**Determining the fetomaternal outcome and the anaesthetic challenges in emergency peripartum hysterectomy at the University of Nigeria Teaching Hospital.**

**Author name:**

**Qualification:**

**Affiliation:**

**Contact details (email):**

ORCID number:

**Co-author name:**

**Qualification:**

**Affiliation:**

**Contact details (email):**

ORCID number:

# Abstract

**Background:** This study aimed to determine the fetomaternal outcome and the anaesthetic challenges in emergency peripartum hysterectomy at the University of Nigeria Teaching Hospital (UNTH), Enugu, Nigeria.

**Methods:** A retrospective study was carried out on parturients that had had emergency peripartum hysterectomy at UNTH in Nigeria, from July 2012 to June 2020. Data collected included demographics, anaesthetic and obstetric records, fetomaternal outcomes and the need for critical care management.

**Results:** Data were collected from a total of 6798 deliveries and 6485 live births, with 16 emergency peripartum hysterectomies. The incidence of emergency peripartum hysterectomy was 0.23% of all deliveries (2.3/1000 deliveries). The causes of emergency hysterectomies were ruptured uterus (11 patients, or 69%), placenta accreta/morbidly adherent placenta (4 patients, or 25%) and uncontrollable postpartum haemorrhage following vaginal delivery (1 patient, or 6%). Eight patients had subtotal hysterectomy, while eight had total abdominal hysterectomy (TAH).

All the patients received general anaesthesia and blood transfusion. There were two postoperative admissions to the intensive care unit (ICU) and two procedure-related deaths due to hypovolaemic shock. There were nine stillbirths but no documented neonatal deaths.

**Conclusion:** Emergency peripartum hysterectomies challenge the anaesthetist and the obstetrician who have to maintain haemodynamic stability in patients who may have lost volumes of blood, particularly in a setting where blood and colloid availability is often limited. The maternal mortality was higher than that of most of the studies reviewed.

**Keywords:** fetomaternal, anaesthesia, peripartum hysterectomy, West Africa, Nigeria.

# Introduction

Obstetric haemorrhage is responsible for about 30% of maternal deaths in sub-Saharan Africa1 and it is the leading cause of maternal death worldwide.2–4 Significant maternal morbidity is also caused by obstetric haemorrhage.5

One way of controlling significant obstetric haemorrhage is an emergency peripartum hysterectomy, especially when it is accompanied by a ragged uterine rupture. This is usually undertaken as a last resort to save the mother’s life.6-8 There is sometimes a dilemma concerning the preservation of future fertility, especially in women of low parity who desire more children.5

Because this procedure is usually performed as a last resort and as an emergency, patients are already compromised when they present for surgery. In some cases, peripartum hysterectomies are performed when massive haemorrhage occurs during caesarean delivery. A ruptured uterus, placenta praevia and any other cause of postpartum haemorrhage can result in an emergency hysterectomy to stop bleeding and prevent severe maternal morbidity/mortality.5 This is especially challenging for the anaesthetist who has to maintain maternal haemodynamic stability during the perioperative period.

A review of literature revealed little work on the anaesthetic challenges in emergency peripartum hysterectomy in West Africa has been done. This study was undertaken to determine the causes of this, and anaesthetic management of patients presenting for emergency peripartum hysterectomy at University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu, Nigeria.

# Methods

An observational retrospective study of parturients that received anaesthesia for peripartum hysterectomy was carried out at UNTH in Nigeria from July 2013 to June 2020. In this study. obstetric theatre records were examined for consecutive cases of emergency peripartum hysterectomy and relevant patient folders were obtained from the records department. The records were reviewed for demographics, obstetric and anaesthetic data. The fetomaternal outcome and admissions into the intensive care unit (ICU) were also reviewed.

It must be noted that the obstetric theatre and labour ward records and documents patients’ demographics, parity, gestational age, indications for surgery, Apgar score (one- and five-minute scores), birth weight, incision-to-delivery time, anaesthetic technique, names of anaesthetists/obstetricians/scrub nurses, major intraoperative complications and fetomaternal outcomes. This has helped in audits where some patient folders may have been unavailable.

# Results

Data were collected from a total of 6798 deliveries and 6485 live births, with 16 emergency peripartum hysterectomies. The incidence of emergency peripartum hysterectomy was 0.23% of all deliveries (2.3/1000 deliveries) and 1% of all caesarean deliveries during the study period (1579 caesarean sections).

Of the 16 emergency peripartum hysterectomies, there were eight patients scheduled for antenatal care, and eight unscheduled patients. There were 11 patients who had emergency hysterectomies following a ruptured uterus (0.16%) and four patients who had the procedure due to placenta accreta/morbidly adherent placenta (0.06%). One patient, the only vaginal delivery patient, had a hysterectomy following uncontrollable postpartum haemorrhage.

The mean age of the patients was 32.8 years with a range of 23 to 42 years. Table 1 shows the age range and Table 2 shows the parity of the patients. There were 11 patients that were at term and two presented at 35 and 36 weeks respectively. The duration of gestation of three of the patients is unknown.

All the patients received volatile anaesthesia using a muscle relaxant and endotracheal intubation, except one patient in which failure to intubate resulted in the use of volatile anaesthesia and a facemask.

All the patients received blood transfusion with the estimated blood loss and the volume of transfused blood is shown in Table 3. The mean intraoperative blood loss and units of blood transfused were 1.9 litres (range 800–4000 ml) and 3 units (range 1–4 units). All the patients received crystalloids.

There were two patients who were admitted to the ICU for postoperative management and there were two procedure-related deaths (death within 24 hours of the procedure) in the ICU and postnatal ward. Both were due to hypovolaemic shock, including acute renal failure in one of the patients.

There were nine stillbirths, including a pair of twins in a patient with rupture of the uterus at 35 weeks gestational age. There were no documented neonatal deaths.

# Discussion

At our centre, the obstetric theatre and labour ward at UNTH, the incidence of patients that had peripartum hysterectomy was 2.3/1000 deliveries (0.23%). This rate is lower than another study that was done in Lagos, Nigeria, that had 3.3/1000 deliveries (0.33%).8 It is, however, similar to an earlier study in our centre by Ozumba et al.7 Our numbers were higher than those from studies in Saudi Arabia (0.5/1000 deliveries),9 Norway (0.2/1000 deliveries),10 and the United Kingdom (0.48/1000 deliveries),11 and lower than the figure reported from a study in India (2.6/1000 deliveries).12

The major indications for peripartum hysterectomy are a ruptured uterus (69%), followed by placenta accreta/morbidly adherent placenta (25%), and a uterine atony (6%).

In Enugu, Nigeria, avoidable factors are still prevalent in maternal deaths. The maternal mortality ratio of 2397.3 maternal deaths per 100 000 live births was reported in Enugu between January 2017 and December 2015.13

Nigeria is a developing country with limited facilities and a poor transport system. Women in labour are usually monitored with a partograph and intermittent auscultation using the Pinard Stethoscope. During the period of the study, the cardiotocograph in the UNTH broke down and was neither repaired nor replaced.

The majority of the women in Nigeria do not book into the hospital and hence do not have formal antenatal care. Many women register with traditional birth attendants and deliver at home. This is said to be because many women have no formal education and are not empowered.

This is somewhat similar to a study by Ozumba et al,7 in which a ruptured uterus accounted for 72% of the hysterectomies. While it differs from another Nigerian study in which uterine atony was the major cause of peripartum hysterectomy at 45%,8 it was similar to studies from Saudi Arabia; 64.7%,9 and Norway; 64%.10 In a report from the Netherlands, placenta accreta was the major indication for peripartum hysterectomy at 50%, followed by uterine atony at 27%.14 This is similar to another study from Croatia in which abnormal placentation was the major indication for hysterectomy.15

The results of our study show that general anaesthesia was used in all the patients because of the potential risk of haemodynamic instability with regional anaesthesia in patients who may have lost or may lose a lot of blood. In elective surgery for placenta praevia there is increasing evidence to support the safety of regional anaesthesia and a combined spinal/epidural that allows more time for surgery.5 Ketamine was often the induction agent of choice, and suxamethonium was used for laryngoscopy and endotracheal intubation. Pancuronium was the non-depolarising muscle relaxant of choice. All the patents received crystalloids and blood transfusion to maintain haemodynamic stability. The blood loss in these cases is often underestimated, making close monitoring very important.5 Non-invasive blood pressure monitoring was used in all the patients and in a minority of patients, pulse oximetry. There was a relative lack of monitors, or accessories like the pulse oximeter, due to budgetary constraints during the study period.

Of the 16 emergency peripartum hysterectomies that were done during the study period, eight patients had total abdominal hysterectomy and the rest had subtotal hysterectomy. The estimated blood loss associated with each procedure depended much on the time of presentation, but patients with a ruptured uterus lost more blood than those with abnormal placentation. Two patients were managed postoperatively in the ICU.

There were two maternal deaths and nine stillbirths, including a pair of twins. There were no neonatal deaths. Both maternal fatalities were due to hypovolaemic shock (with acute renal failure in one patient) and occurred within 24 hours of surgery. In both fatalities, anaesthesia was administered by trainee specialist doctors. One of the hysterectomies was performed by a consultant obstetrician of the deceased patient.

On the whole, more than 60% of the cases were done by trainee specialists. The case mortality rate was 12.5%. This is lower than the earlier reported figure of 29.8% from our centre7 and the 13.6% mortality rate from Lagos, Nigeria.8 It is, however, higher than those reported by studies from The Netherlands (4%),14 Croatia (0%),15 Saudi Arabia (11.6%),16 Norway (0%),10 and India (3%).12

The risk factors for severe morbidity and mortality in this study were unscheduled patients, late presentation, ruptured uterus, previous caesarean section, limited blood availability, and surgeries done by trainee specialists.

Limited blood availability was a challenge for the anaesthetist who had to maintain tissue perfusion in compromised patients without blood products like fresh frozen plasma, cryoprecipitate, and occasionally fresh, whole blood. Blood availability may still remain a problem, as people are averse to donating blood for various reasons, including fear of being tested for HIV, and their blood being used for witchcraft.17 Since only 1–3% of a nation’s population can supply the blood needed for medical services, there should be an awareness campaign to increase the voluntary donor base.18

A study in the United Kingdom reported that the use of interventional radiology to reduce blood loss in patients with placenta accreta, undergoing caesarean section, did not reduce the need for caesarean hysterectomy.19

It was difficult to estimate the number of women that died outside the hospital following untreated peripartum haemorrhage due to lack of a reliable database and estimates might be imprecise.

# Conclusion

Emergency peripartum hysterectomy tasks the anaesthetists and obstetricians who have to maintain haemodynamic stability in patients who may lose volumes of blood in a setting where blood and colloid availability are often limited. This study reported that the major cause for emergency peripartum hysterectomy is a ruptured uterus, which is avoidable with proper counselling of the patient, especially those with a history of previous caesarean section. The roles of poverty, poor transport logistics and education should be addressed. The recent acquisition of pulse oximeters at UNTH should help in reducing future morbidity and mortality in this high-risk group. The maternal mortality was higher than those from most of the studies reviewed.

# Acknowledgements

Our sincere thanks to the staff of the medical records department at the University of Nigeria Teaching Hospital, Enugu, Nigeria, for their kind assistance and consideration.

# References

1. Lalonde A; International Federation of Gynecology and Obstetrics. Prevention and treatment of postpartum hemorrhage in low-resource settings. Int J Gynaecol Obstet. 2012 May;117(2):108-18. doi: 10.1016/j.ijgo.2012.03.001. PMID: 22502595
2. Ronsmans C, Graham WJ; Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where, and why. Lancet. 2006 Sep;368(9542):1189-200. doi: 10.1016/S0140-6736(06)69380-X. PMID: 17011946.
3. Khan KS, Wojdyla D, Say L, Gülmezoglu AM, Van Look PF. WHO analysis of causes of maternal death: a systematic review. Lancet. 2006 Apr;367(9516):1066-74. doi: 10.1016/S0140-6736(06)68397-9. PMID: 16581405.
4. World Health Organization. The World Health Report 2005 – Make every mother and child count. Geneva: World Health Organization, 2005. https://www.who.int/publications-detail-redirect/9241562900 (accessed 31 October 2022).
5. Wise A, Clark V. Strategies to manage major obstetric haemorrhage. Curr Opin Anaesthesiol. 2008 Jun;21(3):281-7. doi: 10.1097/ACO.0b013e3282f8e257. PMID: 18458542.
6. Kore S, Potwar S, Tamboli J, et al. Obstetric hysterectomy: analysis of 34 cases. J Obstet and Gynecol India 2001;50:1–5.
7. Ozumba BC, Mbagwu SC. Emergency obstetric hysterectomy in eastern Nigeria. Int Surg. 1991 Apr-Jun;76(2):109-11. PMID: 1869383.
8. Ezechi OC, Kalu BK, Njokanma FO, Nwokoro CA, Okeke GC. Emergency peripartum hysterectomy in a Nigerian hospital: a 20-year review. J Obstet Gynaecol. 2004 Jun;24(4):372-3. doi: 10.1080/01443610410001685466. PMID: 15203573.
9. Yamani Zamzami TY. Indication of emergency peripartum hysterectomy: review of 17 cases. Arch Gynecol Obstet. 2003 Aug;268(3):131-5. doi: 10.1007/s00404-003-0494-9. Epub 2003 May 20. PMID: 12756583.
10. Engelsen IB, Albrechtsen S, Iversen OE. Peripartum hysterectomy-incidence and maternal morbidity. Acta Obstet Gynecol Scand. 2001 May;80(5):409-12. PMID: 11328216.
11. Selo-Ojeme DO, Bhattacharjee P, Izuwa-Njoku NF, Kadir RA. Emergency peripartum hysterectomy in a tertiary London hospital. Arch Gynecol Obstet. 2005 Feb;271(2):154-9. doi: 10.1007/s00404-004-0715-x. Epub 2005 Feb 3. PMID: 15690169.
12. Ahmad S, Mir I. Emergency peripartum hysterectomy: Experience at Apex Hospital of Kashmir valley. Internet J Gynecol Obstet. 2006;8(2):1-4. Available from: https://print.ispub.com/api/0/ispub-article/13532
13. Ozumba BC, Nwogu-Ikojo EE. Avoidable maternal mortality in Enugu, Nigeria. Public Health. 2008 Apr;122(4):354-60. doi: 10.1016/j.puhe.2007.04.018. PMID: 17959207.
14. Kwee A, Bots ML, Visser GH, Bruinse HW. Emergency peripartum hysterectomy: A prospective study in The Netherlands. Eur J Obstet Gynecol Reprod Biol. 2006 Feb 1;124(2):187-92. doi: 10.1016/j.ejogrb.2005.06.012. PMID: 16026917.
15. Habek D, Becareviç R. Emergency peripartum hysterectomy in a tertiary obstetric center: 8-year evaluation. Fetal Diagn Ther. 2007;22(2):139-42. doi: 10.1159/000097114. PMID: 17139172.
16. Rahman J, Al-Ali M, Qutub HO, Al-Suleiman SS, Al-Jama FE, Rahman MS. Emergency obstetric hysterectomy in a university hospital: A 25-year review. J Obstet Gynaecol. 2008 Jan;28(1):69-72. doi: 10.1080/01443610701816885. PMID: 18259903.
17. Kuliya-Gwarzo A, Kwaru AH. Pattern of blood donation in Aminu Kano Teaching Hospital. Journal of Medicine and Rehabilitation. 2017;1:35–8.
18. Improving blood safety worldwide. Lancet. 2007 Aug 4;370(9585):361. doi: 10.1016/S0140-6736(07)61167-2. PMID: 17678994.
19. Mok M, Heidemann B, Dundas K, Gillespie I, Clark V. Interventional radiology in women with suspected placenta accreta undergoing caesarean section. Int J Obstet Anesth. 2008 Jul;17(3):255-61. doi: 10.1016/j.ijoa.2007.11.010. PMID: 18513942

**Table 1: Age range of the patients (n = 16)**

|  |  |
| --- | --- |
| **Age range** | **Number of patients**  |
| < 23 | Nil |
| 23–29 | 5 |
| 30–35 | 7 |
| 36–40 | 3 |
| > 40 | 1 |

**Table 2: Parity of the patients (n = 16)**

|  |  |
| --- | --- |
| **Parity** | **Number of patients** |
| Nulliparous | Nil |
| 1–3 | 5 |
| 4–6 | 7 |
| 7–9 | 4 |
| > 9 | nil |

**Table 3: Blood loss and transfusion (n = 16)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Number of patients** | **Estimated blood loss in litres (includes hemoperitoneum)** | **Mean volume transfused intraoperatively (units) including the standard deviation** | **Range of blood units transfused** |
| 11 | 1–2 litres | 2.6 +/– 1.6 | 1–4 |
| 5 | 2.1–4litres | 3.75 +/– 1.1 | 2–4 |