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FREQUENCY OF COMPLICATIONS FOLLOWING OBSTETRICAL HYSTERECTOMY

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Abstract

Background: *emergency obstetric hysterectomy (EOH) can save maternal life but it requires proper assessment and adequate surgical skills to avoid complications that may impair quality of life in future. The study results can be helpful to focus on common complications and magnitude of maternal mortality in our setting so that these complications can be prevented.* ***Objective****: To determine the frequency of obstetric hysterectomy related complications.* ***Methodology:*** *This descriptive case series study was done at department of OBG, DHQ hospital DG Khan. The study was completed in 6 months [June 2, 2023 till December 2, 2023]. Data of 141 females was collected using non-probability consecutive sampling.* ***Results:*** *The mean age of participants was 33.74 ± 4.40 years, with a range of 16 years (minimum: 24 years, maximum: 40 years). A total of 52(36.9%) of the participants had complications, while 89(63.1%) did not. 14(9.9%) patients experienced in-hospital mortality, 35(24.8%) of the patients developed renal failure, 28(19.9%) suffered bladder injuries, 30(21.3%) had Disseminated Intravascular Coagulation (DIC) while 34(24.1%) of the patients developed a septic wound.*

Conclusion: *Findings indicate that complications are common, with renal failure, bladder injury, disseminated intravascular coagulation, and septic wounds being the most frequently observed adverse outcomes. Maternal age and parity emerged as significant risk factors, with older and multiparous women exhibiting a higher susceptibility to postoperative complications. Additionally, gestational age played a crucial role, as preterm pregnancies were associated with an increased likelihood of infectious complications.*

INTRODUCTION

A critical and uncommon obstetric procedure employed to save a mother's life when obstetric haemorrhage is uncontrolled is emergency obstetric hysterectomy (EOH) [1]. Even with the presence of a number of conservative treatments, including balloon tamponade, uterine compression sutures, and misoprostol, haemorrhage remain foremost reason behind maternal mortality, claiming 27.1% of lives [2]. the EOH incidence varies between 0.24 and 5.09 per 1000 births, in modern obstetrics [3].

The knowledge and availability of prenatal care, the obtainability of traditional obstetric services, and the efficacy of family planning, determine the frequency in various regions of the world [4]. Due to poverty, social behavior of women, and unavailability of basic obstetric facilities, the prevalence is likely to be

greater in developing countries [5]. Previously, haemorrhage and rupture of the uterus were the most frequently involved indications of EOH [6].

The rising incidence of caesarean sections globally could be the cause of the recent findings of inappropriately adherent placentas as a leading indication for obstetric hysterectomy [7]. Prior c-sections is considered as crucial risk factor because of the risk of placenta previa, a morbidly adherent placenta, and uterine rupture [8]. Multiparty, poor prenatal care, and an unattended delivery that leads to excessive bleeding are other risk factors [8].

There are a number of issues associated with EOH. A study for one year was conducted by Nasrullah FD et al. who took 40 of 4296 (0.93%) cases undergoing an obstetric hysterectomy. They revealed that 75% of patients required more than four units of blood transfusion and 67.5% of patients required admission to the intensive care unit. One-fourth (25%) of the women had maternal mortality [9].

In another study, performed by Mazhar S et al., EOH was present with a frequency of 0.38%, who delivered by caesarean section. Blood transfusions were required in all patients. 14.2% experienced bladder injury, 14.2% experienced re-exploratory laparotomy, 28.5% experienced septic wound, 9.5% experienced chest infection, 4.7% experienced renal failure, and 9.5% experienced disseminated intravascular coagulopathy [10].

In tertiary care hospitals, severe maternal hemorrhage requiring obstetric hysterectomy is frequently encountered, therefore this study has been planned to determine the frequency of obstetric hysterectomy related complications including mortality in our local setting. Though EOH can save maternal life but it requires proper assessment and adequate surgical skills to avoid complications that may impair quality of life in future. The study results may be helpful to focus on common complications and magnitude of maternal mortality in our setting so that these complications can be prevented.

MATERIAL & METHODS

Setting: Department of OBG, DHQ hospital DG Khan

Study design: Descriptive (case series) study

Duration:
6-months after approval of synopsis [June 2, 2023 till December 2, 2023]

Sample size[10]:
Sample size was calculated through WHO sample size calculator using formula for single proportion. Where, frequency of renal failure after postpartum hysterectomy = 4.7%[10]
Confidence level = 95% Absolute precision = 3.5%
Sample size = **141**

Sampling technique:
Non-probability consecutive sampling

Inclusion Criteria:
The women 20- 40 years of age, gestational age >24 weeks and of any parity who were admitted in emergency and underwent obstetric hysterectomy, were included in the study.

Exclusion Criteria:
Women underwent hysterectomy beyond 42 days postpartum

Data collection procedure
The study was conducted after permission from institutional ethic review committee. A total of 141 women underwent obstetric hysterectomy and fulfilled the inclusion criteria were enrolled in the study after informed consent. Baseline characteristics including age, gestational age, parity and area of residence (rural /urban) were noted. Obstetric hysterectomy were performed by consultant surgeon as per hospital protocol.

Operational definitions
Severe postpartum hemorrhage (Blood loss after vaginal delivery >1000 mL or after cesarean section >1500 mLor fall in hemoglobin of ≥ 4g/dl) necessitating surgical removal of uterus with uterine artery ligation was deemed positive for obstetrical hysterectomy.

Complications included

1. In-hospital mortality: Patients who died in-hospital after hysterectomy due to any related complication were deemed positive.
2. Renal failure: Renal failure was deemed positive if serum creatinine rises ≥ 50% compared to before hysterectomy levels.
3. Septic wound: Diagnosed according criteria in Annexure-1
4. Disseminated intravascular coagulation (DIC): Patient was labelled to have DIC if two or more of the following laboratory parameters were fulfilled: a low platelet count (< 150,000/mm^3), elevated D-dimer concentration (>8ug/mL), decreased fibrinogen concentration (< 2 g/L), and prolongation of INR (> 1.5).
5. Bladder injury: Presence of damage (perforation) of urinary bladder as assessed from surgeon notes was deemed positive

Bladder injury during surgical procedure was assessed from surgeon notes. All the patients were followed 30-days postoperatively for documentation of complications as per operational definition. All the data were recorded on proforma designed for the study (attached).

The data were analyzed through SPSS version 23. The quantitative variables like age and gestational age were presented as mean and standard deviation. The qualitative variables like parity, area of residence, and complications were presented as frequency and percentages. The data were stratified on age groups, gestational age, parity and area of residence to determine the effect on frequency of complications following obstetrical hysterectomy. Post-stratification chi-square test was applied and p-value ≤ 0.05 was taken as significant.

RESULTS

The mean age of participants was 33.74 ± 4.40 years, with a range of 16 years (minimum: 24 years, maximum: 40 years). The majority of the participants were in the 31-40 years age group (106(75.2%)), while the remaining were 20-30 years old (35(24.8%)). The mean gestational age was 36.74 ± 1.90 weeks, ranging 10 weeks (minimum: 32 weeks, maximum: 42 weeks). Most participants had a gestational age of 37-42 weeks (84(59.6%)), while 40.4% (57) had a gestational age of less than 37 weeks. A total of 100(70.9%) of the women had six or more pregnancies, whereas 41(29.1%) had less than six. More participants belonged to rural areas (95(67.4%)) than urban areas (46(32.6%)).

A total of 52(36.9%) of the participants had complications, while 89(63.1%) did not. 14(9.9%) patients experienced in-hospital mortality, 35(24.8%) of the patients developed renal failure, 28(19.9%) suffered bladder injuries, 30(21.3%) had Disseminated Intravascular Coagulation (DIC) while 34(24.1%) of the patients developed a septic wound.

A significant association was found between age groups and complications (p = 0.017), with a higher prevalence in the 31-40 years group (45(86.5%) vs. 7(13.5%) in 20-30 years). No significant association was observed with gestational age (p = 0.157), parity (p = 0.113), or residence (p = 0.258). No significant association was found between in-hospital mortality and age (p = 0.107), gestational age (p = 0.705), parity (p = 0.199), or area of residence (p = 0.346). A significant association was observed between age groups and renal failure (p = 0.003), with the 31-40 years group having a higher prevalence (33(94.3%)) compared to the 20-30 years group (2(5.7%)). A significant association was also found with parity (p = 0.008), where women with ≥6 pregnancies had a higher prevalence (31(88.6%)) compared to those with <6 pregnancies (4(11.4%)). Bladder Injury: No significant associations with any demographic factors. No significant associations with any demographic factors. A significant association was found with gestational age (p = 0.035), with a higher prevalence in pregnancies <37 weeks (19(55.9%) vs. 15(44.1%) in 37-42 weeks).

Table-1: Descriptive statistics of age (years)

	Age (years)	Gestational age (weeks)
Mean	33.74	36.74
S.D	4.40	1.90
Range	16.00	10.00
Minimum	24.00	32.00
Maximum	40.00	42.00

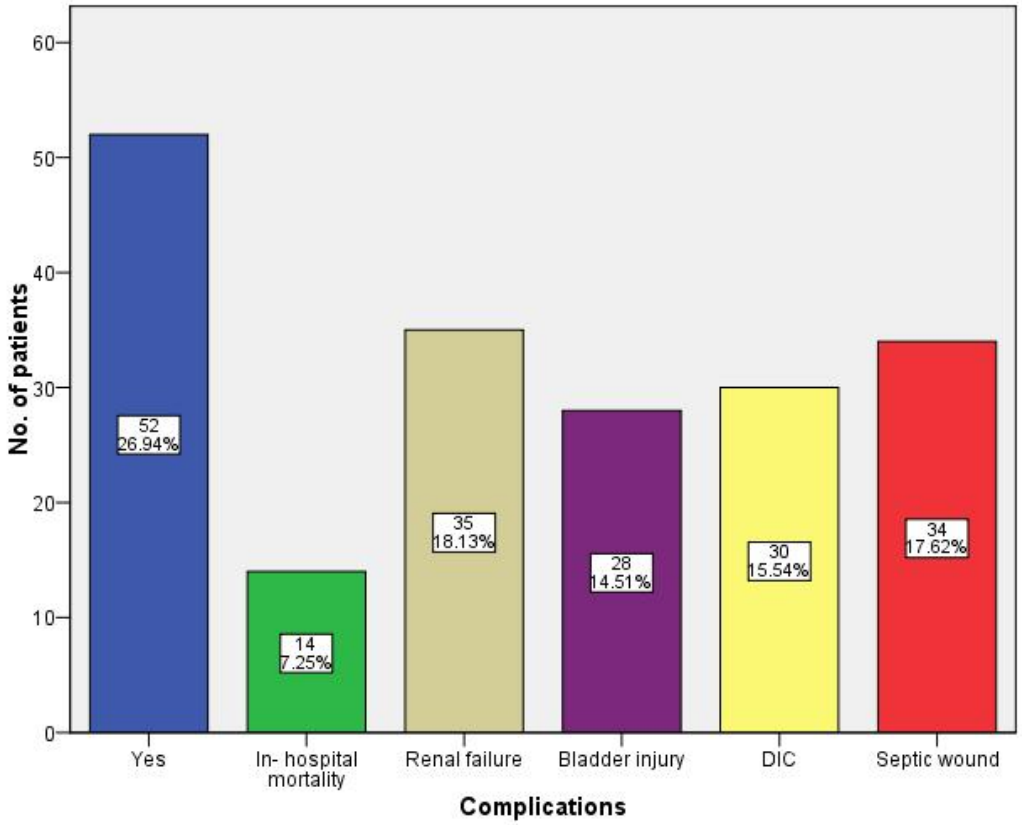

Fig-1: Status of complications

Table-2: Comparison of Complications with respect to age groups, gestational age, parity and area/residence

Complications		Yes	No	Chi-square	p-value
Age groups (years)	20-30	7(13.5%)	28(31.5%)	5.698	0.017*
	31-40	45(86.5%)	61(68.5%)		
Gestational age (weeks)	< 37	25(48.1%)	32(36.0%)	2.003	0.157
	37-42	27(51.9%)	57(64.0%)		
Parity	< 6	11(21.2%)	30(33.7%)	2.508	0.113
	6 or more	41(78.8%)	59(66.3%)		
Area / Residence	Urban	20(38.5%)	26(29.2%)	1.277	0.258
	Rural	32(61.5%)	63(70.8%)		

In- hospital mortality		Yes	No	Chi-square	p-value
Age groups (years)	20-30	1(7.1%)	34(26.8%)	2.604	0.107
	31-40	13(92.9%)	93(73.2%)		
Gestational age (weeks)	< 37	5(35.7%)	52(40.9%)	0.143	0.705
	37-42	9(64.3%)	75(59.1%)		
Parity	< 6	2(14.3%)	39(30.7%)	1.649	0.199
	6 or more	12(85.7%)	88(69.3%)		
Area / Residence	Urban	3(21.4%)	43(33.9%)	0.886	0.346
	Rural	11(78.6%)	84(66.1%)		
Renal failure		**Yes**	**No**	**Chi-square**	**p-value**
Age groups (years)	20-30	2(5.7%)	33(31.1%)	9.110	0.003*
	31-40	33(94.3%)	73(68.9%)		
Gestational age (weeks)	< 37	17(48.6%)	40(37.7%)	1.283	0.257
	37-42	18(51.4%)	66(62.3%)		
Parity	< 6	4(11.4%)	37(34.9%)	7.032	0.008*
	6 or more	31(88.6%)	69(65.1%)		
Area / Residence	Urban	13(37.1%)	33(31.1%)	0.432	0.511
	Rural	22(62.9%)	73(68.9%)		
Bladder injury		**Yes**	**No**	**Chi-square**	**p-value**
Age groups (years)	20-30	5(17.9%)	30(26.5%)	0.908	0.341
	31-40	23(82.1%)	83(73.5%)		
Gestational age (weeks)	< 37	13(46.4%)	44(38.9%)	0.523	0.470
	37-42	15(53.6%)	69(61.1%)		
Parity	< 6	6(21.4%)	35(31.0%)	0.991	0.319
	6 or more	22(78.6%)	78(69.0%)		
Area / Residence	Urban	11(39.3%)	35(31.0%)	0.705	0.401
	Rural	17(60.7%)	78(69.0%)		
DIC		**Yes**	**No**	**Chi-square**	**p-value**
Age groups (years)	20-30	5(16.7%)	30(27.0%)	1.358	0.244
	31-40	25(83.3%)	81(73.0%)		
Gestational age (weeks)	< 37	11(36.7%)	46(41.4%)	0.224	0.636
	37-42	19(63.3%)	65(58.6%)		
Parity	< 6	8(26.7%)	33(29.7%)	0.107	0.743
	6 or more	22(73.3%)	78(70.3%)		
Area / Residence	Urban	11(36.7%)	35(31.5%)	0.283	0.595
	Rural	19(63.3%)	76(68.5%)		
Septic wound		**Yes**	**No**	**Chi-square**	**p-value**
Age groups (years)	20-30	5(14.7%)	30(28.0%)	2.457	0.117
	31-40	29(85.3%)	77(72.0%)		
Gestational age (weeks)	< 37	19(55.9%)	38(35.5%)	4.445	0.035*
	37-42	15(44.1%)	69(64.5%)		

Parity	< 6	7(20.6%)	34(31.8%)	1.566	0.211
	6 or more	27(79.4%)	73(68.2%)		
Area / Residence	Urban	15(44.1%)	31(29.0%)	2.693	0.101
	Rural	19(55.9%)	76(71.0%)		

*Significant

DISCUSSION

Emergency obstetric hysterectomy (EOH) is a critical component of the practice of the obstetrician and mostly conducted due to ongoing and life-threatening obstetric haemorrhage [11]. When emergency obstetric hysterectomy is done, various complications are noted, such as surgery-related complications with damage to surrounding viscera like the bladder, with loss of fertility, requirement of blood transfusion, renal failure, DIC, risk of sepsis, and even death [12].

In our study, the mean age of participants was 33.74 ± 4.40 years, with a range of 16 years (minimum: 24 years, maximum: 40 years) and majority of the women (70.9%) had six or more pregnancies, which is in line with the previous study findings where 56% of patients were reported to be more than 30 years of age and were multipara [13]. High parity has been identified as a risk factor in several investigations [5]. A total of 52(36.9%) of the participants had complications, while 89(63.1%) did not in our study. Our findings reported that 14(9.9%) patients experienced in-hospital mortality, which shows that EOH plays a crucial role in reducing maternal mortality by offering a prompt and effective solution. Our results were comparable with the study results showing 9% maternal deaths among the study population, case-fatality index was reported as 9.3% [14]. Another study reported 16.66% maternal mortality in cases [15].

The most common maternal complications reported in previous literature was bladder injury ranging from (18.8% to 27.11%) [15, 16]. That is in consistent with our study findings that reported 19.9% of bladder injuries. Bladder injury is frequent due to most of the cases being previous cesarean section with placenta adhesion at the scar location. And it is the closest organ at risk of injury during hysterectomy [17].

A total of 35(24.8%) of the patients developed renal failure. According to a study renal failure was found to effect 19.3% cases among total hysterectomy group [18]. Severe pre-eclampsia and hemorrhage is considered as main reason behind disseminated intravascular coagulation (DIC) after hysterectomy. DIC was reported in 30(21.3%) cases that is comparable with the previous study result in which DIC was seen in four patients(19%) [14].

Following a hysterectomy septic wound can develop at the area opened or handled in a surgical process other than the incision [19]. 34(24.1%) of the patients developed a septic wound in or study. In previous local studies, Wound infection was reported 4.0% [20] whereas 5.55% in another Pakistani study [12] which is comparable with our study findings.

The findings of our study revealed a **significant association between age and overall complications (p = 0.017),** with older women experiencing a higher burden of maternal morbidity, particularly **renal failure (p = 0.003).** Advanced age has been widely reported as a risk factor for pregnancy complications, such as gestational hypertension, preeclampsia, gestational diabetes, and adverse perinatal outcomes [21]. While ageing doesn't lead to kidney damage, normal ageing processes have certain physiologic changes that are likely to compromise the kidney's ability to repair itself and therefore make older individuals vulnerable to various renal ailments during EOH [22].

Conversely, younger women (20–30 years) were at lower risk of complications, consistent with earlier findings that complications rise with increasing maternal age due to decreased cardiovascular adaptability, endothelial dysfunction, and enhanced systemic inflammation [23]. However, Nevertheless, although age was strongly correlated with renal failure, no correlation was observed between maternal age and in-hospital mortality (p = 0.107), suggesting that various factors other than age are responsible for maternal mortality.

The mean gestational age was **36.74 ± 1.90 weeks,** with **40.4% of pregnancies classified as preterm (<37 weeks).** In the present study, gestational age was strongly related to bladder injury (p = 0.035), which

was more prevalent in pregnancies <37 weeks. Bladder trauma in labor, especially in preterm gestation, is frequently attributed to the augmentation of medical interventions, cesarean section under emergency conditions, and fetal malpresentation that makes surgery more complicated [24]. Despite these findings, gestational age wasn't related significantly to the total maternal complications (p = 0.157) and in-hospital mortality (p = 0.705), implying that though preterm gestation does account for some complications, it isn't independent with regard to obstetric hysterectomy-related complications.

In our study, 70.9% of participants had high parity (≥6 pregnancies), and 29.1% had lower parity (<6 pregnancies). High parity was significantly associated with renal failure (p = 0.008), as found previously that higher parity has been correlated with increased occurrence of CKD among middle-aged and older Chinese women, which suggests the role of reproductive experience in kidney function [25]. Further findings revealed that, multiparous women were implicated in three out of four EOH cases [26].

CONCLUSION

Findings indicate that complications are common, with renal failure, bladder injury, disseminated intravascular coagulation, and septic wounds being the most frequently observed adverse outcomes. Maternal age and parity emerged as significant risk factors, with older and multiparous women exhibiting a higher susceptibility to postoperative complications. Additionally, gestational age played a crucial role, as preterm pregnancies were associated with an increased likelihood of infectious complications. The absence of significant associations with in-hospital mortality suggests that while complications are frequent, appropriate clinical management may mitigate severe outcomes. These results underscore the need for enhanced prenatal surveillance, timely obstetric interventions, and comprehensive postoperative care to minimize the risks associated with obstetrical hysterectomy, particularly among high-risk maternal populations.

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