

A STUDY ON EMERGENCY OBSTETRIC HYSTERECTOMY IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Emergency obstetric hysterectomy is the ultimate surgical intervention for managing life-threatening obstetric haemorrhage and sepsis. The increasing use of caesarean sections has modified its indications. **Materials and Methods:** A cross-sectional, record-based investigation was conducted in a tertiary care government medical college hospital in Tamil Nadu, India, from November 2018 to October 2019. All females giving birth after 28 weeks who had a hysterectomy for an obstetric reason at the time of delivery or during the postpartum period, including those transferred for care post-delivery, were included. Continuous variables were analysed by Student's t-test and analysis of variance. **Result:** A total of 52 hysterectomies were conducted out of 9360 births, resulting in an incidence rate of 0.55%. The average maternal age was 29.23 ± 3.95 years; 38 women (73.1%) received referrals. Postpartum haemorrhage was the predominant cause (27, 51.9%), followed by morbidly adherent placenta (15, 28.8%) and uterine rupture (6, 11.5%). The most prevalent risk factor was a prior caesarean section (30, 57.7%). A total abdominal hysterectomy accompanied by internal iliac artery ligation was performed in 30 females (57.7%). All women required packed red cell transfusion. Mechanical breathing was reported in 12 women (23.1%) and 4 (7.7%) succumbed to hypovolaemic shock with disseminated intravascular coagulation. Non-survivors required higher quantity of packed cells compared to survivors (4.75 ± 2.22 vs 2.48 ± 1.20 units, $p = 0.001$). Live birth rate was 86.5%. **Conclusion:** Emergency obstetric hysterectomy was performed in 0.55% of deliveries, with postpartum haemorrhage as the leading indication and previous caesarean section a major risk factor.

INTRODUCTION

Obstetric haemorrhage is the leading direct cause of maternal mortality globally, accounting for 27.1% of an estimated 2.44 million maternal fatalities between 2003 and 2009, with the burden concentrated in low- and middle-income countries.^[1] When uterotonic medications, uterine tamponade, and conservative surgical methods like compression sutures and progressive pelvic devascularization fail to control bleeding, uterine removal becomes the sole choice. Emergency obstetric hysterectomy is the removal of a portion or all of the uterus during the intrapartum period or within six weeks after birth due to a serious obstetric problem.^[2] It is conducted in the context of ongoing haemorrhage, a ruptured uterus, or uterine infection and terminates the woman's reproductive capability. Two consecutive global meta-analyses have measured how infrequent and unevenly

distributed the procedure is: van den Akker et al. aggregated 128 studies and indicated a prevalence of about 1 per 1000 births, with a fourfold increase in poorer compared to wealthier settings.^[2] The updated analysis by Kallianidis et al., covering 14 409 hysterectomies among 17.1 million births in 42 countries, gave a pooled incidence of 1.1 per 1000 births, rising to 3.0 per 1000 in lower-middle-income settings against 0.7 per 1000 in high-income settings.^[3]

The signs have changed throughout the last three decades. In a study of 318 women by the United Kingdom Obstetric Surveillance System, the most common causes were uterine atony (53%) and morbidly adherent placenta (39%).^[4] The alteration is mostly caused by repeated caesarean deliveries. In Silver et al.'s prospective cohort, the prevalence of placenta accreta increased from 0.24% at the first caesarean section to 6.74% at the sixth or later

surgery, while the necessity for hysterectomy increased from 0.65% to 8.99%. Among women with placenta praevia, the probability of accreta was 40% after two prior caesarean procedures and 61% after three.^[5] These findings have recently been reinforced in studies of long-term maternal morbidity after repeat caesarean delivery and the FIGO consensus statement on the epidemiology of placenta accreta spectrum illnesses.^[6,7] Machado's examination of the available literature also indicated that aberrant placentation has supplanted uterine atony as the most common sign in most modern series.^[8]

Indian data vary because case mix is largely influenced by referral patterns. Sharma et al. from a north Indian referral institute recorded^[6,9] hysterectomies per 1000 deliveries, with placenta accreta as the indication in 60%.^[9] whereas Tahmina et al. from southern India found only^[12] procedures among 16 473 deliveries over 14 years, with atonic postpartum haemorrhage accounting for 58%.¹⁰ Singla et al. reported 194 operations among 100 712 births in Delhi, with atonic postpartum haemorrhage in 45.9% and unscarred uterine rupture in 18.6%.¹¹ Nooren and Nawal identified ruptured uterus as the primary explanation, with a maternal mortality of 15% due to late referral.^[12] Sub-Saharan African series continue to indicate uterine rupture as the major indication, with significant case fatality: 44.1% and 11.8%, respectively, in a Nigerian multicenter study.^[13] and 60% with an incidence of 2.6 per 1000 births in Ethiopia.^[14] Although the WOMAN study demonstrated that early tranexamic acid lowers bleeding-related fatalities, it did not diminish the need for hysterectomy, since the choice to operate is typically made concurrently with randomisation.^[15] Once conservative methods have been exhausted, surgery remains the last option.

Data on this surgery in a high-volume public sector teaching hospital in Tamil Nadu, where the majority of afflicted women come as unscheduled emergency referrals after giving birth elsewhere, are rare. The purpose of this research was to identify the incidence of emergency obstetric hysterectomy in such a situation, as well as to characterise its rationale, risk factors, surgical treatment, transfusion requirements, and mother and perinatal outcomes.

MATERIALS AND METHODS

Study design and setting: This cross-sectional, record-based research was conducted over a year, from November 2018 to October 2019, in the Department of Obstetrics and Gynaecology of a tertiary care government medical college hospital in Tamil Nadu, India. The hospital accepts referrals from peripheral government health institutions, private nursing homes, and primary health care centres in the district and surrounding areas. It also has an in-house blood bank, an obstetric critical care unit, and a level III neonatal facility.

Participants: All women who delivered after 28 completed weeks of gestation and who underwent hysterectomy for an obstetric indication at the time of delivery or within the puerperium were included. Women who delivered outside the institution and were referred with an obstetric complication meriting hysterectomy, and who otherwise satisfied these criteria, were also included. Women undergoing elective peripartum hysterectomy and those undergoing hysterectomy for carcinoma in situ were excluded.

Data collection: Case records, operation notes, anaesthetic charts, blood bank requisitions and discharge summaries were reviewed using a structured proforma. The following were recorded: maternal age, obstetric history, relevant past medical and surgical history, referral status, gestational age, mode of delivery, indication for hysterectomy, medical and conservative surgical interventions attempted before hysterectomy, type of hysterectomy performed, additional procedures such as internal iliac artery ligation, number of units of packed red cells, fresh frozen plasma, cryoprecipitate and platelets transfused, preoperative findings, intraoperative and postoperative complications, need for inotropic and ventilatory support, duration of hospital stay, neonatal outcome, and condition at discharge. Where a maternal death occurred, the case sheet was reviewed and the cause of death recorded.

Clinical management protocol: Postpartum haemorrhage was managed according to the departmental protocol. Medical management consisted of oxytocin infusion, carboprost tromethamine and misoprostol. Where bleeding continued, conservative surgical measures were undertaken, comprising uterine compression sutures (B-Lynch or Hayman), bilateral uterine artery ligation and bilateral internal iliac artery ligation. Hysterectomy was performed when medical and conservative surgical measures failed to control the haemorrhage, or where the clinical situation, such as an irreparable uterine rupture or a morbidly adherent placenta with continuing blood loss, made conservation unsafe. The choice between total and subtotal hysterectomy was made intraoperatively on the basis of the site of bleeding and the haemodynamic state of the woman. Preoperative findings including broad ligament haematoma, involvement of the uterine vessels, colporrhexis, and injury to bladder, ureter or bowel were documented at operation.

Statistical analysis: Data were entered in a spreadsheet and analysed using SPSS, IBM Corp., Armonk, NY, USA. Categorical variables are presented as frequencies and percentages, and continuous variables as mean $\pm$ standard deviation with range. Maternal age, gestational age and the number of units of packed red cells transfused were compared between survivors and non-survivors using the independent samples Student's t-test. Mean birth weight was compared across gestational age categories using one-way analysis of variance. A

two-sided p value below 0.05 was taken as statistically significant.

RESULTS

There were 9360 deliveries during the one-year study period, and 52 women underwent emergency obstetric hysterectomy, giving an incidence of 0.55%, equivalent to approximately 5.6 per 1000 deliveries [Table 1].

Table 1: Incidence of emergency obstetric hysterectomy during the study period

Variable	Value
Total deliveries during the study period (1 year)	9360
Emergency obstetric hysterectomies	52
Incidence	0.55% (approximately 5.6 per 1000 deliveries)

The mean maternal age was 29.23 ± 3.95 years (range 20–36 years). The largest group was aged 26 to 30 years (23 women, 44.2%), followed by 31 to 35 years (17 women, 32.7%); one woman (1.9%) was aged 20 years and two (3.8%) were above 35 years. Third gravidae formed the largest parity group (18 women, 34.6%), followed by second gravidae (15 women, 28.8%). Seven women (13.5%) were primigravidae. In this subgroup the indication was broad ligament haematoma in two women, uterine inversion in one,

placenta accreta in one and atonic postpartum haemorrhage in the remaining three. The mean gestational age at delivery was 36.1 ± 3.06 weeks (range 29–40 weeks). Twenty-eight women (53.8%) delivered at term and 24 (46.2%) delivered preterm, of whom nine (17.3%) delivered between 28 and 32 weeks. Bleeding placenta praevia and adherent placenta accounted for most preterm deliveries [Table 2].

Table 2: Maternal age, parity and gestational age (n = 52)

Variable	Frequency, n (%)
Age group (years)	≤ 20
	1 (1.9%)
	21–25
	9 (17.3%)
	26–30
Parity	23 (44.2%)
	31–35
	17 (32.7%)
	> 35
	2 (3.8%)
Gestational age (weeks)	Primigravida
	7 (13.5%)
	Second gravida
	15 (28.8%)
	Third gravida
	18 (34.6%)
	Fourth gravida
	7 (13.5%)
	Fifth gravida
	4 (7.7%)
	Sixth gravida
	1 (1.9%)
	28–32
	9 (17.3%)
	33–36
	15 (28.8%)
	37–40
	28 (53.8%)

Thirty-eight women (73.1%) were referred from other health facilities after delivery or in labour, and 14 (26.9%) were booked and delivered within the institution. Caesarean section was the mode of delivery in 37 women (71.2%), vaginal delivery in 13 (25.0%) and instrumental vaginal delivery in two (3.8%). Postpartum haemorrhage was the leading indication and accounted for 27 women (51.9%): atonic postpartum haemorrhage in 20 (38.5%), atonic postpartum haemorrhage with placenta praevia in five (9.6%), secondary postpartum haemorrhage in one (1.9%) and traumatic postpartum haemorrhage in one (1.9%). Morbidly adherent placenta was the second commonest indication in 15 women (28.8%), comprising placenta accreta in nine (17.3%), placenta increta in five (9.6%) and placenta percreta in one (1.9%). The remaining indications were rupture uterus in six women (11.5%), broad ligament haematoma in three (5.8%) and uterine inversion in one (1.9%) [Figure 1].

Previous caesarean section was the commonest risk factor and was present in 30 women (57.7%): one

previous caesarean section in 15 (28.8%), two in 13 (25.0%) and three in two (3.8%). Anaemia and gestational hypertension were each present in eight women (15.4%). Imminent eclampsia, placental abruption, gestational diabetes, fibroid uterus, prelabour rupture of membranes exceeding 18 hours and Rh-negative status were each recorded in one woman (1.9%). Eight women (15.4%) had reported anaemia as a risk factor for emergency hysterectomy [Figure 2]. The woman with gestational diabetes delivered a macrosomic infant and developed atonic postpartum haemorrhage, and the Rh-negative woman also underwent hysterectomy for atonic postpartum haemorrhage.

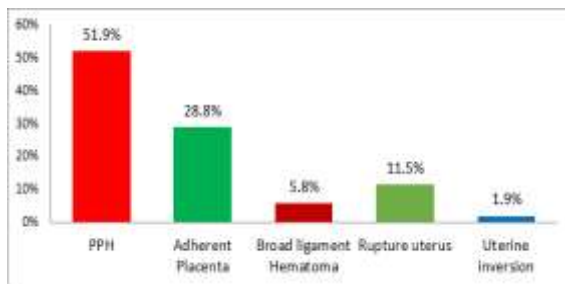


Figure 1: Indication for emergency obstetric hysterectomy (n=52)

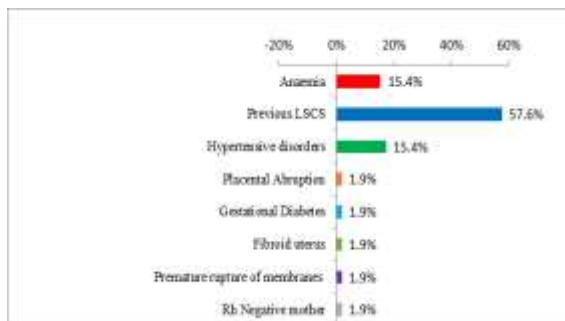


Figure 2: Risk factors for emergency hysterectomy (n=52)

Total abdominal hysterectomy was performed in 42 women (80.8%) and subtotal hysterectomy in 10 (19.2%). Bilateral internal iliac artery ligation was carried out in addition to hysterectomy in 34 women

(65.4%). The commonest single procedure was total abdominal hysterectomy with internal iliac artery ligation, performed in 30 women (57.7%), followed by total abdominal hysterectomy alone in 12 (23.1%), subtotal hysterectomy alone in six (11.5%) and subtotal hysterectomy with internal iliac artery ligation in four (7.7%) [Figure 3].

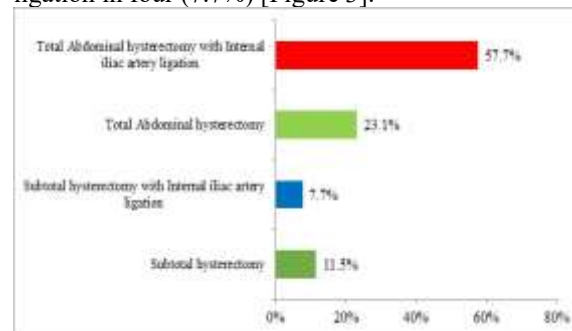


Figure 3: Distribution according to surgery performed (n=52)

All 52 women (100%) required packed red cell transfusion. Sixteen women (30.8%) each received two and three units, nine (17.3%) received a single unit, eight (15.4%) received four units and three (5.8%) received five or more units. Fresh frozen plasma was transfused to 26 women (50.0%), cryoprecipitate to 11 (21.2%) and platelet concentrates to 10 (19.2%) [Table 3].

Table 3: Blood and blood component requirement (n = 52)

Component	Units transfused	Frequency, n (%)
Packed red cells	1 unit	9 (17.3%)
	2 units	16 (30.8%)
	3 units	16 (30.8%)
	4 units	8 (15.4%)
	≥ 5 units	3 (5.8%)
Fresh frozen plasma	2 units	5 (9.6%)
	4 units	14 (26.9%)
	6 units	2 (3.8%)
	8 units	4 (7.7%)
	10 units	1 (1.9%)
Cryoprecipitate	2 units	1 (1.9%)
	3 units	1 (1.9%)
	4 units	8 (15.4%)
	6 units	1 (1.9%)
Platelet concentrate	2 units	1 (1.9%)
	4 units	4 (7.7%)
	8 units	5 (9.6%)

Twenty-eight women (53.8%) had an uneventful postoperative course. Febrile morbidity was the commonest complication, recorded in eight women (15.4%), followed by paralytic ileus in seven (13.5%), bladder injury in four (7.7%), disseminated

intravascular coagulation in three (5.8%), acute kidney injury in three (5.8%) and wound infection in two (3.8%) [Table 4]. Twelve women (23.1%) required mechanical ventilation and eight (15.4%) required inotropic support.

Table 4: Postoperative complications, organ support and maternal outcome (n = 52)

Variable	Frequency, n (%)
Postoperative complications	No complication
	28 (53.8%)
	Febrile morbidity
	8 (15.4%)
	Paralytic ileus
	7 (13.5%)
	Bladder injury
	4 (7.7%)
	Disseminated intravascular coagulation
	3 (5.8%)
	Acute kidney injury
	3 (5.8%)
	Wound infection
	2 (3.8%)

Organ support	Mechanical ventilation required	12 (23.1%)
	Inotropic support required	8 (15.4%)
Maternal outcome	Survived	48 (92.3%)
	Died	4 (7.7%)

*Complication categories are not mutually exclusive.

Forty-eight women (92.3%) survived and were discharged. Four women (7.7%) died, all of whom had been referred from other facilities and all of whom required massive transfusion. Death was attributed to hypovolaemic shock with disseminated intravascular coagulation in every case. Of the 12 women who received mechanical ventilation, eight were weaned successfully and four died; of the eight

who received inotropic support, four were weaned and four died.

Non-survivors had received approximately twice as many units of packed red cells as survivors (4.75 ± 2.22 versus 2.48 ± 1.20 units, $p = 0.001$). Maternal age (27.3 ± 5.9 versus 29.4 ± 3.8 years, $p = 0.302$) and gestational age (36.3 ± 3.9 versus 36.1 ± 3.0 weeks, $p = 0.938$) did not differ between the two groups [Table 5].

Table 5: Comparison of maternal characteristics and transfusion requirement between survivors and non-survivors (n = 52)

Variable	Group	n	Mean $\pm$ SD	p value†
Maternal age (years)	Survivors	48	29.4 ± 3.8	0.302
	Non-survivors	4	27.3 ± 5.9	
Gestational age (weeks)	Survivors	48	36.1 ± 3.0	0.938
	Non-survivors	4	36.3 ± 3.9	
Packed red cells (units)	Survivors	48	2.48 ± 1.203	0.001
	Non-survivors	4	4.75 ± 2.217	

†Independent samples Student's t-test.

There were 45 live births (86.5%) and seven stillbirths (13.5%). Among the live-born infants the mean birth weight was 2.44 ± 0.69 kg (range 1.1–4.0 kg); 12 infants (26.7%) weighed less than 2 kg and 33 more than 2 kg. Twenty-two infants (48.9%) required admission to the neonatal intensive care unit, most commonly for prematurity and respiratory distress.

Mean birth weight increased with advancing gestational age: 1.64 ± 0.81 kg at 28 to 32 weeks ($n = 7$), 2.11 ± 0.36 kg at 33 to 36 weeks ($n = 15$) and 2.90 ± 0.44 kg at 37 to 40 weeks ($n = 23$); the difference across groups was significant ($p < 0.001$) [Table 6 and Figure 4]. Mean birth weight was 2.44 ± 0.69 kg (range 1.1–4.0 kg).

Table 6: Comparison of gestational age and birth weight (n=45)

Gestational age group	n	Mean birth weight $\pm$ SD (kg)	p value‡
28–32 weeks	7	1.64 ± 0.81	< 0.001
33–36 weeks	15	2.11 ± 0.36	
37–40 weeks	23	2.90 ± 0.44	

‡One-way analysis of variance.

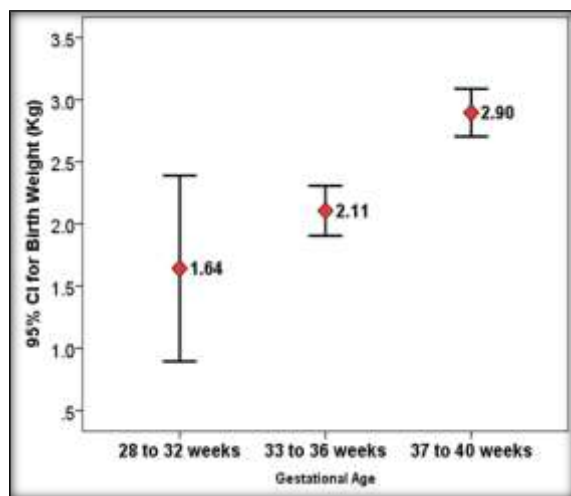


Figure 4: Comparison of gestational age and birth weight (n=45)

DISCUSSION

During this one-year evaluation, emergency obstetric hysterectomy (EOH) was performed in 0.55% of deliveries (5.6 per 1000), higher than the pooled global rate of 1.1 per 1000 and the 0.7 per 1000 reported in high-income settings, but closer to the 3.0 per 1000 reported in lower-middle-income countries. Comparable referral hospitals reported 2.6 per 1000 in south-western Nigeria, 2.6 per 1000 in Ethiopia, and 2.24 per 1000 at Ain Shams University Maternity Hospital, Egypt.^{3,13,14,16} Among Indian studies, the rate lies between 1.92 per 1000 reported by Singla et al. in Delhi and 6.9 per 1000 by Sharma et al. in Chandigarh, and exceeds the 0.73 per 1000 reported by Tahmina et al. over 14 years.^[9-11] Nearly three-quarters (73.1%) were referred, mostly after delivery and failed conservative management, indicating that the institutional rate largely reflects referral case-mix rather than population incidence. Similar findings

were reported by Akar et al., where all 38 women were referred from rural regions.^[17] The high EOH rate primarily reflects referral burden and case severity.

Postpartum haemorrhage was the principal indication (51.9%), with atonic haemorrhage accounting for 38.5% and morbidly adherent placenta for 28.8%. Abnormally adherent placenta accounted for 66.7% of cases in Western Australia, 47.5% in northern Jordan, 42.4% in Turkey, 39.6% in Egypt, and 65% in Saudi Arabia, whereas uterine rupture accounted for 44.5% in the global pooled analysis and 60% in Ethiopia.^[3,14,18] Uterine rupture represented only 11.5% in the present study, considerably lower than in African series and those of Sebitloane and Moodley and Nooren and Nawal.^[12,13,19] The increasing contribution of adherent placenta is consistent with the transition described by Machado and the increased accreta risk associated with placenta praevia and previous caesarean delivery described by Silver et al.^[18,5] Postpartum haemorrhage remains the dominant indication, while placental pathology is an increasingly important contributor.

Previous caesarean section was the most common risk factor (57.7%), including 28.8% with two or more previous surgeries. van den Akker et al. reported odds ratios of 7.5 for EOH following previous caesarean delivery and 11.4 for caesarean delivery in the index pregnancy.² Previous caesarean delivery was reported in 88% of women in Western Australia. In the present cohort, 71.2% underwent caesarean delivery, comparable with 82% in northern Jordan and 85% in the Turkish series.^[20,21] Anaemia and gestational hypertension, each present in 15.4%, indicate potentially preventable gaps in peripheral antenatal surveillance. Thus, previous caesarean delivery was the principal identifiable risk factor, highlighting the need for improved antenatal risk assessment.

The mean maternal age was 29.23 years, with most women aged 26–30 years, younger than the age distribution reported in the United Kingdom and by Akker et al.² 86.5% were gravida.^[2] or higher, comparable with 87% in the global meta-analysis and 83% reported by Tahmina et al.^[10] EOH predominantly affected relatively young, multiparous women with previous uterine scars.

Total hysterectomy was performed in 80.8% of women, with bilateral internal iliac artery ligation in 65.4%. This contrasts with studies favouring subtotal hysterectomy, including Akintayo et al. (67.6%), Tahmina et al. (67%), and Jallad et al.^{10,13,20} Knight found no significant outcome difference between total and subtotal hysterectomy.^[4] Internal iliac artery ligation has also been associated with reduced complications and fresh frozen plasma requirements.^[22] The bladder injury rate of 7.7% was similar to Singla et al. (6.7%) and lower than rates reported by Knight and Akar et al.^[11,4,17] The total hysterectomy with vascular control appears feasible and safe in experienced hands.

All women required packed red-cell transfusion, while approximately half received fresh frozen plasma; 84% of women in Western Australia received blood products.^[10,19]

Non-survivors received significantly more packed cells than survivors (4.75 vs. 2.48 units; $p=0.001$), despite similar maternal age and gestational age. This likely reflects haemorrhage severity and duration before definitive surgery rather than transfusion itself. All four deaths occurred among referred women and were associated with substantial transfusion and disseminated intravascular coagulation. The transfusion requirement is an important marker of haemorrhage severity and delayed definitive management.

Maternal mortality was 7.7%, within the range reported for similar settings but higher than high-income series. Machado reported a mean mortality of 4.8% (range 0–12.5%), compared with 0.6% in the United Kingdom, 11.8% in Nigerian multicentre research, and 15% in the Indian series of Nooren and Nawal, where late referral was implicated.^[8,12] Sharma et al. reported four deaths, all following emergency hysterectomy for atonic postpartum haemorrhage.^[9] Mortality appears closely related to referral delay, haemorrhage severity, and timely access to definitive management.

The live-birth rate was 86.5%, with stillbirth in 13.5%. Almost half of live-born infants (48.9%) required neonatal intensive care, predominantly for prematurity and respiratory distress, while 46.2% of pregnancies ended prematurely, mainly because of bleeding from placenta praevia and adherent placenta. Akintayo et al. reported higher perinatal mortality (55.9%).^[13] An improved antenatal detection and planned management of high-risk placental disorders may reduce prematurity and neonatal morbidity.

Limitations: This single-centre, one-year retrospective study included only 52 women, resulting in limited precision and very small subgroup sizes, particularly among non-survivors ($n=4$). Important variables such as estimated blood loss, decision-to-incision interval, and duration of conservative management were incompletely documented. As a referral-centre study, the reported incidence represents an institutional rather than population-based estimate and may not be generalizable. The absence of a control group prevented identification of factors distinguishing women requiring hysterectomy from those responding to conservative management. Long-term outcomes, including psychological consequences of fertility loss, were also not assessed.

CONCLUSION

Emergency obstetric hysterectomy was uncommon but life-saving, occurring in 0.55% of deliveries. Postpartum haemorrhage was the leading indication, while morbidly adherent placenta and previous

caesarean section were major contributors. Most women were referred, and all maternal deaths occurred among referred patients with hypovolaemic shock and disseminated intravascular coagulation. Early recognition, timely referral, prompt resuscitation, adequate blood products, and multidisciplinary management are essential to improve outcomes.

REFERENCES

1. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health*. 2014;2(6):e323-33.
2. van den Akker T, Brobbel C, Dekkers OM, Bloemenkamp KWM. Prevalence, indications, risk indicators, and outcomes of emergency peripartum hysterectomy worldwide: a systematic review and meta-analysis. *Obstet Gynecol*. 2016;128(6):1281-94.
3. Kallianidis AF, Rijntjes D, Brobbel C, Dekkers OM, Bloemenkamp KWM, van den Akker T. Incidence, indications, risk factors, and outcomes of emergency peripartum hysterectomy worldwide: a systematic review and meta-analysis. *Obstet Gynecol*. 2023;141(1):35-48.
4. Knight M; UKOSS. Peripartum hysterectomy in the UK: management and outcomes of the associated haemorrhage. *BJOG*. 2007;114(11):1380-7.
5. Silver RM, Landon MB, Rouse DJ, Leveno KJ, Spong CY, Thom EA, et al. Maternal morbidity associated with multiple repeat cesarean deliveries. *Obstet Gynecol*. 2006;107(6):1226-32.
6. Clark EAS, Silver RM. Long-term maternal morbidity associated with repeat cesarean delivery. *Am J Obstet Gynecol*. 2011;205(6 Suppl):S2-10.
7. Jauniaux E, Chantraine F, Silver RM, Langhoff-Roos J; FIGO Placenta Accreta Diagnosis and Management Expert Consensus Panel. FIGO consensus guidelines on placenta accreta spectrum disorders: epidemiology. *Int J Gynaecol Obstet*. 2018;140(3):265-73.
8. Machado LSM. Emergency peripartum hysterectomy: incidence, indications, risk factors and outcome. *N Am J Med Sci*. 2011;3(8):358-61.
9. Sharma B, Sikka P, Jain V, Jain K, Bagga R, Suri V. Peripartum hysterectomy in a tertiary care hospital: epidemiology and outcomes. *J Anaesthesiol Clin Pharmacol*. 2017;33(3):324-8.
10. Tahmina S, Daniel M, Gunasegaran P. Emergency peripartum hysterectomy: a 14-year experience at a tertiary care centre in India. *J Clin Diagn Res*. 2017;11(9):QC08-11.
11. Singla A, Mundhra R, Phogat L, Mehta S, Rajaram S. Emergency peripartum hysterectomy: indications and outcome in a tertiary care setting. *J Clin Diagn Res*. 2017;11(3):QC01-3.
12. Nooren M, Nawal R. Obstetric hysterectomy: a life saving emergency. *Indian J Med Sci*. 2013;67(5-6):99-102.
13. Akintayo AA, Olagbuji BN, Aderoba AK, Akadiri O, Olofinbiyi BA, Bakare B. Emergency peripartum hysterectomy: a multicenter study of incidence, indications and outcomes in southwestern Nigeria. *Matern Child Health J*. 2016;20(6):1230-6.
14. Bayable M, Gudu W, Wondafrash M, Sium AF. Incidence, indications, and maternal outcomes of emergency peripartum hysterectomy at a tertiary hospital in Ethiopia: a retrospective review. *Int J Gynaecol Obstet*. 2023;161(1):279-82.
15. WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomised, double-blind, placebo-controlled trial. *Lancet*. 2017;389(10084):2105-16.
16. Allam IS, Gomaa IA, Fathi HM, Sukkar GF. Incidence of emergency peripartum hysterectomy in Ain-shams University Maternity Hospital, Egypt: a retrospective study. *Arch Gynecol Obstet*. 2014;290(5):891-6.
17. Erman Akar M, Saygili Yilmaz E, Yuksel B, Yilmaz Z. Emergency peripartum hysterectomy. *Eur J Obstet Gynecol Reprod Biol*. 2004;113(2):178-81.
18. Begum M, Alsafi F, ElFarra J, Tamim HM, Le T. Emergency peripartum hysterectomy in a tertiary care hospital in Saudi Arabia. *J Obstet Gynaecol India*. 2014;64(5):321-7.
19. Sebitloane MH, Moodley J. Emergency peripartum hysterectomy. *East Afr Med J*. 2001;78(2):70-4.
20. El-Jallad MF, Zayed F, Al-Rimawi HS. Emergency peripartum hysterectomy in northern Jordan: indications and obstetric outcome (an 8-year review). *Arch Gynecol Obstet*. 2004;270(4):271-3.
21. Karayalçın R, Özcan S, Özyer Ş, Mollamahmutoğlu L, Danişman N. Emergency peripartum hysterectomy. *Arch Gynecol Obstet*. 2011;283(4):723-7.
22. Tahaoglu AE, Balsak D, Togrul C, Obut M, Tosun O, Cavus Y, et al. Emergency peripartum hysterectomy: our experience. *Ir J Med Sci*. 2016;185(4):833-8.