

# Investigation of Incidence and Complications of Emergency Peripartum Hysterectomy

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## Abstract

**Introduction:** The emergency peripartum hysterectomy is a high-risk surgery, which is mostly performed after vaginal delivery or Cesarean section. Given the importance of complications and mortality of pregnant mothers for the health system, the present study aimed to investigate the incidence and complications of emergency peripartum hysterectomy in general and teaching hospitals of Zahedan University of Medical Sciences.

**Materials and Methods:** In this cross-sectional descriptive-analytic study, after obtaining the Ethics Committee approval, the medical record of patients with emergency peripartum hysterectomy admitted to Ali ibn Abitaleb hospital of Zahedan for pregnancy termination during 2017-2018 were investigated were studied. After evaluating demographic characteristics, including age, education, and occupation, causes, and complications of emergency hysterectomy were investigated. Finally, data were analyzed by SPSS software.

**Results:** Out of 2438 cases, 50 cases of hysterectomy were investigated. The mean age of mothers and the average number of pregnancy was  $31.06 \pm 5.21$  and  $5.72 \pm 2.31$ , respectively. In this study, 35 cesarean sections (70%) and 15 normal vaginal delivery (30%) were recorded, with only 2% leading to emergency hysterectomy. The most common causes of emergency hysterectomy included placenta accreta (28%), uterine atony (24%), and uterine rupture (20%). The complications also included fever (24%), coagulopathy (14%), and wound infection (12%).

**Conclusion:** Placenta accreta and uterine atony are the most important causes of hysterectomy. The most common complications of emergency hysterectomy are fever, coagulopathy, and wound infections. A decrease in elective caesarean delivery and further encouraging to natural vaginal delivery could significantly reduce the incidence of peripartum hysterectomy and maternal mortality.

**Keywords:** Emergency Hysterectomy; Uterine Atony; Placenta Accrete; Childbirth; Cesarean Section

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## Introduction

Emergency peripartum hysterectomy (EPH) is defined as extirpation of the uterus either at the time of cesarean section or following vaginal delivery, or within the puerperium period. It is usually performed in the face of unrelenting and life-threatening obstetric hemorrhage. Studying such events is very important because it provides insight into care standards and contributes to the reduction of maternal mortality [1,2]. Previous studies, mostly in developed countries, have shown that the prevalence of hysterectomy varies 4-40% by ethnic and geographical area [3-5]. In a study in Iran, the prevalence was 0.37 per 100 deliveries [6]. The most common causes of postpartum hemorrhage in women and Emergency peripartum hysterectomy include uterine rupture, abruptio placentae, and uterine prolapse. The surgery even in modern midwifery is associated with high maternal mortality and morbidity [7]. Complications such blood transfusion, fever, DIC, and re-laparotomy as well as maternal mortality have been highly reported [8]. The hysterectomy surgery includes

removal of uterus, cervix, and in some cases, the Fallopian tubes and ovaries. In heavy postpartum haemorrhage following normal vaginal delivery (NVD), emergency hysterectomy is performed [9]. The main complications of the obstetric hysterectomy include sever hemorrhage, injury to urinary tract, wound infection, disseminated intravascular coagulation(DIC), and adnexectomy [10]. Hysterectomy may be either supracervical or total. Also, oophorectomy is sometimes needed [11].

The most important indication of postpartum hysterectomy is the abnormal placental adherence [12]. In recent years, abnormal placental adherence has become more common due to the increasing number of women undergoing cesarean section. According to statistics, 59.8% and 75% of patients with placenta accreta and placenta previa have a history of cesarean section [10,13]. Reports indicate that there is a direct relationship between placenta previa and cesarean section, and that the prevalence of emergency hysterectomy is more common in patients with placenta previa and placenta accreta than in patients with placenta previa. A number of factors, including multiple pregnancy, cesarean



section, miscarriages, and curettage, increase the risk of placenta previa and the abnormal placental adherence [14,15]. Another concern is the inadequate experience of novice obstetricians and gynecologists in the emergency hysterectomy. According to one report from Netherlands, the average chance of successful performing one EPH for novice gynaecologists is once in the first 11 years of their work. These results indicate that more efforts should be made to identify potential risks for patients in need of emergency hysterectomy. Also, the need for experienced gynecologists is necessary to manage the early stages of the disease [10,16].

Due to the postoperative complications of hysterectomy that can lead to maternal mortality, the importance of eliminating these complications, planning to reduce the complications of this great and vital surgery for pregnant mothers, and suggesting optimal solutions, the present study aimed to investigate the incidence and complications of Emergency peripartum hysterectomy.

### Materials and Methods

In this cross-sectional descriptive-analytic study, all pregnant women with Emergency peripartum hysterectomy who referred to Ali Ibn Abitaleb hospital of Zahedan during 2017-1018 were investigated. In total, the total number of deliveries performed at Ali Ibn Abitaleb Hospital was 2438. In this study, all cases of emergency hysterectomy were evaluated due to limited surgery.

### Study Design

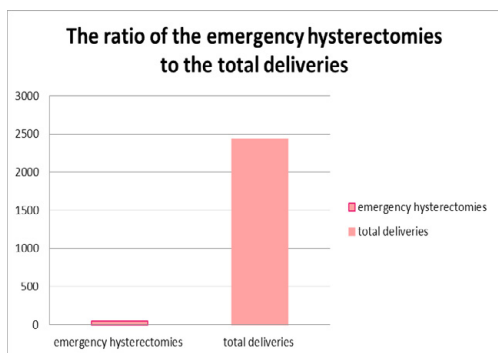
After obtaining the Student Ethics Committee approval, the medical record of patients with hysterectomy was studied. Inclusion criterion was the Emergency peripartum hysterectomy. The data were reviewed and entered into the checklist based on a pre-determined form. After evaluating demographic characteristics, including age, education, and occupation, causes, frequency, and complications of emergency hysterectomy were investigated. Finally, data were analyzed by SPSS software ( $p=0.05$ ).

### Results

Out of 2438 cases, 50 cases of hysterectomy were investigated. The mean age of mothers and the average number of pregnancy was  $31.06 \pm 5.21$  years (16-39 years) and  $5.72 \pm 2.31$ , respectively. In this study, 35 cesarean sections (70%) and 15 normal vaginal delivery (30%) were recorded, with only 2% leading to emergency hysterectomy.

### The Frequency of Emergency Postpartum Hysterectomy

As shown in Figure 1, approximately 2% of deliveries resulted in the emergency hysterectomy.



**Figure 1:** The ratio of the emergency hysterectomies to the total deliveries.

### The Causes of Emergency Postpartum Hysterectomy

In the present study, the cases resulted in the emergency hysterectomy were due to placenta accreta (28%), uterine atony (24%), uterine rupture (20%), abruptio placentae (18%), and placenta previa (10%) (Table 1).

### Demographic Characteristics and Emergency Postpartum Hysterectomy

Due to the significance of Kolmogorov-Smirnov test ( $P < 0.022$ ), nonparametric tests were used for age assessment. In the present study, no significant relationship was observed between age ( $P = 0.664$ ), occupation ( $P = 0.549$ ) and education ( $P = 0.0569$ ) with the cause of hysterectomy (Tables 2- 4).

In the present study, the mean of hospital stay was  $5.96 \pm 2.57$  day, with a minimum and maximum hospital stay of 2 and 14 days, respectively.

In the present study, complications of the emergency postpartum hysterectomy were coagulopathy (24%), wound infection (14%), need for reoperation (12%), need for vasopressor (4%), and hospitalization at ICU (1%), mortality (20%), and bladder rupture (8%) (Table 5).

**Table 1:** Causes of the emergency peripartum hysterectomy.

Causes	Number	Percentage
Placenta accreta	14	28
Uterine atony	12	24
Uterine rupture	10	20
Abruptio placentae	9	18
Placenta previa	5	10
Total	50	100

**Table 2:** Association of age and the causes of hysterectomy (Kruskal-Wallis test).

Causes	SD±M	P-value
Placenta accreta	27.1 ± 50.31	0.664
Uterine atony	16.2 ± 00.32	
Uterine rupture	9.0 ± 50.32	
Abruptio placentae	58.1 ± 00.31	
Placenta previa	63.1 ± 00.29	
Total	73.0 ± 00.32	

**Table 3:** Association of education and the causes of hysterectomy (Pearson's chi-squared).

Causes	Education		Total	Significance
	Literate	Illiterate		
Placenta accreta	8, 57.1%	6, 42.9%	14	0.569
Uterine atony	4, 33.3%	8, 66.7%	12	
Uterine rupture	4, 40%	6, 60%	10	
Abruptio placentae	3, 33.3%	6, 66.7%	9	
Placenta previa	1, 20%	4, 80%	5	
Total	20, 40%	30, 60%	50	

**Table 4:** Association of occupation and the causes of hysterectomy (Fisher's exact test).

Causes	Occupation		Total	Significance
	Employed	Unemployed		
Placenta accreta	5, 35.7%	9, 64.3%	14	0.583
Uterine atony	6, 50%	6, 50%	12	
Uterine rupture	7, 70%	3, 30%	10	
Abruptio placentae	4, 44.4%	5, 55.6%	9	
Placenta previa	3, 60%	2, 40%	5	
Total	25	25	50	



In the present study, 10 infants were admitted to the NICU and 8 infants died after delivery.

In the present study, no significant relationship was observed between the cause of hysterectomy and the type of delivery ( $P = 0.845$ ). Fisher's exact test was used to analyze the statistical data. Also, in mothers who had cesarean section, the most common causes of the hysterectomy were placenta accreta (78.6%), uterine atony (75%), uterine rupture (60%), abruptio placentae (66.7%), and Placenta previa (60%) (Table 6).

**Table 5:** Complications of postpartum emergency hysterectomy.

Complications	Number	Percentage
Fever	12	24
Hospitalization at ICU	10	20
Coagulopathy	7	14
Wound infection	6	12
Need vasopressor	5	10
Mortality	4	8
Bladder rupture	4	8
Reoperation	2	4

**Table 6:** Association of the type of delivery and the causes of emergency postpartum hysterectomy (Fisher's exact test).

Causes	Occupation		Total	Significance
	Employed	Unemployed		
Placenta accreta	11, 78.6%	3, 21.4%	14	0.829
Uterine atony	9, 75%	3, 25%	12	
Uterine rupture	6, 60%	4, 40%	10	
Abruptio placentae	6, 66.6%	3, 33.3%	9	
Placenta previa	3, 60%	2, 40%	5	

## Discussion

Despite advances in medicine and surgery, postpartum hemorrhage is one of the leading causes of maternal complications and mortality [17]. The emergency hysterectomy is a way to save the lives of pregnant mothers, especially in cases of persistent postpartum hemorrhage. This method has been supported by obstetricians for more than 100 years [18]. In fact, before Porro's Operation, maternal mortality following cesarean section was approximately 100% [19]. The Porro's method reduced the mortality rate by 58% and today the method is very successful with the corrections made by many gynecologists [20]. The present study aimed to investigate the incidence and complications of Emergency peripartum hysterectomy. The results of our study showed that 2% of deliveries resulted in emergency hysterectomy. Huque S, et al. (2018), in their study on 193 hospitals in 21 countries, reported that 5% (1020/20017) of women have hysterectomy [12]. Liu F, et al. (2017), in a study on Chinese rural women, reported a 3.31% prevalence of hysterectomy [21]. In a meta-analysis study by Akker et al. (2016) the prevalence of hysterectomy based on income level was reported to be 2.8 and 0.7 per 100 deliveries in low- and high-income communities, respectively [22]. The difference in the prevalence rate could be due to differences in the statistical population of the study.

Also, in the present study, 28, 24, 20, 18, and 10% of cases resulted in the emergency hysterectomy were due to placenta accreta, uterine atony, uterine rupture, abruptio placentae, and Placenta Previa. Complications of the emergency postpartum hysterectomy were coagulopathy (24%), wound infection (14%), need for reoperation (12%), need for vasopressor (4%), and hospitalization at ICU (1%), mortality (20%), and bladder rupture (8%).

In a study by Chawla et al. (2015), the most common cause of

emergency cesarean section were uterine atony (25%), abnormal placental adhesion (21.4%), and uterine rupture (9.17%), and Placenta previa (8.9%). Also, the most common complications of emergency hysterectomy were fever (25%), coagulopathy (12.5%), wound infection (10.7%), need for reoperation (2.6%), hospitalization at ICU (35.7%) and maternal mortality (17.9%) [2]. In a study by Zhang Y, et al. (2017), the leading cause of emergency hysterectomy was abnormal placental adherence (53.1%). Also, the most common complications included coagulopathy trauma, wound infection, and urinary tract trauma, which were rather similar to our study. At the same time, there was 1 case of maternal mortality, which was less than our study [23]. Nohira T, et al. (2014) reported 13 cases of postpartum hysterectomy out of 42,119 deliveries. Uterine rupture (38.5%) was the most common cause in their study, and the disseminated intravascular coagulation was the most common complication before and after surgery [24]. In a study by Begum M, et al. (2014) the most common causes of emergency hysterectomy were placenta accreta, uterine atony, and uterine rupture, respectively. The most common complications were also coagulopathy (37.9%), fever (48.5%), bladder trauma (3.3%), and maternal mortality (4.5%) [25]. In a study by Lee IH, et al. (2012), the most common causes of emergency hysterectomy were placenta accreta (54.3%), uterine atony (30.4%), uterine rupture (6.5%), and placenta previa (4.3%) [26].

According to most global studies, abnormalities in preimplantation embryo is generally the leading cause of Emergency peripartum hysterectomy [27]. According to previous studies, the use of oxytocin and various drugs to stimulate the uterus is one of the dangerous factors for uterine atony that may necessitate emergency hysterectomy [7]. The reason for this difference in this study may be that surgical interventions to control uterine atony, including compression sutures and pre-hysterectomy sclerotherapy are not yet widely used. Also, the measures of the national health network to reduce the cesarean section and increase vaginal deliveries and ethnic factors can be effective; therefore, in case of risk factors, preventive measures to uterine atony are strongly recommended and induction of uterine should be performed with caution. According to the present study, the most common indication of obstetric hysterectomy in patients with a previous uterine scar was placenta accreta.

In a study by Macharey G, et al. (2015), the emergency hysterectomy was prevalent in 2001 and 2007, while 2010 showed an increasing trend of hysterectomy [28].

In addition, the results of our study showed no significant association between the age, occupation, and education with the causes of hysterectomy. In a meta-analysis by Wilson et al., the first menstruation cycle and low level of education were positively associated with hysterectomy, although they suggested that the data should be interpreted with caution due to variance in studies [29]. In addition, it has been shown that the low level of education is associated with a higher risk of hysterectomy, though varies by ethnic [30,31] and geographical area [32]. In another study, Cooper R, et al. (2005) investigated the social and economic status of pregnant women in Australia and the United Kingdom. They found an inverse relationship between education, occupation, and dropout age with hysterectomy [33]. Liu F, et al. (2017) also reported no significant relationship between hysterectomy and education, though suggested that older women are susceptible for increased risk of hysterectomy [21]. However, in our study, there was no significant relationship between the mentioned variables and hysterectomy, which could be further investigated in future studies.



In general, emergency hysterectomy is an essential treatment in childbirth, which, while reducing the potential for childbearing, in many cases saves the mother's life. Due to the increasing number of cesarean sections and multiple pregnancies, the prevalence of emergency hysterectomy is likely to increase, requiring healthcare systems to train specialists, increase their skills, and allocate more facilities.

## Conclusion

Based on the results of our study, the most common causes of hysterectomy were placenta accreta and uterine atony. Complications such as fever, coagulopathy and wound infection were the most common complications of emergency hysterectomy; therefore, it seems that a decrease in Cesarean section without indications and further accuracy in the managed natural childbirth could significantly reduce the incidence of obstetric hysterectomy and maternal mortality

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