi [6].

Obstetric management

In our study, manual exploration of the uterine cavity was the most frequently performed procedure (93%), followed by uterine massage (59.9%); this reflects a therapeutic strategy focused on evacuating debris and stimulating uterine contraction. These rates are significantly higher than those reported by Kétévi [21] in Togo (38.9% and 57.1%, respectively).

Mechanical management

Our study showed that 27.8% of patients underwent mechanical interventions. Among these, intrauterine balloon tamponade was used in 37.1% of cases (n=46)—representing 10% of all PPH cases—often as an adjunct to or follow-up for other treatments; this proportion is significantly higher than that observed by Dieme [7] in 2017 (n=2). Our results confirm the growing interest in this technique as an effective alternative following medical management. Notably, in a meta-analysis, Suarez found an efficacy rate of 85.9% (95% confidence interval: 83.9–87.9%) for the intrauterine balloon [22]. In a study conducted between 2002 and 2013, Lo et al. found that the use of the Bakri balloon led to a reduction in the postpartum hysterectomy rate from 7.8 per 10,000 deliveries to 2.3 per 10,000 deliveries [23].

Surgical management

Surgical treatment was performed in 56.5% of patients (n=247). Among the reported interventions, laparotomy accounted for 22.3% of cases (n=55), and the most frequent indication was hemostatic hysterectomy (70.2% of these cases, n=40; representing 8.9% of all PPH cases). This proportion is significantly higher than the rates reported by Bouziani [11] (2.38%) and Diarra [16] (1.2%). Although radical, this procedure is often life-saving in cases of severe PPH. In our series, a significant number of PPH cases were severe; patients were often admitted late or were already in hemorrhagic shock, thereby limiting the scope for conservative management techniques.

Maternal outcome

In our series, nearly one in two women who experienced postpartum hemorrhage developed a complication in the immediate or short-

term aftermath. Anemia accounted for 43% of cases, reflecting the direct impact of blood loss. The case fatality rate was 4.9%—a figure slightly higher than those reported by Azzouzi [4] and Ka [15] (2.7% and 4.2%, respectively). However, it remains lower than the 5.4% rate found in the 2015–2016 rapid assessment report on emergency obstetric and newborn care (EmONC) in Senegal. This indicates a significant decline in mortality associated with postpartum hemorrhage, driven by improvements in clinical management.

Conclusion

Immediate postpartum hemorrhage remains a major obstetric emergency and a significant cause of maternal morbidity and mortality. This study, conducted at the Nabil Choucair Health Center, reveals an incidence of 0.71%, with traumatic injuries, uterine atony, and retained placenta predominating as the primary causes. Despite the widespread use of uterotonics and first-line obstetric interventions, delays in management, the high prevalence of anemia, and a case fatality rate of 4.9% highlight persistent shortcomings in the continuum of care.

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