

Emergency Peripartum Hysterectomy in a Developing Country

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Abstract

Background: Emergency peripartum hysterectomy (EPH) is a life-saving surgical procedure that is associated with maternal morbidity and mortality, especially in developing countries. The advent of newer medical and conservative surgical methods of controlling postpartum hemorrhage will influence both the rate and the outcomes of the procedure.

Objective: To study the rate of EPH, the influence of sociodemographic characteristics on the rate of the procedure, the modality of treatment used in each of the indications, and maternal–fetal morbidity and mortality.

Methods: We conducted a case–control study of 30 patients who underwent EPH between June 1, 2003, and 31 May 31, 2008, at Aminu Kano Teaching Hospital, Kano, Nigeria, a tertiary institution in a developing country.

Results: The rate of EPH in this study was 4.0 per 1000 deliveries. Ruptured uterus (73.3%) was the most common indication. Factors showing a significant association with EPH were being 31 to 40 years old (OR 6.7; 95% CI 3.9 to 15.7), being para \geq 5 (OR 4.1; 95% CI 1.87 to 9.1), having unbooked status (OR 9.1; 95% CI 3.6 to 24.9), and being in a low social class (OR 7.5; 95% CI 1.7 to 45.3). Ruptured uterus (OR 164.3; 95% CI 67.9 to 410.0) and placenta previa accreta (OR 36.1; 95% CI 10.0 to 117.3) were significantly associated with EPH. The most common morbidity was wound sepsis (60%). The case fatality rate was 13.3%, and perinatal mortality was 73.3%.

Conclusion: The rate of EPH in our institution is high, and maternal–fetal outcome is poor. Antenatal care and hospital delivery should be encouraged.

Résumé

Contexte : L'hystérectomie péripartum d'urgence (HPU) est une intervention chirurgicale salvatrice qui est associée à la morbidité et à la mortalité maternelles, particulièrement au sein des pays en développement. L'arrivée de nouvelles méthodes chirurgicales conservatrices et médicales permettant de juguler l'hémorragie postpartum influencera tant les taux que les issues de l'intervention.

Objectif : Étudier le taux d'HPU, l'influence des caractéristiques sociodémographiques sur le taux d'intervention, la modalité de traitement utilisée dans chacune des indications et la morbidité et la mortalité foëto-maternelles.

Méthodes : Nous avons mené une étude cas-témoins portant sur 30 patientes qui ont subi une HPU, entre le 1^{er} juin 2003 et le 31 mai 2008, au *Aminu Kano Teaching Hospital*, à Kano, au Nigeria, soit au sein d'un établissement tertiaire situé dans un pays en développement.

Résultats : Dans le cadre de cette étude, le taux d'HPU a été de 4,0 par 1 000 accouchements. La rupture utérine (73,3 %) constituait l'indication la plus courante. Parmi les facteurs présentant une association significative avec l'HPU, on trouvait le fait d'être âgée de 31 à 40 ans (RC, 6,7; IC à 95 %, 3,9 - 15,7), le fait d'être para \geq 5 (RC, 4,1; IC à 95 %, 1,87 - 9,1), le fait de ne pas être inscrite (RC, 9,1; IC à 95 %, 3,6 - 24,9) et le fait d'appartenir à une classe sociale défavorisée (RC, 7,5; IC à 95 %, 1,7 - 45,3). La rupture utérine (RC, 164,3; IC à 95 %, 67,9 - 410,0) et le placenta prævia accreta (RC, 36,1; IC à 95 %, 10,0 - 117,3) présentaient une association significative avec l'HPU. La sepsie de plaie constituait la morbidité la plus courante (60 %). Le taux de létalité était de 13,3 % et le taux de mortalité périnatale était de 73,3 %.

Conclusion : Au sein de notre établissement, le taux d'HPU est élevé et les issues foëto-maternelles sont de piètre qualité. L'obtention de soins prénatals et l'accouchement à l'hôpital devraient être favorisés.

Key Words: Emergency peripartum hysterectomy, emergency peripartum hysterectomy rate, indications, management options, maternal-fetal outcome.

Competing Interests: None declared.

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INTRODUCTION

Emergency hysterectomy is the surgical removal of the uterus following an unexpected and sudden event, which must be dealt with urgently by carrying out the procedure.¹⁻⁴ When it is carried out in a woman with a pregnant uterus less than 24 hours after delivery, it is termed emergency peripartum hysterectomy.^{1,2} This life-saving obstetric procedure has been in use for more than 100 years, since Edward Porro in 1876 published the first case report of a successful procedure in which both mother and baby survived.¹

A comparison of institutional figures shows that the rate of EPH in Nigeria ranges from 1.8 to 5.4 per 1000 births.⁵⁻⁷ In Pakistan the reported rate is 5.6 per 1000 births,¹ in India 2.6 per 1000 births,³ and in the United States between 1.2 and 2.7 per 1000 births.^{8,9} However, the rate is lower in European countries: a rate of 0.2 per 1000 births was reported from Norway,¹⁰ and 0.3 per 1000 births from Ireland¹¹ and the Netherlands.¹² This may be because of proper use of effective antenatal and delivery facilities, and the desire for small family size in Europe.^{11,13,14}

The increasing rate of the procedure in developed countries such as the United States and Canada, despite proper use of effective antenatal and delivery facilities, has been attributed to the increasing Caesarean section rate,^{4,8,13} which predisposes to placenta previa and placenta previa accreta. These two conditions are now the leading indications for EPH in developed countries.⁸

Developing countries like Nigeria may have high rates of the procedure because more deliveries take place outside health facilities and are unsupervised or poorly supervised.¹⁴ They also take place in communities with a high prevalence of risk factors for primary postpartum hemorrhage and EPH, such as uterine fibroids in pregnancy, multiple pregnancies, grand multiparity, unbooked status, and prolonged labour (which are associated with uterine atony). Uterine fibroids, a myomectomy scar, a contracted pelvis, and previous Caesarean section predispose women to ruptured uterus and possibly to placenta previa or placenta previa accreta.⁵⁻⁷

In Nigeria, 70% of deliveries are conducted outside hospitals by unskilled birth attendants, traditional birth attendants, traditional priests, herbalists, or prophets, and 16.9% of women deliver alone without assistance from

anyone.¹⁵ Delay in getting appropriate care in labour has been attributed to poor development of essential obstetric care facilities; most rural public hospitals and health centres do not function 24 hours per day, and road networks and transportation systems to the cities are poor.^{15,16} In Pakistan 89% of women deliver at home, and of these 80% are delivered by traditional birth attendants.¹

The most common indication for EPH is severe uterine hemorrhage that cannot be controlled by conservative measures.¹⁷ Such hemorrhage may be due to abnormal placentation (e.g., placenta previa and placenta previa accreta), uterine atony, uterine rupture, leiomyomas, coagulopathy, or laceration of a uterine vessel that is not treatable by conservative measures.¹⁷⁻¹⁹ The relative frequency of these conditions is variable and is dependent upon the patient population and practice patterns.¹⁷

A sequence of conservative measures to control uterine hemorrhage should be attempted before resorting to more radical surgical procedures.¹⁷ If an intervention does not succeed, the next treatment in the sequence should be swiftly instituted.^{17,18} Hysterectomy should not be performed too early or too late.¹⁷ Delay leads to further hemorrhage and anemia, and may be responsible for the high maternal mortality.⁵ The skills that are necessary for performing hysterectomy are best acquired with an experienced mentor during scheduled non-emergency cases.^{1,3,4,20}

Recent advances in the medical and conservative management of postpartum hemorrhage have reduced the rate of and indications for EPH,^{17,18} while sophistication in obstetric care and blood transfusion services have improved outcomes, especially in developed countries.¹⁷ This study was designed to determine the rate of EPH at Aminu Kano Teaching Hospital, Kano, Nigeria (a tertiary health facility in a developing country), the indications for performing those procedures, and the outcomes, in order to make recommendations that will reduce the incidence of the procedure and improve its outcome.

METHODS

This was a case-control study of 30 women who had EPH at the Aminu Kano Teaching Hospital, Kano, Nigeria, between June 1, 2003, and 31 May, 2008.

For the purpose of this study, booked patients were pregnant women who registered for care at our booking clinic and attended three follow-up clinics, but we also recorded a woman who was without any medical or obstetric risk factors, and who registered at our booking

ABBREVIATIONS

EPH	emergency peripartum hysterectomy
PPH	postpartum hemorrhage

Table 1. Sociodemographic characteristics of the patients who had emergency peripartum hysterectomy

Variable	Cases, n (%) (n = 30)	Control subjects, n (%) (n = 7532)	OR	95% CI	P
Age, years					
15 to 20		1872 (24.9)			
21 to 30	9 (30)	3708 (49.2)	0.4	0.2 to 1.0	NS
31 to 40	21 (70)	1952 (25.9)	6.7	3.9 to 15.7	< 0.05
Parity					
0		1539 (20.4)			
1 to 4	12 (40.0)	3974 (52.8)	0.6	0.3 to 1.3	NS
≥ 5	18 (60.0)	2019 (26.8)	4.1	0.9 to 9.1	< 0.05
Social class*					
Upper	2 (6.7)	2617 (34.7)	0.1	0.0 to 0.6	< 0.05
Lower	28 (93.3)	4915 (65.3)	7.5	1.7 to 45.2	< 0.05
Booking status					
Booked	6 (20.0)	5238 (69.5)	0.1	0.1 to 0.3	< 0.05
Unbooked	24 (80.0)	2294 (30.5)	9.1	3.6 to 24.9	< 0.05

*Scores were assigned for the husband's occupation (professional: 1, middle level: 2, unskilled: 3) and the wife's level of education (university: 0, secondary 1, primary 2). The husband's and wife's scores were added to give the social class.

clinic, as a booked patient. Unbooked patients were those who did not register but attended our antenatal clinic. The social class of a woman was determined by her educational status and her husband's occupation. Upper social class comprised social classes I and II, lower social class social class III, IV, and V.²¹ Sociodemographic characteristics of the group are shown in Table 1.

Postoperative severe anemia was defined as a hemoglobin concentration of < 6 g/dL, and postpartum hemorrhage as blood loss of ≥ 500 mL following vaginal delivery or ≥ 1000 mL or more following Caesarean section. Urinary tract infection referred to urinary symptoms with a positive urine culture. Postoperative pyrexia referred to a rectal temperature of ≥ 38.5°C, persisting for more than two postoperative days.

Early marriage/childbearing referred to adolescents aged < 18 years at first marriage or pregnancy. Grand multiparity referred to women who had had five or more pregnancies carried beyond 28 weeks. Contraceptive prevalence rate referred to the percentage of women of reproductive age (15 to 49 years), married or in a stable union, who were currently using any method of contraception or whose partner was using any contraception at a given point in time. Adult literacy rate was the proportion of literate persons in the population aged 15 years and older.

For the cross-sectional component, during the five-year period the authors carried out surveillance of all patients

who were hospitalized to give birth, in order to identify those who had EPH. The study variables of interest were the rate of the procedure, sociodemographic characteristics of the patients, indications for the procedure and management options used in each of the indications, and maternal–fetal outcome.

For the case–control study component, the influence of sociodemographic characteristics on the rate was analyzed through comparing the sociodemographic characteristics of the women who had EPH (cases) with those of the women who delivered in our labour ward and did not have EPH (control subjects). The larger number of women in the control group was used to minimize the small error applied over the larger number of women who did not have peripartum hysterectomy. Analysis of the influence of the indications on the type of procedure that was used to control PPH was carried out by comparing the use of EPH and medical or conservative surgical treatments in each of the indications.

Postoperative counselling was carried out for all the cases before they were discharged to help patients accept the loss of menstrual function and childbearing ability that inevitably accompany this procedure.

The data obtained from the patients or their relatives, as well as from their case notes, were recorded in a standard form. Quality control was done by ensuring that data collection was carried out before the patients were discharged.

Table 2. Distribution according to the choice of procedure used in patients with primary postpartum hemorrhage in each of the indications

Indications	EPH		OR	95% CI	P
	Yes	No			
Ruptured uterus	22	124	164.3	67.9 to 410.0	< 0.05
Placenta previa accreta	4	32	36.1	10.0 to 117.3	< 0.05
Uterine atony	2	189	2.8	0.7 to 11.5	NS
Placenta previa	2	334	0.7	0.1 to 5.4	NS

The data that were obtained were analyzed using Epi Info Version 6.0 (Centers for Disease Control and Prevention, Atlanta GA). Numerical data were analyzed using mean \pm standard deviation. Categorical data were presented as frequencies and percentages. Chi-square test was used to compare groups for significant differences. The contribution of the sociodemographic factors to the incidence of the procedures, and of the indications for the procedure on the management options, were estimated using chi-square test, and a *P* value of < 0.05 was taken as significant. The odds ratio and 95% confidence intervals were also determined where appropriate.

RESULTS

There were 30 cases of EPH and 7532 women who delivered in our labour ward and did not have the procedure during the period of study, giving a rate for the procedure of 4.0 per 1000 deliveries. Among the total deliveries, 5238 patients were booked and 2294 were unbooked. Among the cases of EPH, six patients (20%) were booked and delivered in our hospital and 24 patients (80%) were unbooked and laboured or delivered outside, supervised by traditional midwives; this gives a rate of 1.2 per 1000 deliveries for booked patients and 10.5 per 1000 deliveries for unbooked patients.

The indications for EPH are shown in Table 2. Of the 24 patients who laboured or delivered outside the hospital, 19 (79.2%) were admitted to hospital two hours or more after the onset of PPH, and 21 (87.5%) were admitted in hypovolemic shock (systolic BP < 90 mmHg). All the cases of maternal deaths were admitted to hospital two hours or more after the onset of PPH. All 22 patients with ruptured uterus who had EPH were unbooked and laboured outside the health facility; among them, seven (31.8%) had a ragged tear that extended to the upper uterine segment. The four patients who had EPH for placenta previa accreta had a partially separated placenta at Caesarean section; two of these patients were booked and delivered in our hospital. The two booked patients

who had EPH for placenta previa and PPH had their management complicated by coagulopathy that developed during Caesarean section. Twenty-four of the 30 cases underwent subtotal hysterectomy (80.0%), and total abdominal hysterectomy accounted for the remaining six cases (20.0%). Twenty-six of the 30 cases (86.7%) had a blood transfusion.

The age range of cases was from 20 to 40 years, with a mean age of 31 ± 1.6 years. Thirty percent of the patients were aged 21 to 30 years. The odds of requiring EPH was much higher in the 31 to 40 years age group (OR 6.7; 95% CI 3.9 to 15.7) than in the 21 to 30 years age group (OR 0.4; 95% CI 0.2 to 1.0).

The range of parity was 1 to 10, with a mean parity of 3.5 ± 0.7 . Women who were para 1 to 4 accounted for 40% of the patients. The odds of requiring EPH was seven times higher among women who were para ≥ 5 (OR 4.1; 95% CI 1.87 to 9.1) than among those who were para 1 to 4 (OR 0.6; 95% CI 0.3 to 1.3).

The need for EPH showed an inverse correlation with social class. The odds of having EPH was much higher among the low social class (OR 7.5; 95% CI 1.7 to 45.2) than among the upper social class (OR 0.1; 95% CI 0.0 to 0.6).

The highest frequency of EPH (80.0%) was in the unbooked patients. The odds of having EPH was dramatically higher in unbooked patients (OR 9.1; 95% CI 3.6 to 24.9) than in booked patients (OR 0.1; 95% CI 0.1 to 0.3) (Table 1).

Ruptured uterus (73.3%) was the most common indication for the procedure, followed by placenta previa accreta (13.3%), uterine atony (6.7%), and placenta previa (6.7%).

All the patients with ruptured uterus who had EPH were unbooked; eight cases occurred in patients with a previous Caesarean section scar, while 14 cases occurred in an unscarred uterus. Of the six cases of placenta previa/accreta, four occurred in women with a previous Caesarean section scar, and two occurred in an unscarred uterus.

Table 3. Morbidity and mortality in patients who had emergency peripartum hysterectomy

Variables	Frequency n (%)
Postoperative wound sepsis	18 (60.0)
Postoperative pyrexia	16 (53.3)
Postoperative severe anemia	12 (40.0)
Urinary tract infection	11 (36.7)
Other	9 (30.0)
Perinatal death	22 (73.3)
Maternal death	4 (13.3)
14 patients had multiple postoperative complications	

The two patients with uterine atony requiring EPH were booked cases; one had very large uterine fibroids and the other had a twin pregnancy, with PPH following vaginal delivery. Among the indications, the use of EPH among patients with PPH was significant for uterine rupture (OR 164.3; 95% CI 67.9 to 410.0) and placenta previa accreta (OR 36.1; 95% CI 10.0 to 117.3) (Table 2).

The complications related to the procedure are shown in Table 3. Fourteen patients had multiple postoperative complications. Three of the four maternal deaths and all of the perinatal deaths occurred among unbooked patients with uterine rupture who laboured outside the health facility. One of the cases of maternal death, who had placenta previa complicated by PPH and coagulopathy, was booked and delivered in our health facility.

DISCUSSION

The rate of EPH in this study was 4.0 per 1000 deliveries. This is similar to institutional rates in other studies from developing countries, where a variable rate of 2 to 6 per 1000 deliveries has been reported.^{3,5-7} However, it is higher than the rate of 0.2 to 2.7 per 1000 deliveries reported from developed countries.^{8,9,17,18} This may be because in developing countries there is a high prevalence of risk factors for PPH, such as uterine fibroids in pregnancy, multiple pregnancy, grand multiparity, cephalopelvic disproportion and prolonged labour, previous Caesarean section or myomectomy scar, and placenta previa,^{22,23} in addition, most pregnant women are unbooked and undergo labour and delivery outside the health facilities, without the assistance of a skilled care provider.^{15,16,23} This is a result of low levels of literacy, marriage at an early age, socioeconomic deprivation of women, desire for a large family, and a low prevalence of contraceptive use.^{5,15}

However, in developed countries the situation is different: most women deliver in health facilities supervised by skilled birth attendants,⁸ have a high literacy level and socioeconomic empowerment, and desire a small family, and the prevalence of contraceptive use is high.⁸

Grand multiparity, low socioeconomic class, and unbooked status were found to be risk factors that were significantly associated with EPH in this study and in other studies from developing countries.^{5,24,25} This is probably because grand multiparity is associated with low socioeconomic class and unbooked status, and together these three factors constitute the triad leading to high maternal mortality and morbidity in developing countries.¹⁶ The high prevalence of low levels of adult literacy in developing countries¹⁵ may account for the high prevalence of unbooked patients and of grand multiparity, because the likelihood that mothers will consult a health professional for antenatal care or family planning increase as the mother's educational level rises. Consultation rates increase from 44% among women with no education, to 97% among those with college education, while the proportion of births that take place in health facilities varies from 6% among uneducated women to 73% among women with college education.^{26,27}

This may also explain why uterine rupture, which reflects a poor level of obstetric care and/or provision of care in any community,²² was the commonest indication for EPH in this study, and in other studies from developing countries.^{5,27,28} Studies from developing countries have shown that 74.7% of case referrals to tertiary centres were because of mismanagement by unskilled birth attendants.^{28,29} In developed countries, placenta previa or placenta previa accreta is currently the commonest indication for EPH,⁸ probably because most patients in these countries are literate and deliver in health facilities assisted by skilled care providers.²⁷ This reduces the incidence of avoidable antecedents such as ruptured uterus.³⁰

Placenta previa or placenta previa accreta was the second commonest indication for EPH in this study and in other studies from developing countries.²⁴ The prominence of placenta previa or placenta previa accreta as an indication for EPH has been reported globally.¹⁻⁵ This has been attributed to the increasing Caesarean section rate and the concomitant rise in the prevalence of placenta previa and placenta previa accreta worldwide.³¹⁻³⁵

Uterine rupture and placenta previa accreta were risk factors that were significantly associated with EPH in this study, a finding in agreement with other studies from developing countries,^{5,24} this is probably because uterine rupture and placenta previa accreta tend to be relatively less amenable

to medical and conservative surgical treatments, and sometimes necessitate radical surgical intervention such as hysterectomy.¹⁷ Placenta previa accreta may predispose to partial separation of the placenta, in which case EPH is usually required to control hemorrhage.¹⁷

Uterine atony, which is responsible for 75% to 90% of cases of postpartum hemorrhage,^{17,18} was not significantly associated with EPH in this study. This was probably because recent advances in medical and conservative surgical measures to control PPH (such as rectal misoprostol, intramyometrial injection of prostaglandin, carboprost, manual compression of the uterus, uterine packing with catheters, internal iliac or uterine artery ligation, uterine artery embolization, insertion of B-Lynch sutures,^{17,18} oxytocin, and ergometrine) will control most cases of PPH resulting from uterine atony.^{17,18}

In this study, 86.7% of the patients had a blood transfusion, which agrees with other studies.^{5,24} The importance of efficient blood transfusion services in the management of PPH and EPH has been emphasized.^{36–38} The involvement of governmental and non-governmental agencies such as Safe Blood for Africa,³⁷ and hospital- or community-based campaigns such as the Save a Life free blood donation campaign,¹⁶ are needed, especially in developing countries in which the budget for health care is limited and there is an aversion to free blood donations.¹⁶ Wound sepsis, postoperative pyrexia, anemia, and urinary tract infection were the commonest morbidities in this study, as in other studies from Nigeria.^{5,7} This may be because the leading indication for EPH in Nigeria is uterine rupture following prolonged obstructed labour occurring outside the health facilities; this is associated with a combination of trauma and anemia from hemorrhage, sepsis from the aseptic techniques of traditional midwives, and urethral catheterization for 14 days after delivery to prevent vesicovaginal fistula formation,¹⁶ all of which may predispose to these morbidities.¹⁶ Also, some of the manipulations involved in the conservative surgical treatments that were carried out before the hysterectomy may carry a risk of intrauterine infection.³¹

The high case fatality in this study is in accordance with other studies from Nigeria,^{5,24,25} and has been attributed to delay in carrying out the life-saving hysterectomy. A sequence of conservative measures to control uterine hemorrhage will usually be attempted before resorting to hysterectomy.²⁴ Delay is associated with further bleeding and anemia, with the likelihood that the hysterectomy may be seriously complicated by coagulopathy, severe hypovolemia, tissue hypoxia, hypothermia, and acidosis, which further compromise the patient's status.^{17,18} The moribund state

of the patients at the time of hysterectomy is likely more responsible for the high maternal mortality rate than the operative procedure itself.⁵ Timing is critical to an optimal outcome.¹⁷ The obstetrician will have to avoid spending excessive time on alternative techniques that are proving ineffective, and move judiciously to the definitive and life-saving hysterectomy.³³ Appropriate obstetric judgement in these circumstances, to avoid delay in instituting appropriate treatment, will ensure consistent optimal performance.³⁰

The high perinatal mortality rate found in this study was also found in other studies from Nigeria,^{5,7} probably because uterine rupture occurring in women who laboured outside the hospital was the leading indication for EPH. After uterine rupture, immediate laparotomy is necessary to salvage the fetus,¹⁸ and this is not usually feasible in patients who labour outside the hospital.

In this study, most of the patients had subtotal hysterectomy, probably because most of the patients were not fit for surgery and anaesthesia. This was also the case in other studies.¹⁷ The cervix and paracolpos are not usually involved as the source of hemorrhage, and subtotal hysterectomy should be adequate to achieve hemostasis.³³ Subtotal hysterectomy is safer, faster, and easier to perform than total hysterectomy,³³ especially in the hands of trainee surgeons, who encounter most of the cases during call hours. The future risk of cervical stump carcinoma is low (0.1% to 0.15%¹⁶) and can be prevented by regular cytological screening.⁸

CONCLUSION

The rate of EPH is high, and the associated maternal–fetal outcome is poor at our institution. Improvement in female literacy levels will improve the socioeconomic status of women and the prevalence of contraception, increase the number of women receiving antenatal care and giving birth in hospital delivery facilities supervised by skilled care providers, and reduce the prevalence of grand multiparity. Provision of adequate facilities and trained care providers to carry out medical and conservative surgical treatment of PPH and efficient blood transfusion services are also needed to reduce the rate of EPH and to improve the outcome. Women who are at high risk for primary postpartum hemorrhage should book for antenatal care and deliver in specialized health facilities. Government interventions, such as the recent launch of the National Health Insurance Scheme in Nigeria, should be encouraged, especially in developing countries, to improve the of available antenatal care and hospital delivery facilities supervised by skilled care providers.

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