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FREQUENCY OF PRIMARY POSTPARTUM HEMORRHAGE DUE TO TRAUMA INCLUDING CERVICAL AND PERINEAL TEARS DURING VAGINAL DELIVERY

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Abstract

Background: *Primary postpartum hemorrhage (PPH) is a major cause of maternal morbidity and mortality worldwide.*

Objective: *To determine the frequency of primary postpartum hemorrhage due to cervical and perineal tears during vaginal delivery and to assess associated maternal and obstetric risk factors.*

Methodology: *This cross-sectional study was conducted at Unit II, Department of Gynecology and Obstetrics, Ghulam Muhammad Mahar Medical College (GMMMC), Sukkur, from April 2205 to July 2025. A total of 200 women aged 18–40 years, with gestational age >32 weeks and parity <5, were enrolled using non-probability consecutive sampling. Women with multiple gestations, abnormal placentation, or a history of PPH were excluded. Demographic, obstetric, and clinical data were collected using a structured proforma. Participants were followed for 24 hours post-delivery, and blood loss >500 mL after vaginal delivery was labeled as PPH.*

Results: *The mean age of participants was 28.6 ± 5.1 years, and the mean gestational age was 37.8 ± 1.6 weeks. Perineal tears were found in 59% of cases, while cervical tears occurred in 41%. Primary PPH developed in 27 women (13.5%), with 66.7% attributed to cervical tears and 33.3% to perineal tears. PPH was significantly associated with anemia ($p = 0.021$), instrumental delivery ($p = 0.015$), and cervical tears ($p = 0.008$). No significant correlation was found with age, BMI, or parity.*

Conclusion: *It is concluded that trauma, particularly cervical tears, is a considerable cause of primary postpartum hemorrhage following vaginal delivery. Careful postpartum genital examination, early detection and repair of tears, correction of antenatal anemia, and skilled obstetric practices are essential to prevent trauma-related hemorrhage and improve maternal safety.*

INTRODUCTION

Primary postpartum hemorrhage (PPH) remains one of the leading causes of maternal morbidity and mortality worldwide, particularly in low- and middle-income countries where access to timely obstetric care may be limited. It is defined as blood loss exceeding 500 mL following vaginal delivery or 1000 mL after

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cesarean section within the first 24 hours postpartum. Postpartum Hemorrhage is defined as a loss of >= 500-1000 ml blood from the genital tract, accompanied by signs or symptoms of hypovolemia within 24 hours after the birth process. Primary PPH can also be defined as a fall in hematocrit >10%.[1, 2]Postpartum hemorrhage is an obstetrical emergency and although the mortality rate from postpartum hemorrhage has decreased, it is still considered a challenge in obstetrics.[3, 4]

According to WHO, postpartum hemorrhage is responsible for 25% of all maternal deaths and is the most common cause of maternal morbidity and mortality. Post-partum hemorrhage is the leading cause of admissions to the intensive care unit. Post-partum hemorrhage is also an important cause of maternal mortality even in high-income countries, accounting for about 13% of maternal deaths.[1] The most common causes of postpartum hemorrhage are classified using the acronym of the four Ts (tone, trauma, tissue and thrombin); uterine atony accounts for about 70% of postpartum hemorrhage cases, genital tract trauma accounts for 15–20% of cases, retention of the placenta and/or membranes increases the incidence of postpartum hemorrhage by 3.5 times (10–40%) and coagulation disorders, both inherited and acquired, account for approximately 1% of postpartum hemorrhage.[5, 6]

Genital tract trauma is the second most common cause of Primary postpartum hemorrhage, and can cause short-term and long-term consequences for new mothers. Preventive measures have not been fully explicated.[7] It has been reported in a study that postpartum hemorrhage occurred in 4.7% in females with cervical tears while 2.4% in perineal tears. [8] One more study reported that postpartum hemorrhage occurred in 5.6% in females with cervical tears while 4.2% in perineal tears.[9] The frequency of PPH due to genital tract trauma varies across settings, influenced by obstetric practices, skill levels of birth attendants, and the availability of perineal support techniques during delivery.[10] Studies have shown that trauma-related PPH can account for 10–20% of all PPH cases, emphasizing the need for comprehensive postpartum assessment. Failure to promptly identify and repair these lacerations can result in severe hemorrhage, hypovolemic shock, and increased maternal mortality.[11,12]

Rationale of this study is to determine the frequency of primary postpartum hemorrhage due to trauma including cervical and perineal tears. Literature showed that although the risk of postpartum hemorrhage in such cases is very low. But we observe postpartum hemorrhage more common in local setting, although the evidence is scarce for local population. Therefore, we want to conduct this study to get evidence for local population and implement findings in local population. This will help us to improve our knowledge and practice and in future, we will implement screening of females for cervical and perineal tears to prevent postpartum hemorrhage and its adverse consequences.

Objective

To determine the frequency of Primary postpartum hemorrhage due to trauma including Cervical and perineal tears during vaginal delivery

Methodology

This cross-sectional study was conducted at Unit II, Gynecology and Obstetrics Department, Ghulam Muhammad Mahar Medical College (GMMMC), Sukkur from April 2025 to July 2025. By using WHO calculator, sample size of 175 cases is calculated with 95% confidence level, 3% margin of error and percentage of postpartum hemorrhage i.e. 4.2% in females with cervical tears.[9] Data were collected through Non probability, consecutive sampling technique.

Inclusion criteria:

1. Pregnant women aged 18-40 years, parity<5
2. Presenting at gestational age >32 weeks (on LMP) and ultrasound scan
3. Diagnosed with Cervical and perineal tears (as per operational definition).

Exclusion criteria:

1. Pregnant women with multiple gestations or fetal anomalies (on ultrasound).
2. Women with abnormal placenta (accreta, increta, previa, percreta, or abruption) detected on ultrasound.
3. Women with a previous history of postpartum hemorrhage.

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Data collection

A total of 200 women fulfilling the inclusion and exclusion criteria were enrolled from the post-delivery wards after obtaining informed written consent. Demographic data and clinical information were recorded, including name, husband's name, age, weight (kg), height (m), BMI (kg/m²), parity, gestational age at delivery, occupation, presence of gestational diabetes (OGTT >186 mg/dL), gestational hypertension (BP ≥140/90 mmHg after 20 weeks of gestation), anemia (Hb <10 g/dL), mode of delivery, history of perineal trauma, and type of trauma (cervical or perineal tear). Participants were followed for 24 hours postpartum. Those experiencing blood loss exceeding 500 mL following vaginal delivery were labeled as having primary postpartum hemorrhage, in accordance with the operational definition. Patients diagnosed with PPH were managed according to institutional standard treatment protocols. All collected data were documented in a predesigned proforma.

Data Analysis

Data were analyzed using Statistical Package for Social Sciences (SPSS) version 25. Quantitative variables such as age, height, weight, BMI, and gestational age were expressed as mean ± standard deviation (SD). Qualitative variables including parity, occupation, gestational diabetes, gestational hypertension, anemia, mode of delivery, history of perineal trauma, type of trauma (cervical or perineal tear), and postpartum hemorrhage were presented as frequencies and percentages. Data were stratified for potential confounding factors such as age, BMI, gestational age, parity, occupation, gestational diabetes, gestational hypertension, anemia, mode of delivery, history of perineal trauma, and type of trauma. Post-stratification, chi-square or Fisher's exact test was applied to compare the occurrence of postpartum hemorrhage across groups, with a p-value ≤0.05 considered statistically significant.

Results

Data were collected from 200 patients, mean age of participants was 28.6 ± 5.1 years, with most of the women (62%) aged between 26 and 35 years, followed by 29% between 18 and 25 years, and 9% between 36 and 40 years. The mean gestational age at delivery was 37.8 ± 1.6 weeks, and the mean BMI was 25.3 ± 3.8 kg/m². Multiparous women made up 57% of the sample, while 43% were primiparous. Most participants were housewives (74%), and 26% were working women. Gestational hypertension was found in 14%, gestational diabetes in 9%, and anemia (hemoglobin <10 g/dL) in 18% of women.

Table 1. Baseline Demographic and Clinical Characteristics of Study Participants (N = 200)

Variable	Categories	n (%) / Mean ± SD
Age (years)		28.6 ± 5.1
	18–25	58 (29.0)
	26–35	124 (62.0)
	36–40	18 (9.0)
Gestational age at delivery (weeks)		37.8 ± 1.6
BMI (kg/m²)		25.3 ± 3.8
Parity	Primiparous	86 (43.0)
	Multiparous	114 (57.0)
Occupation	Housewife	148 (74.0)
	Working	52 (26.0)
Gestational hypertension	Yes	28 (14.0)
	No	172 (86.0)
Gestational diabetes	Yes	18 (9.0)
	No	182 (91.0)
Anemia (Hb < 10 g/dL)	Yes	36 (18.0)
	No	164 (82.0)

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Most women (83%) delivered spontaneously, while 17% underwent instrumental delivery. A history of perineal trauma was observed in 59% of participants. Among the types of trauma, perineal tears were seen in 59% of women, whereas 41% had cervical tears. Postpartum hemorrhage was observed in 27 cases (13.5%), while 173 women (86.5%) did not develop hemorrhage. Among those who had postpartum hemorrhage, cervical tears were responsible in 66.7% of cases, and perineal tears accounted for 33.3%.

Table 2. Obstetric and Delivery-Related Factors (N = 200)

Variable	Categories	n (%)
Mode of delivery	Spontaneous vaginal delivery	166 (83.0)
	Instrumental delivery	34 (17.0)
History of perineal trauma	Yes	118 (59.0)
	No	82 (41.0)
Type of trauma	Perineal tear	118 (59.0)
	Cervical tear	82 (41.0)
Postpartum hemorrhage	Present	27 (13.5)
	Absent	173 (86.5)
Type of trauma among PPH cases	Cervical tears	18 (66.7)
	Perineal tears	9 (33.3)

The frequency of postpartum hemorrhage was higher among women aged 36–40 years (22.2%) compared to other age groups, but this association was not statistically significant (p = 0.62). Similarly, parity did not show a significant relationship with postpartum hemorrhage (p = 0.38). However, a significant association was found between instrumental delivery and postpartum hemorrhage (29.4% vs. 10.2% in spontaneous deliveries, p = 0.015). Anemia was also significantly associated with postpartum hemorrhage (25.0% vs. 11.0%, p = 0.021). The type of trauma had a significant relationship with postpartum hemorrhage, as cervical tears were more likely to cause bleeding (22.0%) compared to perineal tears (7.6%) with p = 0.008.

Table 3. Association of Primary Postpartum Hemorrhage with Clinical and Obstetric Factors

Variable	Categories	PPH Present n (%)	PPH Absent n (%)	p-value
Age group (years)	18–25	7 (12.1)	51 (87.9)	0.62
	26–35	16 (12.9)	108 (87.1)	
	36–40	4 (22.2)	14 (77.8)	
Parity	Primiparous	10 (11.6)	76 (88.4)	0.38
	Multiparous	17 (14.9)	97 (85.1)	
Mode of delivery	Spontaneous	17 (10.2)	149 (89.8)	0.015*
	Instrumental	10 (29.4)	24 (70.6)	
Anemia	Yes	9 (25.0)	27 (75.0)	0.021*
	No	18 (11.0)	146 (89.0)	
Type of trauma	Cervical tears	18 (22.0)	64 (78.0)	0.008*
	Perineal tears	9 (7.6)	109 (92.4)	

*p ≤ 0.05 statistically significant

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Discussion

This study aimed to determine the frequency of primary postpartum hemorrhage (PPH) due to trauma, specifically cervical and perineal tears, among women undergoing vaginal delivery. Out of 200 participants, 13.5% developed primary PPH, with cervical tears accounting for two-thirds (66.7%) of these cases. These findings highlight that genital tract trauma, though often overshadowed by uterine atony, remains a significant and preventable cause of postpartum hemorrhage in vaginal deliveries. The frequency of trauma-related PPH observed in this study aligns with previous literature, which reports genital tract lacerations contributing to approximately 10–20% of PPH cases (WHO, 2018). A study by Sosa et al. (2009) similarly found that trauma-related bleeding accounted for 12% of PPH episodes, with cervical tears being more frequent in cases of instrumental or rapid deliveries. The predominance of cervical tears in our study is consistent with this pattern, likely reflecting mechanical injury from forceful fetal expulsion or inadequate perineal support during delivery.[13] A significant association between instrumental delivery and PPH ($p = 0.015$) was observed in this study. Instrumental deliveries, particularly with forceps or vacuum extraction, increase the risk of soft tissue trauma, leading to lacerations of the cervix, vagina, or perineum. Similar findings were reported by Bose et al. (2020), who emphasized the importance of skilled technique and timely assessment of genital tract integrity following assisted deliveries. Anemia also showed a significant association with PPH ($p = 0.021$), suggesting that preexisting low hemoglobin levels may exacerbate the impact of even moderate blood loss. This is in line with the observations with other studies who noted that anemic women are more likely to experience hemodynamic instability and require transfusion even with minimal postpartum bleeding. The presence of anemia before delivery thus magnifies the risk of morbidity in the event of obstetric hemorrhage. Cervical tears were found to be a more significant cause of PPH than perineal tears in this study ($p = 0.008$).[14] Cervical lacerations often go unnoticed if not carefully inspected after delivery, especially when uterine tone is adequate but bleeding persists. The results are comparable to those of Al-Zirqi et al. (2017), who reported cervical tears as a leading source of concealed bleeding in cases initially misclassified as uterine atony. This underscores the need for routine post-delivery inspection of the cervix and vaginal walls in all cases of unexplained bleeding, regardless of uterine contractility.[15-17] The overall frequency of PPH (13.5%) in our study is higher than some regional studies but lower than figures reported in resource-limited settings lacking standardized obstetric protocols. Differences in PPH incidence across studies can be attributed to variations in obstetric practice, delivery environment, and operator experience.[18,19] In well-equipped centers where skilled birth attendants perform deliveries and active management of the third stage of labor is routinely practiced, trauma-related hemorrhage tends to be promptly detected and managed.[20] The findings also highlight the importance of preventive measures, including antenatal correction of anemia, use of controlled delivery techniques to avoid perineal overdistension, and timely repair of tears under adequate anesthesia. Training healthcare providers in perineal protection and postpartum examination protocols can further reduce trauma-related hemorrhage rates. **Limitations** of this study include its single-center design and relatively small sample size, which may limit generalizability. Additionally, the study did not assess long-term maternal outcomes such as wound healing or transfusion requirements. However, its strength lies in its focused analysis of trauma-specific PPH, a relatively underexplored aspect in the local context.

Conclusion

It is concluded that trauma-related primary postpartum hemorrhage, particularly due to cervical and perineal tears, remains a significant yet preventable cause of maternal morbidity following vaginal delivery. In this study, 13.5% of women developed PPH, with cervical tears being the predominant cause. The occurrence of PPH was notably higher among women with anemia and those who underwent instrumental deliveries, underscoring the need for preventive measures and vigilant postpartum assessment.