

ORIGINAL ARTICLE

Frequency of various factors leading to peripartum hysterectomy.Maryam Rehman¹, Huma Ahmed²

ABSTRACT... Objective: To determine the frequency of common causes of peripartum hysterectomy and to evaluate their association with demographic and clinical variables among women managed at a tertiary care hospital. **Study Design:** Descriptive Cross-sectional study. **Setting:** Department of Obstetrics and Gynecology, Sialkot Medical College and its Affiliated Hospitals. **Period:** September 2025 to March 2026. **Methods:** After approval from the Institutional Review Board of Sialkot Medical College (IRB No. SMC-IRB/03/25 dated 21st January 2025), this descriptive cross-sectional study was conducted on 100 patients undergoing peripartum hysterectomy who were included through non-probability consecutive sampling. Data were collected using a predesigned proforma that included demographic variables such as age, body mass index (BMI), mode of delivery, and socioeconomic status, along with clinical variables including obstructed labour, previous cesarean section, grand multiparity, prolonged labour, placenta previa, and uterine atony. Data analysis was performed using SPSS version 22.0. Quantitative variables were expressed as mean $\pm$ standard deviation, while qualitative variables were presented as frequencies and percentages. Stratification and post-stratification Chi-square tests were applied, and a p-value ≤ 0.05 was considered statistically significant. **Results:** The mean age of the patients was 29.52 ± 4.40 years, while the mean BMI was 24.91 ± 2.82 kg/m². Cesarean section was the most common mode of delivery (58%), and the majority of patients belonged to the low socioeconomic group (63%). The most frequent risk factor associated with peripartum hysterectomy was previous cesarean section (74%), followed by grand multiparity (46%), uterine atony (45%), obstructed labour (35%), placenta previa (25%), and prolonged labour (18%). Stratified analysis demonstrated no statistically significant association of these risk factors with age, BMI, mode of delivery, or socioeconomic status ($p > 0.05$). **Conclusion:** Previous cesarean section, grand multiparity, and uterine atony were the most common factors associated with peripartum hysterectomy. The high prevalence of these potentially preventable risk factors highlights the importance of reducing unnecessary cesarean sections, improving antenatal risk assessment, and ensuring timely obstetric management to decrease maternal morbidity and improve outcomes.

Key words: Cesarean Section, Maternal Morbidity, Peripartum Hysterectomy, Postpartum Hemorrhage, Placenta Previa, Uterine Atony.

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INTRODUCTION

Peripartum hysterectomy is a radical yet life-saving surgical procedure implemented during or soon following the delivery in cases of uncontrollable obstetric hemorrhage, which is mostly postpartum hemorrhage (PPH). Even with the improvement in the area of obstetric care, PPH is still a major cause of maternal mortality accounting to almost a quarter of all deaths of mothers in the world today.¹ Despite its certainty, peripartum hysterectomy can be characterized by a high level of maternal morbidity, such as massive loss of blood, damage to adjacent organs, long-term hospital admission, and irreversible infertility, which is one of the most urgent emergencies in obstetric practice.²

Incidences of peripartum hysterectomy differ

across the regions widely with 0.2 to 5 per 1000 deliveries differing depending on the healthcare infrastructures and the population. The incidence is reported to be about 1.02/1000 deliveries in tertiary care settings with almost two-thirds being abnormal placentation.³ In high-income nations, uterine atony has been replaced as the major signifier of placenta accreta spectrum disorders, and this shift is strongly due to the rise in the rates of cesarean section. Research has shown that a high number of women with peripartum hysterectomy had previous cesarean section and therefore it is a significant risk factor that can be significantly modified.^{2,4}

Low- and middle-income countries (LMICs) such as Pakistan on the other hand still have a greater burden of peripartum hysterectomy.

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This has been mainly as a result of late referrals, insufficient access to full obstetric care, insufficient blood transfusion services, and poor antenatal follow-up. The incidence rates in the region have been reported to be high with rates of between 4 and 11 per 1000 deliveries which are very high compared to those in the developed nations.^{5,6} Also, some old-fashioned risk factors like grand multiparity, obstructed labour, and prolonged labour persist in these environments and indicate the consistent gaps in the maternal healthcare systems.⁵

The trend of increased cesarean births has also led to a rise in the number of cases of abnormal placentation such as placenta previa and placenta accreta spectrum disorders that have become the major causes of peripartum hysterectomy in the world today. Mother factors like older age, high body mass index (BMI) and history of uterine surgery have also been identified as significant factors that determine both the incidence and the outcome of the hysterectomy.⁷ Also, an increased BMI and cesarean delivery have been found to play a crucial role in the development of perioperative complications, such as bladder trauma, infection, and thromboembolism.^{2,8}

Although the existing world literature is growing, there is still a dearth of organized, region specific data on Pakistan that assesses the occurrence and frequency of factors that result in peripartum hysterectomy that is based on standardized definitions and stratified analysis. Most existing studies are retrospective, limited in scope, or primarily focus on indications and outcomes rather than quantifying associated risk factors. Furthermore, limited evidence is available on the interaction between demographic and clinical variables, such as age, BMI, mode of delivery, and socioeconomic status, and these risk factors in local populations.^{6,8}

Therefore, this study was conducted to determine the frequency of various factors leading to peripartum hysterectomy in a tertiary care setting and to evaluate their distribution across key demographic and clinical variables. The findings are expected to provide locally relevant evidence that may facilitate early identification of high-risk patients

and contribute to the development of targeted strategies aimed at reducing maternal morbidity associated with this life-threatening condition.

METHODS

The study was a descriptive cross-sectional study that took place in the "Department of Obstetrics and Gynecology of Sialkot Medical College and associated hospitals, Sialkot", from September 2025 to March 2026 upon the approval of the study synopsis by the Institutional Review Board of Sialkot Medical College (IRB No. SMC-IRB/03/25 dated 21st January 2025). The study involved 100 patients who were having peripartum hysterectomy. The sample size (100) was based on 95% level of confidence, 7.5% level of error and the expected placenta previa occurrence of 16.7% as per a local study conducted earlier.⁹ Study employed a non-probability consecutive sampling method which was used to recruit patients who presented during the study period.

The study included women aged 18-40 years who had gestational age more than 37 weeks and peripartum hysterectomy (according to the definition of this operation) regardless of the number of children they had. Clinical records excluded patients with diabetes mellitus, kidney failure, hepatolithyroid or adrenal disease. Informed consent was obtained with all the patients before enrolling them, after the institutional ethical committee gave the consent.

The pre-designed proforma was used to collect the data. Such demographic variables as age, body mass index (BMI), parity, mode of delivery, and socioeconomic status were documented. Factors that triggered peripartum hysterectomy such as obstructed labour, previous cesarean section, grand multiparity, prolonged labour, placenta previa, and uterine atony that caused primary postpartum haemorrhage were measured based on the predefined operational definitions. Peripartum hysterectomy was considered to be hysterectomy carried out during delivery or six weeks after delivery. Obstructed labour Obstructed fetal descent was the failure of fetal descent as a result of malpresentation despite good uterine contractions diagnosed clinically and/or by ultrasonography. The parity of five or more was called grand multiparity. The prolonged

labour was considered to be the labour which took a duration over 20 hours in primigravida and a duration over 14 hours in multigravida. The placenta previa was identified based on the ultrasonographic findings of grade III or IV placenta previa. The condition characterized by postpartum hemorrhage due to uterine atony was characterized as a boggy uterus and bleeding above 500 ml after vaginal birth or above 1000 ml after cesarean delivery within the 24 hours of part birth. All patients were treated in accordance to the normal hospital procedures.

The entry and analysis of all the data were done with the help of IBM SPSS Statistics version 22.0. Quantitative variables like age, BMI were represented as mean standard deviation and qualitative variables like socioeconomic status, mode of delivery and risk factors were in form of frequencies and percentages. The stratification of data was done in terms of age, BMI, parity, mode of delivery and socioeconomic status to check the effect modifiers. Post-stratification, the chi-square test was applied to assess associations, and a p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 100 patients undergoing peripartum hysterectomy were included in the study. The mean age of the patients was 29.52 ± 4.40 years, while the mean body mass index (BMI) was 24.91 ± 2.82 kg/m². Regarding mode of delivery, 58% of the patients underwent cesarean section, whereas 42% had vaginal delivery. The majority of patients belonged to the low socioeconomic group (63%), followed by middle (33%) and high (4%) socioeconomic classes, as shown in Table-I.

Among the identified factors leading to peripartum hysterectomy, previous cesarean section was the most frequent, present in 74% of patients. Grand multiparity was observed in 46% of cases, while uterine atony was noted in 45% of patients. Placenta previa was identified in 25% of the study population. In addition, obstructed labour and prolonged labour were observed in 35% and 18% of patients, respectively, as shown in Table-II.

Stratification of risk factors with respect to mode of delivery demonstrated no statistically significant

association with obstructed labour ($p = 0.73$), previous cesarean section ($p = 0.79$), grand multiparity ($p = 0.94$), prolonged labour ($p = 1.00$), placenta previa ($p = 0.64$), or uterine atony ($p = 0.14$), as shown in Table-III. Similarly, stratification with respect to age groups (≤ 30 years and >30 years) revealed no significant association between age and obstructed labour ($p = 1.00$), previous cesarean section ($p = 0.63$), grand multiparity ($p = 0.48$), prolonged labour ($p = 0.83$), placenta previa ($p = 0.82$), or uterine atony ($p = 0.90$), as presented in Table-IV.

TABLE-I

Baseline characteristics of patients undergoing peripartum hysterectomy (n = 100).

Variable	Category	Frequency (n)	Percentage (%)
Mode of Delivery	Cesarean Section	58	58.0
	Vaginal Delivery	42	42.0
Socioeconomic Status	Low	63	63.0
	Middle	33	33.0
	High	4	4.0

TABLE-II

Frequency of factors associated with peripartum hysterectomy among the study population (n = 100).

Factor	Present (n)	Percentage (%)
Previous Cesarean Section	74	74.0
Grand Multiparity	46	46.0
Uterine Atony	45	45.0
Placenta Previa	25	25.0
Obstructed Labour	35	35.0
Prolonged Labour	18	18.0

Stratification according to BMI (<25 kg/m² and ≥ 25 kg/m²) also showed no statistically significant association with obstructed labour ($p = 0.33$), previous cesarean section ($p = 1.00$), grand multiparity ($p = 0.87$), prolonged labour ($p = 0.94$), placenta previa ($p = 0.25$), or uterine atony ($p = 0.24$), as shown in Table-V. Furthermore, stratification with respect to socioeconomic status demonstrated no significant association with obstructed labour ($p = 0.30$), previous cesarean section ($p = 0.79$), grand multiparity ($p = 0.24$), prolonged labour ($p = 0.20$), placenta previa ($p = 0.45$), or uterine atony ($p = 0.73$), as presented in Table-VI.

TABLE-III

Stratification of risk factors with respect to mode of delivery and their association using chi-square test (n = 100).

Factor	Mode of Delivery	Yes n (%)	No n (%)	Total	P-Value
Obstructed Labour	C-Section	19 (32.8%)	39 (67.2%)	58	0.73
	Vaginal	16 (38.1%)	26 (61.9%)	42	
Previous Cesarean Section	C-Section	43 (74.1%)	15 (25.9%)	58	0.79
	Vaginal	31 (73.8%)	11 (26.2%)	42	
Grand Multiparity	C-Section	27 (46.6%)	31 (53.4%)	58	0.94
	Vaginal	19 (45.2%)	23 (54.8%)	42	
Prolonged Labour	C-Section	10 (17.2%)	48 (82.8%)	58	1.00
	Vaginal	8 (19.0%)	34 (81.0%)	42	
Placenta Previa	C-Section	16 (27.6%)	42 (72.4%)	58	0.64
	Vaginal	9 (21.4%)	33 (78.6%)	42	
Uterine Atony	C-Section	29 (50.0%)	29 (50.0%)	58	0.14
	Vaginal	16 (38.1%)	26 (61.9%)	42	

TABLE-IV

Stratification of risk factors with respect to age groups (≤ 30 years and >30 years) and their association using chi-square test (n = 100).

Factor	Age Group	Yes n (%)	No n (%)	Total	P-Value
Obstructed Labour	≤ 30	20 (35.7%)	36 (64.3%)	56	1.00
	>30	15 (34.1%)	29 (65.9%)	44	
Previous Cesarean Section	≤ 30	43 (76.8%)	13 (23.2%)	56	0.63
	>30	31 (70.5%)	13 (29.5%)	44	
Grand Multiparity	≤ 30	28 (50.0%)	28 (50.0%)	56	0.48
	>30	18 (40.9%)	26 (59.1%)	44	
Prolonged Labour	≤ 30	11 (19.6%)	45 (80.4%)	56	0.83
	>30	7 (15.9%)	37 (84.1%)	44	
Placenta Previa	≤ 30	15 (26.8%)	41 (73.2%)	56	0.82
	>30	10 (22.7%)	34 (77.3%)	44	
Uterine Atony	≤ 30	26 (46.4%)	30 (53.6%)	56	0.90
	>30	19 (43.2%)	25 (56.8%)	44	

DISCUSSION

Peripartum hysterectomy remains a life-saving but radical obstetric intervention performed in cases of uncontrolled hemorrhage when conservative measures fail. In the present study, the mean maternal age was 29.52 ± 4.40 years, which is consistent with both local and international findings. According to a Pakistani study by Iftikhar et al., the

mean age of 30.04 ± 3.87 indicated that the female population in late reproductive age is the most prevalent.¹⁰

In the same way, Ikram-ul-Haq et al. found that 87 percent of the cases were registered in women aged between 25 and 33 years, a very regular trend in the population of South Asians.¹¹

TABLE-V

Stratification of risk factors with respect to body mass index (<25 kg/m² and ≥25 kg/m²) and their association using chi-square test (n = 100).

Factor	BMI Group	Yes n (%)	No n (%)	Total	P-Value
Obstructed Labour	<25	21 (40.4%)	31 (59.6%)	52	0.33
	≥25	14 (29.2%)	34 (70.8%)	48	
Previous Cesarean Section	<25	38 (73.1%)	14 (26.9%)	52	1.00
	≥25	36 (75.0%)	12 (25.0%)	48	
Grand Multiparity	<25	23 (44.2%)	29 (55.8%)	52	0.87
	≥25	23 (47.9%)	25 (52.1%)	48	
Prolonged Labour	<25	10 (19.2%)	42 (80.8%)	52	0.94
	≥25	8 (16.7%)	40 (83.3%)	48	
Placenta Previa	<25	10 (19.2%)	42 (80.8%)	52	0.25
	≥25	15 (31.2%)	33 (68.8%)	48	
Uterine Atony	<25	20 (38.5%)	32 (61.5%)	52	0.24
	≥25	25 (52.1%)	23 (47.9%)	48	

TABLE-VI

Stratification of risk factors with respect to socioeconomic status and their association using chi-square test (n = 100).

Factor	Socioeconomic Status	Yes n (%)	No n (%)	Total	P-Value
Obstructed Labour	Low	19 (30.2%)	44 (69.8%)	63	0.30
	Middle	15 (45.5%)	18 (54.5%)	33	
	High	1 (25.0%)	3 (75.0%)	4	
Previous Cesarean Section	Low	48 (76.2%)	15 (23.8%)	63	0.79
	Middle	23 (69.7%)	10 (30.3%)	33	
	High	3 (75.0%)	1 (25.0%)	4	
Grand Multiparity	Low	25 (39.7%)	38 (60.3%)	63	0.24
	Middle	19 (57.6%)	14 (42.4%)	33	
	High	2 (50.0%)	2 (50.0%)	4	
Prolonged Labour	Low	8 (12.7%)	55 (87.3%)	63	0.20
	Middle	9 (27.3%)	24 (72.7%)	33	
	High	1 (25.0%)	3 (75.0%)	4	
Placenta Previa	Low	16 (25.4%)	47 (74.6%)	63	0.45
	Middle	7 (21.2%)	26 (78.8%)	33	
	High	2 (50.0%)	2 (50.0%)	4	
Uterine Atony	Low	30 (47.6%)	33 (52.4%)	63	0.73
	Middle	13 (39.4%)	20 (60.6%)	33	
	High	2 (50.0%)	2 (50.0%)	4	

Similar tendencies have been mentioned in European cohorts, in which maternal age is a significant risk factor of peripartum hysterectomy.^{12,13}

Cesarean section was most used in our study (58%), and previous cesarean section was found to be the most frequent risk factor (74%). This result has been highly corroborated with the worldly data that has shown that an increasing prevalence of cesarean sections is a significant cause of the growing occurrence of peripartum hysterectomies. In Turkey the long term data showed that the rates of hysterectomy were increasing significantly in parallel with the increasing number of cesarean deliveries and the highest rates were observed in recent years where up to 95% of patients had had a previous cesarean section.¹⁴ Likewise, systematic reviews conducted across the entire world have shown that previous cesarean delivery is one of the most strong risk factors because it is associated with placenta accreta spectrum disorders.^{15,16} The Rawalpindi study also highlighted the fact that all the patients who underwent hysterectomy due to morbidly adherent placenta had had a prior cesarean section, and therefore the risk is cumulative as more and more patients undergo hysterectomy following repeated cesarean sections.¹²

In our study, grand multiparity was witnessed in 46% of the patients which is comparable to the developing regions where high parity is still a major cause of obstetric complications. Although it has become less relevant in high-income contexts because of the better reproductive health services, it is still relevant in low and middle-income countries where the access to the antenatal care services and family planning might be scarce. Our cohort also reported obstructed labour (35%), which is an indicator of system-wide problems (such as delayed referrals and poor intrapartum monitoring). The results are corroborated by the regional studies that indicated obstruction of labour and uterine rupture as significant factors contributing to emergency obstetric hysterectomy in resource-limited regions.^{13,6}

Our research revealed that 45 percent of the cases had uterine atony, which is within the range that has been stated in the international literature.

A large meta-analysis reported uterine atony as a leading indication in approximately 27% of cases globally, although its contribution varies significantly depending on healthcare infrastructure.⁶ In contrast, placental pathologies, including placenta previa and placenta accreta spectrum, accounted for 25% of cases in our study. This proportion is lower than that reported in high-income settings, where placental disorders have become the predominant indication for hysterectomy due to increasing cesarean section rates and improved antenatal diagnosis.^{17,18} Studies from Romania and Norway have similarly reported a shift toward placental pathology as the leading cause, often associated with previous cesarean delivery and advanced maternal age.^{4,8}

The stratified analysis in our study did not demonstrate statistically significant associations between risk factors and variables such as age, BMI, mode of delivery, or socioeconomic status. While this may initially appear unexpected, it is not uncommon in descriptive cross-sectional studies with relatively small sample sizes. Previous literature has emphasized that although clinical factors such as previous cesarean section and abnormal placentation are strongly associated with peripartum hysterectomy, statistical significance may not always be evident in smaller cohorts due to limited power and heterogeneity in patient populations.^{12,16} Furthermore, socioeconomic status did not show a significant association in our study, which is consistent with findings suggesting that clinical and obstetric factors often outweigh sociodemographic determinants in predicting the need for hysterectomy.⁹

The peripartum hysterectomy rates and signs are heterogeneous across the healthcare systems in the globe. The incidence rates are higher in lower- and middle-income countries, which is frequently explained by the delay of the referral, insufficient antenatal care, and insufficient access to emergency obstetric services.^{6,7} Conversely, high-income nations exhibit lower rates and a higher rate of cases belonging to placenta accreta spectrum disorders associated with the changing obstetric practice and rising rates of cesarean sections.^{4,8} The international movement implies a shift towards placental pathology rather than uterine atony and

rupture as the primary signifier of the long-term implications of rising rates of cesarean delivery.

The results of this paper reveal the pivotal role of a history of cesarean delivery, high multiparity, and hemorrhagic complication in the development of peripartum hysterectomy. Such findings are aligned with the local and international literature and highlight the necessity of preventive interventions that focus on the modifiable risk factors. The reduction of unnecessary primary cesarean sections, enhancement of antenatal diagnosis of abnormal placentation, and enhancement of referral systems and emergency obstetric care should be the efforts. With tertiary care facilities, the risk of high-risk patients is identified earlier and the management is done by various experts, which can greatly decrease the maternal morbidity and the radical surgical interventions.

CONCLUSION

Peripartum hysterectomy is still a life-saving measure in case of serious obstetric bleeding. Previous cesarean section, grand multiparity, and uterine atony were the most common related variables in this research, which is consistent with the trends found in regional and international sources. Whilst these modifiable risk factors did not find any statistically significant correlations in the stratified analysis, their prevalence as the leading causes of unnecessary cesarean births highlights the significance of decreasing unnecessary cesarean births, enhancing the effectiveness of risk identification during pregnancy, and enhancing the timeliness of obstetric care. In the future, these associations should be better determined through further multicenter research that would inform preventive measures.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	Maryam Rehman: Data collection, analysis.
2	Huma Ahmed: Interpretation, design.