Scientific Research Publishing

Open Journal of Obstetrics and Gynecology, 2024, 14, 1611-1627
https://www.scirp.org/journal/ojog
ISSN Online: 2160-8806
ISSN Print: 2160-8792

Emergency Obstetric Hysterectomy in a Low Resources Country: An Eight-Year Retrospective Cohort Study from a Secondary Care Hospital in Niger

Amadou Issa Abdou[1], Hamidou Soumana Diaouga[2*], Zalika Salifou Lankoandé[3], Souley Ibrahim Lailata[1], Maina Oumara[4], Harouna Salifou Jamila[1], Salamatou Guédé[2], Younsou Ganda[1], Moussa Boukari[1], Oumarou Garba Souleymane[3], Hamissou Souley M. Noury[5], Madi Nayama[2]

[1]Department of Obstetrics & Gynecology, Mother and Child Health Centre, Dan Dicko Dankoulodo University of Maradi, Maradi, Niger
[2]Department of Obstetrics & Gynecology, Issaka Gazoby Maternity Hospital, Abdou Moumouni University in Niamey, Niamey, Niger
[3]Department of Obstetrics & Gynecology, Mother and Child Health Centre, Andre Salifou University of Zinder, Zinder, Niger
[4]Department of Obstetrics & Gynecology, General Referal Hospital, Abdou Moumouni University in Niamey, Niamey, Niger
[5]Department of Anesthesia, Referal Hospital in Maradi, Maradi, Niger
Email: *hamidousoumana21@gmail.com

How to cite this paper: Abdou, A.I., Diaouga, H.S., Lankoandé, Z.S., Lailata, S.I., Oumara, M., Jamila, H.S., Guédé, S., Ganda, Y., Boukari, M., Souleymane, O.G., Noury, H.S.M. and Nayama, M. (2024) Emergency Obstetric Hysterectomy in a Low Resources Country: An Eight-Year Retrospective Cohort Study from a Secondary Care Hospital in Niger. *Open Journal of Obstetrics and Gynecology*, **14**, 1611-1627.
https://doi.org/10.4236/ojog.2024.1410132

Received: September 13, 2024
Accepted: October 25, 2024
Published: October 28, 2024

Abstract

Introduction: Emergency obstetric hysterectomy (EOH) is a lifesaving procedure that is performed as a last resort in cases of severe postpartum haemorrhage. **Objective**: The objective of this study was to determine the incidence, socio-demographic profile of patients, indications, management and maternal-fetal outcomes of EOH in a maternity hospital with limited resources in Niger. **Methodology:** This was an eight-year retrospective cohort study involving the analysis of medical records from patients who underwent emergency obstetric hysterectomies between 1 January 2015 and 31 December 2022 at the Mother and Child Health Centre (MCHC) in Maradi, Niger. The epidemiological data, indications, and outcomes of EOH were collated and subjected to analysis using the statistical software package SPSS 21.0. Comparisons were made using the Chi-squared test. A p-value of less than 0.05 was considered statistically significant. **Results:** During the study period, 239 cases of emergency obstetric hysterectomy were recorded out of 269,710 deliveries, representing a frequency of 0.89%. The mean age of the patients was 32.41 years (range: 17 - 50 years). The patients were identified as married (239 cases, 100%), unemployed (228 cases, 95.4%), and not attending school (215 cases,

90%). The largest number of cases were observed in large multiparous women (*i.e.*, those with more than five children), representing 58.6% of the total number of cases (140 patients). The average parity among this group was 6.15 children. The majority of patients (229 patients, 95.82%) had undergone in utero transfer, with 169 patients (70.71%), originating from peripheral maternity units in the Maradi region. Upon admission, 116 patients (48.53%) exhibited active genital haemorrhage, while 58 patients (24.26%) were in shock. The primary indications for hysterectomy were uterine rupture (153 patients, 64%), uterine atony (77 patients, 32.2%), and placental accreta (six patients, 2.5%). Hysterectomy was performed by an obstetric gynaecologist (230 patients, 96.2%), an obstetric gynaecology resident (six patients, 2.5%), or a general practitioner with district surgical expertise (three patients, 1.3%). In the majority of cases (180 patients, 75.3%), total hysterectomy was performed. The incidence of maternal mortality (26 patients, 10.9%), and perinatal mortality (223 newborns, 93.4%) was notably elevated in our series. **Conclusion:** Our findings are in close alignment with those previously documented in the literature. The practice of emergency obstetric hysterectomy is a common occurrence in our region. It is considered a last resort when conservative procedures have failed or are not an option. Improved obstetric management would result in a reduction in the number of cases of haemostatic hysterectomy. The availability of blood products is expected to improve maternal prognosis.

Keywords

Emergency Obstetrical Hysterectomy, Postpartum Hemorrhage, Maternal Mortality, Niger

1. Introduction

Postpartum haemorrhage (PPH) represents a significant contributor to maternal morbidity and mortality in both developing and developed countries, with an estimated, 150.000 deaths annually worldwide. It is the primary cause of maternal mortality in developing countries [1]-[3]. The management of PPH is primarily based on the prevention of postpartum haemorrhage through the consideration of risk factors, the respectful monitoring of the physiological processes of delivery, the conducting of an aetiological assessment and the monitoring of the patient in the postpartum period. The implementation of curative treatment necessitates a multidisciplinary approach, the utilisation of medical resources (such as oxytocics and prostaglandins), radiological resources (including uterine artery embolisation) and surgical resources (such as staged vessel ligation and haemostasis hysterectomy) [4].

Obstetric hysterectomy is defined as the surgical removal of the uterus performed at the time of delivery or in the immediate postpartum period [5]. It is a last resort treatment for severe postpartum haemorrhage and is associated with high maternal morbidity and mortality rates [5] [6]. It is an essential treatment

for life-threatening obstetric emergencies, particularly in countries with limited resources, where the frequency is very high (between 0.4% and 1.25%) due to the absence of conservative treatment methods and the unavailability of blood products or coagulation factors [7] [8].

The frequency of emergency obstetric hysterectomy in Niger is reported to vary from 0.81 to 0.98, depending on the study in question [4] [7] [9]. In order to gain a deeper understanding of this phenomenon, it is essential to examine the practice of emergency obstetric hysterectomy in a secondary healthcare hospital in the town of Maradi in the Republic of Niger.

The objective of this study was to determine the incidence, socio-demographic profile of patients, indications, management and maternal-fetal outcomes in women who underwent emergency obstetric hysterectomy. Furthermore, we delineate potential avenues for enhancement in our existing practice, thereby proposing alternative strategies and actions for implementation in under-resourced settings.

2. Materials and Methods

2.1. Study Design and Setting

This was a retrospective, descriptive, and analytical study conducted over 8 years from 1 January 2015 to 31 December 2022 at the Mother and Child Health Centre of Maradi (MCHC). The MCHC of Maradi is a secondary healthcare facility that offers medical education, clinical care, and research to a population of over 5 million inhabitants of the city of Maradi and its environs. The Obstetrics and Gynaecology department has 8 obstetricians, 45 paramedical staff (comprising of midwives, nurses and assistant nurses), 3 outpatient consultation rooms, 1 delivery room, 4 delivery beds with an annual average of 3300 deliveries.

2.2. Study Population and Sampling

The study involved all patients admitted directly or after in utero transfer to the department and who underwent emergency obstetric hysterectomy during the period 2015 to 2022.

2.3. Inclusion Criteria

The study population comprised all patients who had undergone vaginal delivery or caesarean section beyond 23 weeks of amenorrhoea, presented with severe postpartum haemorrhage within 24 hours of delivery and required obstetric hysterectomy immediately or after the failure of conservative treatments. The term "emergency obstetric hysterectomy" is used to describe the surgical removal of the uterus in an emergency situation during pregnancy, childbirth or the postnatal period for a reason that threatens the patient's vital prognosis. The condition of neonates born to patients who had undergone hysterectomy was assessed.

2.4. Non-Inclusion Criteria

The study did not include patients who had undergone hysterectomy for gynaecological or oncological reasons, as well as those who had undergone the procedure outside the remit of the department. Furthermore, patients who had undergone an obstetric hysterectomy outside the specified study period were not included in the study.

2.5. Exclusion Criteria

We excluded all unusable records with missing data.

2.6. Data Collection

Data were collected from obstetric records and various registers (delivery room and emergency room registers, operative reports) using a pre-established survey form.

2.7. Variables Studied

The variables under investigation encompassed socio-demographic characteristics and a range of clinical, paraclinical, therapeutic and prognostic data pertaining to both patients and newborns.

2.8. Statistical Analysis

The data were entered, processed and analysed using the statistical software package SPSS 21.0. The results are presented as mean values and proportions, expressed as percentages. Comparisons were made using the Chi-squared test, with a significance level of P-value < 0.05. Tables 1-6 and Figure 1 were generated using Microsoft Word and Excel 2016.

Table 1. Socio-demographic characteristics of patients.

Variables	Number of cases	Percentage (%)
Age(year)		
<20	4	1.7
20 - 24	20	8.4
25 - 29	42	17.6
30 - 34	62	25.9
35 - 39	83	34.7
≥40	28	11.7
Parity		
1	11	4.6
2 - 3	38	15.9
4 - 5	50	20.9
≥6	140	58.6

Continued

Profession		
Unemployed	228	95.4
Student	3	1.3
Nurse	2	0.8
Shopkeeper	3	1.3
Teacher	3	1.3
ANC		
0	53	22.2
1 - 3	130	54.4
≥4	56	23.4

ANC: Antenatal care.

Table 2. Risk factors for postpartum haemorrhage found in patients.

Variables	Number of cases	Percentage (%)
Previous uterine scar	45	18.8
Multiparity	190	79.5
Dystocic delivery	50	20.9
Retroplacental haematoma	30	12.6
Anemia	13	5.4
Placenta previa	10	4.2
Placenta accreta	6	2.5
Multiple pregnancy	1	4.3
Preeclampsia	2	0.8

Table 3. Reasons for admission of patients to the Mother and Child Health Centre in Maradi.

Variables	Number of cases	Percentage (%)
Severe anaemia	13	5.4
Perpartum asphyxia	8	3.3
Postpartum haemorrhage	13	5.4
Clandestine abortion	1	0.4
Cervical tear	2	0.8
Dystocic delivery	51	21.3
3rd trimester haemorrhage	27	11.3
Retroplacental haematoma	30	12.6
Fetal death in utero	9	3.8
Oligohydramnios	1	0.4
Placenta previa	10	4.2
Severe pre-eclampsia	2	0.8
Cord prolapse	5	2.1
Placental retention	1	0.4

Continued

Premature rupture of membranes	1	0.4
Uterine rupture	33	13.8
Eutoctopic labour	7	2.9
Scarred uterus	19	7.9
Other	6	2.5

Table 4. Indications for emergency obstetric hysterectomy in patients.

Variables	Number of cases	Percentage (%)
Uterine rupture	153	64
Uterine atony	77	32.2
Placenta accreta	6	2.5
Uterine perforation after clandestine abortion	1	0.4
Physiometry	2	0.8
Total	239	**100.0**

Table 5. Complications of emergency obstetric hysterectomy in patients.

Complication	Number of cases	Percentage (%)
Anemia	38	48.10
Hemorrhagic shock	17	21.51
Cardiac arrest	9	11.40
Parietal suppuration	6	7.64
Renal failure	4	5.06
Vesico-vaginal fistula	3	3.79
Digestive fistula	1	1.25
Evisceration	1	1.25
Total	79	100

Table 6. Factors predictive of patient mortality.

Variables	Number of cases	percentage (%)	P-value
Age (year)			0.27
<30	5	19.2	
≥30	21	80.8	
Parity			0.42
1	1	3.85	
2 - 3	3	11.54	
4 - 5	8	30.75	
≥6	14	53.85	
Admission mod			0.1
Direct	9	34.6	
Referred	17	65.4	

2.9. Ethics Approval

Ethics approval was obtained by the ethics committee of the Dan Dicko Dancoulodo University of Maradi. The institutional review board of our Hospital (Mother and Child Health Centre of Maradi) waived the requirement for written informed consent from the patients because of the retrospective nature of the study. The study was conducted according to the principles of the World Medical Association Declaration of Helsinki.

3. Results

A total of 26.971 deliveries were recorded over the course of the study period. Two hundred and thirty-nine (239) obstetric hysterectomies were performed, representing a frequency of 0.89%. Figure 1 illustrates the frequency of obstetric hysterectomies in the department over the years. The highest prevalence was recorded in 2019, with a rate of 1.31% (39 cases per 2967 deliveries).

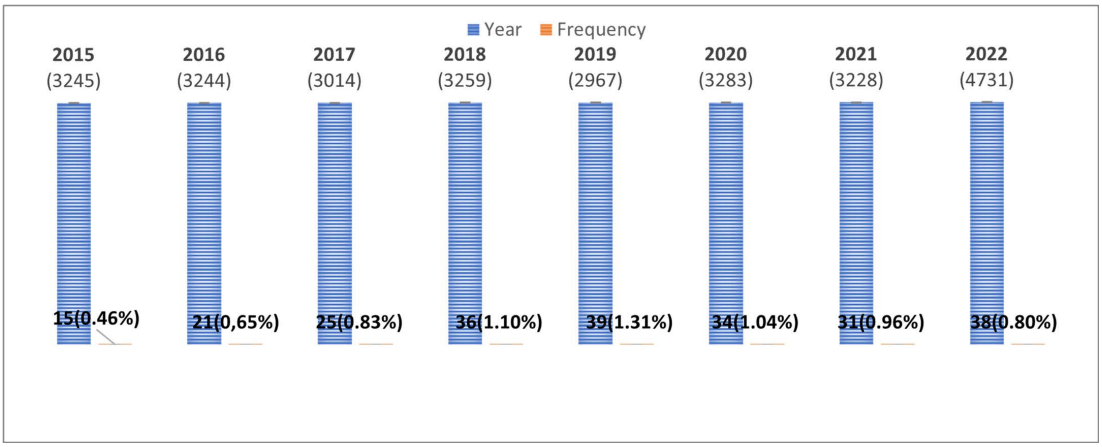

Figure 1. Annual evolution of obstetric hysterectomy.

The mean age of the patients was 32.41 years (ranging from 17 to 50 years). The age group with the highest representation was that of 35 - 39 years old, with a total of 83 patients (34.7%). Four patients (1.7%) were under the age of 20. The majority of patients were married (239 cases, 100%), unemployed (228 cases, 95.4%) and not schooling (215 cases, 90%). The mean parity was 6.15, with a range from 1 to 13 children. The majority of women were large multiparous (*i.e.*, had given birth to more than five children), with 140 patients (58.6%) falling into this category. Conversely, 11 patients (4.6%) were primiparous. Of the total number of patients, 45 (18.8%) had undergone at least one previous caesarean section.

With regard to antenatal care (ANC), 53 patients (22.2%) had not attended any antenatal visit. One hundred and thirty patients (54.39%) had undergone one to three antenatal visits. A mere 57 patients (23.84%) had undergone at least four ANC procedures.

Upon examination of the mode of admission, it was determined that 10 patients (4.18%) had presented directly to the department for delivery. Two hundred and

twenty-nine patients (95.82%) were the result of in utero transfers, of whom 169 patients (70.71%) had been transferred from peripheral maternity units in the Maradi region. The majority of patients (70.71%) resided at distances ranging from 33.5 to 124.1 km from the Maradi MCHC, which equates to an approximate journey time of 39 minutes to two hours, despite the availability of ambulances in district hospitals. Upon admission, 22 patients (9.2%) were less than 37 weeks' gestation. The primary motif for admission was haemorrhage in the third trimester of pregnancy (100 patients, 41.84%, including 33 with uterine rupture, 30 with retroplacental haematoma and 10 with placental previa), as well as dynamic and mechanical dystocia (46 patients, 19%). The remaining cases were attributed to a variety of other causes, including delivery in a scarred uterus (19 patients, 7.9%), postpartum haemorrhage (six patients, 2.51%), in utero foetal death (9 patients, 3.8%) and perinatal asphyxia (8 patients, 3.3%).

Concerning the condition of the patient upon admission, a mere 94 patients (39.3%) were in good general condition. One hundred and sixteen patients (48.53%) exhibited active genital haemorrhage, while 58 patients (24.26%) were in a state of haemorrhagic shock.

With regard to the paraclinical assessment, haemoglobin levels were determined for all patients (100%). The mean haemoglobin level was 7.85 g/dl, with a range of 3.1 to 13.6 g/dl. A total of 41 patients (17.2%) exhibited a haemoglobin level of less than or equal to 7 g/dl. A haemoglobin level of 11 g/dl or above was observed in only 68 patients (28.5%).

In examining the mode of delivery, it was observed that 18 patients (7.53%) had given birth in peripheral maternity hospitals in Maradi, while 221 patients (92.47%) had given birth in our department. Twenty-two patients (9.2%) had undergone a vaginal delivery. One hundred patients (41.8%) had undergone laparotomy for uterine rupture. One hundred and seventeen patients (49%) had undergone a caesarean section, with the following indications: retroplacental haematoma (46 patients, 39.3%), mechanical dystocia (33 patients, 28.2%), scar uterus (16 patients, 13.7%), and severe pre-eclampsia (12 patients, 10%). The remaining causes were as follows: placental previa (seven patients, 6%), perinatal asphyxia (two patients, 1.7%), chorioamnionitis (two patients, 1.7%), cord prolapse (one patient, 0.9%) and premature rupture of the membranes (one patient, 0.9%).

With regard to the timing of hysterectomy, in 217 patients (90.79%), the decision was made intraoperatively. The indications for obstetric hysterectomy were dominated by three main categories: uterine rupture (153 patients, 64%), uterine atony (77 patients, 32.2%) and placental accreta (six patients, 2.5%). An examination of the qualifications of the operator revealed that the hysterectomy was performed by an obstetric gynaecologist in 96.2% of cases (230 patients), by an obstetric gynaecology resident in 2.5% (six patients) and by a general practitioner with district surgical competence in 1.3% (three patients). A total hysterectomy was performed in 75.3% of cases (180 patients), while a subtotal hysterectomy was

performed in 24.7% (59 patients). Two hundred and twenty-nine patients (95.8%) had received a blood transfusion.

In terms of the parameters pertaining to the newborns, a total of 239 births were recorded. Two hundred and twenty-three newborns (93.4%) exhibited an Apgar score of 0 at the time of birth. The mean birth weight was 2650 g, with extremes of 910 and 3910 g. Only 16 newborns (6.6%) survived to be discharged from the hospital. The stillbirth rate was 93.4% (223 newborns), and the neonatal death rate was 0% (0 newborns), resulting in a perinatal mortality rate of 93.4%.

With regard to maternal prognosis, no postoperative complications were observed in 66.95% of cases (160 patients). Nine patients (11.4%) experienced a cardiac arrest during the surgical procedure. Maternal morbidity was predominantly characterised by anaemia (38 patients, 48.1%), haemorrhagic shock (17 patients, 21.51%) and renal failure (5 patients, 5.06%). The postoperative complications observed were as follows: Parietal suppuration (six patients, 7.64%), vesicovaginal fistula (three patients, 3.79%), digestive fistula (one patient, 1.25%), and evisceration (one patient, 1.25%). The mean length of hospitalisation was 6.58 days, with a range of 0 to 47 days.

A total of 26 patients died, resulting in a maternal mortality rate of 10.9%. A total of 16 patients (61.54%) succumbed to haemorrhagic shock with disseminated intravascular coagulation (DIC) due to a lack of blood derivatives to treat the depletion of blood components. A total of five deaths (19.23%) were attributable to perioperative cardiac arrest. A total of three patients (11.56%) succumbed to septic shock in the postoperative period. One patient (3.85%) succumbed to renal failure, while another (3.85%) died of an associated diabetic coma. Of the patients who died, 17 (65.38%) were from regions in close proximity to the city of Maradi. Of the deceased patients, 21 (80.77%) had given birth at the Maradi MCHC.

4. Discussion

The incidence of emergency obstetric hysterectomy in our study was 0.89%. Similar prevalence rates have been reported in two other maternity hospitals in Niger: 0.81% in Niamey [10] and 0.98% in Zinder [9]. The observed rate is higher than that reported in the majority of African studies, with a prevalence varying between 0.016% and 0.53% [3]-[12]. The incidence of emergency obstetric hysterectomy in Asian and European series was found to vary considerably, from 0.02% in Denmark, Ireland, Norway, and Türkiye to 1.1% in India [13]. The highest incidence was observed in lower middle-income settings, as in our series and those of most African countries, with which we share the same social and health conditions. [4] [13]. The lowest incidence was observed in high-income settings, which benefit from superior conditions for patient management, particularly due to the availability of modern methods for the management of postpartum haemorrhage. [13] [14]

In addition to the relatively low technical level of the maternity unit, other factors may contribute to the high frequency of emergency obstetric hysterectomy

observed in our series. Firstly, the maternity unit is a referral facility, serving not only the urban community of Maradi but also neighbouring regions within a 125 km radius. Secondly, the peripheral hospitals are in a state of disrepair due to a lack of qualified personnel, appropriate medical equipment and essential pharmaceuticals.

In our series, the age group most affected was that comprising women aged 35-39 years, with an average age of 32.41 years. A similar trend has been documented by the majority of authors in the field, with mean ages ranging from 29.46 to 35.4 years. [4]-[15]. In a systematic review of the literature, which included 154 studies with 7741 patients from 22 countries, Kallianidis *et al*. observed that the mean age was 32.1 years [13].

The mean parity in our series was 6.15 children. The largest proportion of women who expressed concern were those who had given birth more than five times (58.6%), followed by those who had given birth between four and five times (22.22%). The cohort of patients who had given birth to two to three children constituted 15.9% of the total, while those who had given birth only once represented only 4.6%. Our findings are in accordance with the data presented in the existing literature [13]. Several studies have demonstrated that the prevalence of emergency obstetric hysterectomy rises markedly with increasing parity. [8] [10] [16] [17]. Multiparity has been identified as an independent risk factor for emergency obstetric hysterectomy [4] [16]. Multiparity is a contributing factor to uterine fragility, which in turn increases the risk of uterine rupture, uterine atony and uterine inversion, as well as postpartum haemorrhage [17].

With regard to the mode of admission, medical evacuation (in utero transfer) was the predominant mode of admission for the majority of patients (95.82%). This is a contributing factor to the poor maternal-fetal prognosis observed in our patient cohort. Indeed, the suboptimal conditions of health evacuations in our regions (from villages to district hospitals, from neighbourhood maternity hospitals to the reference maternity hospital) and the considerable distances to travel to reach the reference maternity hospital contribute to delays in care, which frequently result in the ultimate intervention of emergency obstetric hysterectomy. A comparable result was observed in the majority of African studies [4] [7]-[12]. It is therefore crucial to implement effective measures to address the factors impeding these evacuations, namely the utilisation of healthcare services by parturients, prompt decision-making in emergency situations, the expeditious deployment of ambulances and the operational readiness of on-call teams in emergency departments. Furthermore, the establishment of a communication system, whether by telephone or radio, between the village health centres (CSIs) and the district hospitals, which are equipped with ambulances, would facilitate improved evacuation conditions between these two levels of healthcare. Furthermore, it is imperative that the patient's family should not be required to bear the financial burden of fuel costs, given the dearth of health insurance and mutual health insurance in our country. It is imperative that the community, the political authorities

and donors assume a more active role, utilising a range of financial instruments, including the common fund, taxes, tontines, repayable loans and endowments. It is notable that a considerable number of evacuations are unpredictable (retroplacental heamatoma), and that obstetric emergencies (retroplacental heamatoma, eclampsia, uterine rupture, haemorrhagic placenta previa) are frequent. Furthermore, Niger remains one of the poorest countries in the world [4] [7].

In terms of obstetric follow-up, 22.2% of patients had no follow-up and 54.4% had attended three or fewer antenatal visits. A mere 23.4% of patients had attended at least four antenatal visits. This rate was not aligned with the World Health Organization (WHO) recommendations, which advise a minimum of four antenatal care visits during pregnancy, with an optimal number of eight ANC. Antenatal follow-up represents the optimal opportunity for the early identification and management of high-risk pregnancies. As is the case in the majority of series reported in the literature, the number of ANC was identified as a contributing factor in the occurrence of severe postpartum haemorrhage in our study. This is indicative of the quality of follow-up, compliance and accessibility of care provided to our patients, as evidenced in the literature [4] [7]-[9]. Indeed, certain aetiologies of postpartum haemorrhage can be effectively managed through the provision of high-quality antenatal care, particularly in cases of gravidic hypertension and its associated complications. It is imperative that increased public education, patient and community awareness, and continuing medical education for health staff (midwives, nurses and district doctors) be provided in our regions.

The primary indications for evacuation among our patient cohort were obstructed labour (21.3%), uterine rupture (13.8%) and retroplacental haematoma (12.6%). In Mali, Fané *et al.* observed that 69% of patients were evacuated due to uterine rupture and 17% due to retroplacental haematoma [18].

Of the patients in the study, 49% had undergone caesarean section delivery. Some authors have suggested that caesarean sections may be associated with an increased risk of haemorrhage [4].

In our study, the indications for caesarean section themselves constituted risk factors for postpartum haemorrhage.

In our study, the indications for emergency haemostasis hysterectomy were predominantly uterine rupture (64%), uterine atony (32.2%), and placenta accreta (2.5%).

Similarly, Oumarou *et al.* [9] observed a comparable trend in another Type II maternity hospital in Niger, with 68% uterine rupture and 32% uterine atony. Other authors have similarly identified uterine rupture as the primary indication for obstetric hysterectomy [10] [18]-[21]. Conversely, other authors posit that uterine atony represents the primary indication for emergency obstetric hysterectomy [8] [22] [23]. In the global literature, the most prevalent indications were identified as placental pathology (38.0%), uterine atony (27.0%), and uterine rupture (21.2%).

The distribution of these indications exhibited considerable variation across

income settings. In lower middle-income settings, the most common indication was uterine rupture (44.5%); in high-income countries, it was placental pathology (48.4%) [13].

The most frequently employed surgical technique in our study was total hysterectomy, accounting for 75.3% of cases, while subtotal hysterectomy was performed in 24.7% of cases. These figures are closely aligned with those reported in the recent literature. Indeed, globally, total hysterectomy was performed in 50.1% of cases, while subtotal hysterectomy accounted for the remaining 49.8% [13]. However, it is notable that total hysterectomy is a more prevalent procedure in underdeveloped countries, whereas subtotal hysterectomy is more common in developed countries [4] [9] [10]. This discrepancy can be attributed to the variation in the type of hysterectomy performed across different income settings. In low-income countries, total hysterectomy was conducted in 90.6% of cases, while in lower-middle-income countries, it was performed in 36.3% of cases. In upper middle-income countries, the figure stood at 51.4%, and in high-income countries, it reached 56.9% [13].

In the medical literature, subtotal hysterectomy is described as the preferred surgical technique for the treatment of postpartum haemorrhage. Dissection is a more straightforward procedure with a shorter operating time. Furthermore, the risk of utero-vesical lesions is reduced in cases of subtotal hysterectomy. However, the anatomical conditions present during pregnancy make it challenging to accurately determine the limits of the cervix, particularly during childbirth. However, it should be noted that subtotal hysterectomy does not always result in complete cessation of bleeding, particularly in cases of disseminated intravascular coagulation.

In regions with limited resources, the continued bleeding from the cervix postoperatively can be fatal for the patient. This is due to the lack of availability of blood products and other haemostatic products. Consequently, total hysterectomy is the preferred surgical approach in underdeveloped countries. It is an effective method for stopping the bleeding and reducing the risk of reoperation. The management of postpartum haemorrhage in our department adheres to the current scientific standards and the available resources [4] [7] [9] [10]. Resuscitation involved the administration of crystalloid solutions while awaiting the arrival of whole blood. The quantity of blood products provided was not always aligned with the specific needs of each patient, but rather contingent on the availability of these resources. Prior to the decision to perform a hysterectomy, the procedure entailed three main steps: firstly, a uterine revision to confirm the absence of intrauterine contents and the integrity of the uterus; secondly, the repair of any lesions in the genital tract; and thirdly, the administration of uterotonics in conjunction with uterine massage in cases of uterine atony. The sole therapeutic agent employed was oxytocin, administered intravenously and/or intramuscularly. Misoprostol was administered rectally at a dosage of 800 mcg. It should be noted that parenteral prostaglandins are not available in Niger [4] [7] [9] [10].

Despite our awareness of the effectiveness of this surgical technique, we did not attempt any form of vascular ligation in the course of our study. In Mali, the series by Camara *et al*. [8] describes the attempted use of triple vascular ligation as a first-line treatment in 3.96% of cases prior to hysterectomy. In the Tinusia series by Idriss Abidi *et al*. [12], uterine artery ligation was performed in 70% of cases, Tsirulnikov triple ligation in 70% of patients and bilateral hypogastric artery ligation in 30% of patients.

In our department, as in other regions of Niger, the haemodynamic state of our patients, who were often admitted late, and the precarious conditions of intensive care did not allow for such a surgical option to be performed. Therefore, hysterectomy was the preferred option.

In our series, hysterectomy was also the preferred option due to the lack of alternative treatments and the efficacy and rapidity of the procedure. Indeed, the procedure is straightforward and has the potential to be lifesaving, particularly in comparison to the hazardous and uncertain resuscitation procedures that may be required in the context of disseminated intravascular coagulation. Furthermore, in our developing and under-equipped country, there are no alternatives to radical surgery, such as conservative surgery and interventional radiology. (Complex logistics, training of radiologists, high cost of the procedure, patient admission methods) [4] [10].

In terms of perinatal prognosis, the perinatal mortality rate was exceedingly high in our series (93.4%), with all cases classified as stillbirths. This elevated rate may be attributed to the underlying aetiological pathologies, the circumstances surrounding patient admission and the limited resuscitation resources available in our departments [4] [7] [9]. Our rate is comparable to those reported by Nayama *et al*. [10] and Oumarou *et al*. [9], who respectively reported 78.8% and 79% perinatal mortality in their series. However, Archana *et al*. [25] and Salih *et al*. [26] reported lower perinatal mortality rates of 18.18% and 25%, respectively.

In our study, maternal morbidity was dominated by anaemia (48.1%), renal failure (5.06%), parietal suppuration (7.64%), vesicovaginal fistula (3.79%), digestive fistula (1.25%) and evisceration (1.25%). Similar findings were reported by Dembele *et al*. [11] in Cameroon. In the series by Camara *et al*. [8] in Mali, the most prevalent forms of morbidity were oliguria (9%), parietal suppuration (7.9%), and post-transfusion reactions, including skin rash and hyperthermia (1.98%). In a recent systematic review of the international literature, the most commonly described complications were febrile morbidity (29.7%), haematological (27.5%), and infection (12.7%) [13].

The maternal lethality rate in our series was 10.9%. This rate is higher than those observed by certain authors, with a lethality varying between 2.95%, and 9% [8] [11] [12] [15] [25] [26]. However, other authors have reported a higher mortality rate, with figures ranging from 17.7% to 59.1% [11] [13] [27]. The highest maternal case fatality rate was reported in Nigeria, with 59.1% of cases undergoing hysterectomy resulting in death [13]. The literature indicates that the overall

mortality rate is 3.2%. However, there is considerable variation in maternal case fatality rates across different income settings. The mean case fatality rates for low- and lower-middle-income countries were 9.3% and 11.2%, respectively, while in upper-middle- and high-income countries, the corresponding rates were 3.9% and 1.0%, respectively [13].

In the present study, the primary cause of maternal mortality was identified as haemorrhagic shock with disseminated intravascular coagulation, accounting for 61.54% of cases. This was likely exacerbated by the subsequent surgical procedure. Therefore, the absence of red blood cells, blood derivatives (fibrinogen) and macromolecules was a significant contributing factor to the mortality of our patients. It is imperative that maternity units are equipped with blood banks to compensate for the deficit of blood products and the time lost [4].

5. Conclusion

The findings of this study indicate that emergency obstetric hysterectomy is a common practice within our department. The socio-demographic profile is that of a young, uneducated, unemployed multiparous woman who does not utilise antenatal care services. These circumstances resulted in delayed management of the patients, given the lack of adequate medical equipment and the absence of alternative options for practitioners in the management of postpartum haemorrhage. The prognosis for the mother and foetus has been poor, with a high maternal and perinatal mortality rate. It is imperative that emphasis be placed on the prevention of postpartum haemorrhage through the identification of risk factors, the improvement of perinatal and postnatal care at all levels of the health system, and the enhancement of evacuation conditions, particularly in rural areas where resources are scarce. At the level of the referral structure, there is a need for modernisation of the technical facilities and the establishment of a functional blood bank.

Acknowledgement

Not Applicable.

Conflicts of Interest

The authors declare that there is no conflict of interest.

References

[1] Callaghan, W.M., Kuklina, E.V. and Berg, C.J. (2010) Trends in Postpartum Hemorrhage: United States, 1994-2006. *American Journal of Obstetrics and Gynecology*, **202**, 353.e1-353.e6. https://doi.org/10.1016/j.ajog.2010.01.011

[2] Say, L., Chou, D., Gemmill, A., Tunçalp, Ö., Moller, A., Daniels, J., *et al.* (2014) Global Causes of Maternal Death: A WHO Systematic Analysis. *The Lancet Global Health*, **2**, e323-e333. https://doi.org/10.1016/s2214-109x(14)70227-x

[3] Zhang, Y., Yan, J., Han, Q., Yang, T., Cai, L., Fu, Y., *et al.* (2017) Emergency Obstetric Hysterectomy for Life-Threatening Postpartum Hemorrhage: A 12-Year Review.

Medicine, **96**, e8443. https://doi.org/10.1097/md.0000000000008443

[4] Nayama, M., Moulaye, A., Djibrill, B., Garba, M., Idi, N. and Boukerrou, M. (2006) Les hystérectomies d'hémostase en pays sous-équipé: Un geste vital. Étude prospective dans une maternité de référence au Niger. *Gynécologie Obstétrique & Fertilité*, **34**, 900-905. https://doi.org/10.1016/j.gyobfe.2006.06.020

[5] Chaudhary, V., Singh, M., Nain, S., Reena, F., Aggarwal, K., Biswas, R., *et al.* (2021) Incidence, Management and Outcomes in Women Undergoing Peripartum Hysterectomy in a Tertiary Care Centre in India. *Cureus*, **13**, e14171. https://doi.org/10.7759/cureus.14171

[6] Schaap, T., Bloemenkamp, K., Deneux-Tharaux, C., Knight, M., Langhoff-Roos, J., Sullivan, E., *et al.* (2017) Defining Definitions: A Delphi Study to Develop a Core Outcome Set for Conditions of Severe Maternal Morbidity. *BJOG: An International Journal of Obstetrics & Gynaecology*, **126**, 394-401. https://doi.org/10.1111/1471-0528.14833

[7] Amadou Issa, A., Oumara, M., Guédé, S., Mado Oumarou, R., Younsou, G., Moussa, B., *et al.* (2024) Obstetrical Hemostasis Hysterectomies in Maradi (Niger): A Report of 90 Cases. *Health Sciences and Diseases*, **25**, 14-18.

[8] Camara, D., Kone, J., Sidibe, A., Bocoum, A., Sissoko, H., Traore, S.O., *et al.* (2018) Clinical Features and Maternal Prognosis in Situation of Emergency Obstetrical Hysterectomy at Bamako. *Health Sciences and Diseases*, **19**, 29-32.

[9] Garba, O., Salifou Lankoande, Z., Nabara, I., Isahirou, S., Hassane, L., Gabkika, B., *et al.* (2023) Analysis of Emergency Hysterectomies at Zinder Mother and Child Health Center (CSME). *Magna Scientia Advanced Research and Reviews*, **7**, 25-29. https://doi.org/10.30574/msarr.2023.7.1.0020

[10] Nayama, M., Gama-Alio, A., Idi, N., Oumara, M., Guede, S., Mallam-Issoufou, M., *et al.* (2014) Hystérectomies obstétricales à la Maternité Issaka Gazobi de Niamey. *Médecine d'Afrique Noire*, **61**, 613-621.

[11] Dembele, A., Zamané, H., Ouattara, S., Yaméogo, B., Ahamada, Y., Somé, D.A., *et al.* (2019) Hemostasis Hysterectomies in a Low Resources Country: Epidemiological, Clinical, and Therapeutic Aspects. *Open Journal of Obstetrics and Gynecology*, **9**, 1265-1272. https://doi.org/10.4236/ojog.2019.99122

[12] Abidi, I., Bettaieb, H., Souayeh, N., Mbarki, W., Frikha, M., Bouhmida, R., *et al.* (2022) Etude rétrospective sur 70 cas d'hystérectomie d'hémostase dans le département de gynécologie obstétrique de l'hôpital de Ben Arous, Tunisie. *Pan African Medical Journal*, **42**, Article No. 172. https://doi.org/10.11604/pamj.2022.42.172.34423

[13] Kallianidis, A.F., Rijntjes, D., Brobbel, C., Dekkers, O.M., Bloemenkamp, K.W.M. and van den Akker, T. (2022) Incidence, Indications, Risk Factors, and Outcomes of Emergency Peripartum Hysterectomy Worldwide. *Obstetrics & Gynecology*, **141**, 35-48. https://doi.org/10.1097/aog.0000000000005022

[14] Jung, Y.W., Kim, J., Shin, W.K., Song, S.Y., Choi, J.S., Hyun, S.H., *et al.* (2024) Outcomes and Prognosis of Postpartum Hemorrhage According to Management Protocol: An 11-Year Retrospective Study from Two Referral Centers. *World Journal of Emergency Surgery*, **19**, Article No. 27. https://doi.org/10.1186/s13017-024-00556-5

[15] Verma, A., Sharma, G. and Kashyap, M. (2023) A Retrospective Analysis of Emergency Obstetric Hysterectomy: A Life-Saving Intervention. *Cureus*, **15**, e46758. https://doi.org/10.7759/cureus.46758

[16] Zelop, C.M., Harlow, B.L., Frigoletto, F.D., Safon, L.E. and Saltzman, D.H. (1993) Emergency Peripartum Hysterectomy. *American Journal of Obstetrics and Gynecology*, **168**, 1443-1448. https://doi.org/10.1016/s0002-9378(11)90779-0

[17] Lone, F., Sultan, A.H., Thakar, R. and Beggs, A. (2009) Risk Factors and Management Patterns for Emergency Obstetric Hysterectomy over 2 Decades. *International Journal of Gynecology & Obstetrics*, **109**, 12-15. https://doi.org/10.1016/j.ijgo.2009.10.012

[18] Fané, S., Bocoum, A., Sylla, C., Sissoko, A., Traoré, A., Traoré, S.O., *et al*. (2021) Les Hystérecto-Mies Obstétricales d'Urgence au CHU Gabriel Toure de Bamako de 2003 à 2020. *Health Sciences and Diseases*, **22**, 33-39.

[19] Sah, S. and Gupta, S. (2021) Obstetric Hysterectomy: A Surgical Emergency 3 Years Review in a Tertiary Care Centre. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, **10**, 2999-3004. https://doi.org/10.18203/2320-1770.ijrcog20212810

[20] Randriambelomanana, J.A., Botolahy, Z.A., Rakotoarivony, S.T., Herinirina, S.A.E., Ra-sataharifetra, H. and Ratsivalaka, R. (2011) Obstetric Hysterectomies Performed in the Maternity Department of the University Hospital of Toamasina Madagascar. *Review of Anesthesia-Resuscitation and Emergency Medicine*, **3**, 8-11.

[21] Nisar, N. and Sohoo, N.A. (2009) Hystérectomie péripartum d'urgence: Fréquence, indications et résultats maternels. *Journal of Ayub Medical College Abbottabad*, **21**, 48-51.

[22] More, M.V., Purandare, N.S., Kaundinya, A.P., Poojari, D.S., Gandi, S., Patil, A.P., *et al*. (2023) Obstetric Hysterectomy in a Tertiary Centre: A 3-Year Retrospective Study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, **12**, 1866-1870. https://doi.org/10.18203/2320-1770.ijrcog20231570

[23] Kazi, S. (2018) Emergency Peripartum Hysterectomy: A Great Obstetric Challenge. *Pakistan Journal of Medical Sciences*, **34**, 1567-1570. https://doi.org/10.12669/pjms.346.13686

[24] Goffinet, F., Mercier, F., Teyssier, V., Pierre, F., Dreyfus, M., Mignon, A., *et al*. (2005) Hémorragies du post-partum: Recommandations du CNGOF pour la pratique clinique (décembre 2004). *Gynécologie Obstétrique & Fertilité*, **33**, 268-274. https://doi.org/10.1016/j.gyobfe.2005.03.016

[25] S, A. and Syamala, O. (2020) Obstetric Hysterectomy—An Analysis. *Indian Journal of Obstetrics and Gynecology Research*, **5**, 563-566. https://doi.org/10.18231/2394-2754.2018.0126

[26] Salih, A.A.M., Shamdeen, M.Y. and Yasen, S.T. (2022) Emergency Obstetric Hysterectomy: A Retrospective Study from Obstetrics and Gynecology Hospital—Duhok over Three Years 2017 to 2019. *Advanced Medical Journal*, **7**, 52-58. https://doi.org/10.56056/amj.2022.178

[27] Chawla, J., Arora, C.D., Paul, M. and Ajmani, S.N. (2015) Emergency Obstetric Hysterectomy: A Retrospective Study from a Teaching Hospital in North India over Eight Years. *Oman Medical Journal*, **30**, 181-186. https://doi.org/10.5001/omj.2015.39

Abbreviations

EOH	Emergency obstetric hysterectomy
MCHC	Mother and Child Health Centre
PPH	Postpartum hemorrhage
ANC	Antenatal care
DIC	Disseminated intravascular coagulation
WHO	Wold Health Organisation