Original Article
DOI: https://doi.org/10.70749/ijbr.v3i4.2278

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://ijbr.com.pk
ISSN: 2960-2793/ 2960-2807

Primary Postpartum Hemorrhage in Twin Pregnancy Delivery

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ARTICLE INFO

Keywords: Twin Pregnancy, Primary Postpartum Hemorrhage, Vaginal Delivery, Cesarean Section, Maternal Outcomes.

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Declaration
Authors' Contribution
All authors equally contributed to the study and approved the final manuscript

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History
Received: 12-01-2025 Revised: 04-04-2025
Accepted: 17-04-2025 Published: 30-04-2025

ABSTRACT

Background: Twin pregnancies are associated with increased maternal and neonatal risks, and primary postpartum hemorrhage remains one of the most significant complications during delivery. While cesarean section is often perceived as carrying greater risk of hemorrhage compared to vaginal birth, data remain inconsistent across populations, necessitating further evaluation in local healthcare settings. **Objective:** To determine the frequency of primary postpartum hemorrhage in twin pregnancies and compare its occurrence between vaginal and cesarean deliveries. **Study design:** Descriptive study. **Duration and place of study:** The study was conducted from June to November 2024 at the Department of Obstetrics and Gynaecology, Khyber Teaching Hospital, Peshawar. **Methodology:** Eighty-five women with ultrasound-confirmed twin pregnancies beyond 36 weeks of gestation were enrolled through consecutive sampling. Patients underwent either vaginal or cesarean delivery. Blood loss was measured by weighing sponges, pads, and clots, with thresholds of ≥500 ml for vaginal and ≥1000 ml for cesarean delivery used to define primary postpartum hemorrhage. Demographic data, clinical parameters, and obstetric details were recorded. **Results:** The mean maternal age was 29.4±7.4 years, with mean gestational age of 38.0±1.2 weeks. Primary postpartum hemorrhage occurred in 15 (17.6%) women overall, with similar rates in vaginal (18.4%) and cesarean (17.0%) deliveries (p=0.866). Mean blood loss was significantly higher following cesarean birth (755.2±247.3 ml) compared to vaginal delivery (396.1±170.3 ml, p<0.001). **Conclusion:** Primary postpartum hemorrhage was a frequent complication in twin pregnancies, with comparable frequency across both delivery modes.

INTRODUCTION

Twin pregnancies are one of the important clinical disorders as they can affect both fetal and maternal outcomes as compare to the singleton pregnancies.[1] One of its many conditions are that the uterus stretches widely by the additional push by two or more fetuses and the respective accompanying placental and amniotic support systems and subjects the woman to severe physiological stress in the body.[2] This condition can also leaves the pregnant woman with maternal morbidity like pre-eclampsia and gestational hypertension and preterm labour and various fetal complications in the form of IUGR and malformations and increased perinatal mortality.[3] It also cause high dependency antenatal monitoring and multi-disciplinary care are thus key in a bid to maximize the outcome among the infants and the pregnant woman.[4]

Twin gestation will usually have more challenges to warrant intensive obstetric monitoring. One or both the fetuses can be compromised due to malpresentation and prolonged or obstructed labour can be salient.[5] Moreover cord prolapse and risk for operative intervention such as cesarean section are also typical outcomes of pregnancy.[6] Uterine overdistension can also be the reasons for feeble uterine contractility and double placental separation can cause excessive bleeding during the time of delivery.[7] Such eventualities call for careful delivery outlining usually requiring experienced obstetricians and anesthesia assistance and preparedness for resuscitation of two neonates concurrently.[8]

Primary postpartum hemorrhage is among the one of the most prevalent complication arising following delivery in twins and remains the most frequent cause of maternal death and morbidity among such patients.[9] Most common mechanisms among such patients are uterine atony secondary to excessive distension of the uterus while retained placental tissue and trauma to the genital tract and disorders of coagulation.[10] The risk is much greater than as compare to singleton delivery and require proactive preventive measure such as the active management of the third phase of the labor process and uterotonic agents and preparation for surgical or interventional intervention when necessary.[11] So timely identification and intensive care are the hallmark of the best reduction in maternal bleeding and the clinical outcome usually among twin gestation complicated by postpartum hemorrhage.

A study conducted by di Marco G et al. reported that the overall frequency of primary postpartum hemorrhage in twin pregnancies was 16.97%, with rates of 19.2% in twin vaginal deliveries and 17.82% in twin cesarean sections.[12]

Twin pregnancies are at far greater risk for obstetric complications and primary postpartum hemorrhage ranks among the most severe causes of maternal morbidity and mortality. Although global evidence has established how prevalent it is, local evidence in Peshawar is limited and creates a knowledge gap when estimating local prevalence and risk factors related to it. This study in Peshawar is critical in creating region-specific evidence that can guide preventive interventions, improve care during delivery and ultimately reduce maternal complications in twin delivery.

METHODOLOGY

This descriptive study was carried out in the Department of Obstetrics and Gynaecology at Khyber Teaching Hospital, Peshawar, over a six-month period from June 2024 to November 2024. A total of 85 participants were included, and the sample size was calculated using the World Health Organization software, based on a 95% confidence level, 8% margin of error, and an expected prevalence of primary postpartum hemorrhage in twin pregnancies of 16.97%.[12]

Approval for the study was obtained from the institutional research and ethics committee (311/DME/KMC) before commencement. Women aged 18 to 40 years with ultrasound-confirmed twin pregnancies at more than 36 weeks of gestation, regardless of parity, and scheduled for either vaginal birth or cesarean section were considered eligible. Twin pregnancy was confirmed on ultrasound by at least three of the following findings: two gestational sacs with distinct chorionic membranes, an intertwin membrane greater than 2 mm, the presence of a twin-peak (lambda) sign, or visualization of two yolk sacs. Women were excluded if they had monochorionic monoamniotic twins, major fetal malformations, placenta previa or vasa previa, a history of myomectomy involving the endometrial cavity, previous uterine rupture, hematological disorders, or active hepatitis C documented in medical records. Written informed consent was obtained from each participant after providing an explanation regarding the study purpose and its potential benefits.

Each patient was assessed clinically and followed until delivery. Primary postpartum hemorrhage was defined as blood loss of at least 1000 ml following cesarean birth or at least 500 ml following vaginal birth within the first 24 hours. Blood loss was quantified by weighing used sponges, pads, and clots, with 1 gram equated to 1 milliliter of blood. Vaginal delivery was defined as the complete expulsion of the fetus, placenta, and membranes via the natural birth canal, while cesarean section referred to delivery of the fetus through an abdominal incision.

Data were entered on a predesigned proforma and analyzed using IBM SPSS version 26. Quantitative variables were presented as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. The occurrence of primary postpartum hemorrhage was compared between vaginal and cesarean deliveries using the chi-square test, with a p-value of ≤0.05 considered statistically significant. Blood loss was compared between the two delivery modes using the independent sample t-test. Subgroup analyses were performed and post-stratification chi-square testing was applied with significance set at p ≤0.05.

RESULTS

The study included 85 patients with a mean age of 29.38±7.41 years and gestational age of 38.01±1.23 weeks. The mean parity was 1.84±1.55, BMI was 26.29±3.44 Kg/m^2, and mean blood loss was 594.64±280.21 ml. Most participants were housewives (72, 84.7%) compared to those with jobs (13, 15.3%). Rural residents comprised 51 (60.0%) of the sample while urban residents were 34 (40.0%). Regarding socioeconomic status, 43 (50.6%) were classified as poor, 39 (45.9%) as middle class, and 3 (3.5%) as rich. The mode of delivery showed 38 (44.7%) vaginal deliveries and 47 (55.3%) cesarean sections (as shown in Table-I).

Table I

Patient Demographics

Demographics	Mean ± SD
Age (years)	29.38±7.41
Gestational Age (weeks)	38.01±1.23
Parity	1.84±1.55
BMI (Kg/m2)	26.29±3.44
Blood Loss (ml)	594.64±280.21
Profession	
Housewife n (%)	72 (84.7%)
Job n (%)	13 (15.3%)
Residential Status	
Rural n (%)	51 (60.0%)
Urban n (%)	34 (40.0%)
Socioeconomic Status	
Poor n (%)	43 (50.6%)
Middle n (%)	39 (45.9%)
Rich n (%)	3 (3.5%)
Mode of Delivery	
Vaginal n (%)	38 (44.7%)
C-section n (%)	47 (55.3%)

Primary postpartum hemorrhage occurred in 15 (17.60%) cases while 70 (82.40%) patients did not experience this complication, representing the total sample of 85 (100%) patients (as shown in Table-II).

Table II

Frequency of Primary Postpartum Hemorrhage

Primary PPH	Frequency	% age
Yes	15	17.60%
No	70	82.40%
Total	85	100%

When comparing delivery methods with primary PPH occurrence, vaginal delivery showed 7 (18.4%) cases with PPH and 31 (81.6%) without, while cesarean section demonstrated 8 (17.0%) cases with PPH and 39 (83.0%) without, with no statistically significant difference (p=0.866) (as shown in Table-III)

Table III

Comparison of Mode of Delivery with Primary Postpartum Hemorrhage

Mode of Delivery	Primary PPH		P-value
	Yes n(%)	No n(%)	
Vaginal	7 (18.4%)	31 (81.6%)	0.866

C-section	8 (17.0%)	39 (83.0%)

Blood loss comparison revealed significantly higher volumes in cesarean sections (755.15±247.31 ml, n=47) compared to vaginal deliveries (396.11±170.32 ml, n=38), with a t-value of -7.605 and p<0.001 (as shown in Table-IV).

Table IV

Comparison of mean Blood Loss in both groups

	Vaginal n=38	C-section n=47	t	P value
Blood Loss (ml)	396.11±170.32	755.15±247.31	-7.605	<0.001

Demographic factor associations with primary PPH showed no statistically significant relationships: age groups ≤30 years had 9 (21.4%) PPH cases versus 33 (78.6%) without, while >30 years had 6 (14.0%) with PPH versus 37 (86.0%) without (p=0.366); parity ≤3 showed 13 (18.3%) with PPH versus 58 (81.7%) without, and >3 parity had 2 (14.3%) with PPH versus 12 (85.7%) without (p=1.000, Fischer Exact Test); BMI ≤25 Kg/m^2 demonstrated 7 (21.9%) PPH cases versus 25 (78.1%) without, while >25 Kg/m^2 showed 8 (15.1%) with PPH versus 45 (84.9%) without (p=0.427); profession analysis revealed housewives had 11 (15.3%) PPH cases versus 61 (84.7%) without, while those with jobs had 4 (30.8%) with PPH versus 9 (69.2%) without (p=0.232, Fischer Exact Test); residential status showed rural residents with 8 (15.7%) PPH cases versus 43 (84.3%) without, and urban residents with 7 (20.6%) PPH cases versus 27 (79.4%) without (p=0.772); socioeconomic status demonstrated poor patients with 4 (9.3%) PPH cases versus 39 (90.7%) without, middle class with 10 (25.6%) PPH cases versus 29 (74.4%) without, and rich patients with 1 (33.3%) PPH case versus 2 (66.7%) without (p=0.131, Fischer Exact Test) (as shown in Table-V).

Table V

Association of Primary PPH with Demographic Factors

Demographic Factors		Primary PPH Yes n(%)	Primary PPH No n(%)	p-value
Age Group (years)	≤30	9 (21.4%)	33 (78.6%)	0.366
	>30	6 (14.0%)	37 (86.0%)	
Parity Group	≤3	13 (18.3%)	58 (81.7%)	1.000*
	>3	2 (14.3%)	12 (85.7%)	
BMI Group (Kg/m^2)	≤25	7 (21.9%)	25 (78.1%)	0.427
	>25	8 (15.1%)	45 (84.9%)	
Profession	Housewife	11 (15.3%)	61 (84.7%)	0.232*
	Job	4 (30.8%)	9 (69.2%)	
Residential Status	Rural	8 (15.7%)	43 (84.3%)	0.772
	Urban	7 (20.6%)	27 (79.4%)	
Socioeconomic Status	Poor	4 (9.3%)	39 (90.7%)	0.131*
	Middle	10 (25.6%)	29 (74.4%)	
	Rich	1 (33.3%)	2 (66.7%)	

***Fischer Exact Test**

DISCUSSION

The study aimed to determine the frequency of primary postpartum hemorrhage in twin pregnancy deliveries and compare its occurrence between vaginal delivery and cesarean section. The overall frequency of primary PPH was 17.60%, which falls within the expected range for twin pregnancies where the risk is inherently higher due to uterine overdistension, increased placental surface area, and greater likelihood of uterine atony following delivery of multiple fetuses. The comparison between delivery methods revealed no statistically significant difference in PPH occurrence (18.4% vaginal vs 17.0% cesarean, p=0.866), suggesting that the mode of delivery itself does not significantly influence the risk of primary PPH in twin pregnancies. However, cesarean section was associated with significantly higher mean blood loss compared to vaginal delivery (755.15±247.31 ml vs 396.11±170.32 ml, p<0.001), which can be attributed to the surgical incision through the uterine muscle, additional blood loss from the abdominal wall incision, and the potential for intraoperative complications such as extension of the uterine incision or injury to surrounding structures. The lack of association between demographic factors and primary PPH occurrence indicates that age, parity, BMI, profession, residential status, and socioeconomic status do not significantly predispose to this complication in twin pregnancies. This suggests that the pathophysiology of PPH in multiple gestations is primarily related to mechanical factors such as uterine overdistension and impaired contractility rather than maternal demographic characteristics, emphasizing the importance of vigilant monitoring and preparedness regardless of patient background.

The primary PPH frequency of 17.60% observed in our twin pregnancy cohort is considerably higher than rates reported in singleton pregnancies, with Ahmed et al. [13] documenting 2.5% in mixed deliveries and Kebede et al. [14] reporting 16.6% in predominantly singleton pregnancies. However, our findings align closely with studies specifically examining twin pregnancies, [15] where di Marco et al. [12] found a 16.97% PPH rate in twin deliveries at ≥32 weeks, and the systematic review by Abdulsalam et al. [16] reported pooled incidences of 10.9% for vaginal and 27.0% for cesarean twin deliveries. The higher PPH rates in twin pregnancies compared to singletons can be attributed to uterine overdistension leading to impaired contractility, larger placental surface area increasing bleeding potential, and the mechanical challenges of delivering two fetuses sequentially.

Our finding of no significant difference in PPH occurrence between vaginal delivery (18.4%) and cesarean section (17.0%, p=0.866) contrasts sharply with several studies that consistently demonstrate higher PPH rates following cesarean delivery. Fenn et al. [17] reported a three-fold higher PPH risk after cesarean section (13.0% vs 4.0%), while Abdulsalam et al. [16] meta-analysis showed substantially higher rates in cesarean (27.0%) versus vaginal (10.9%) twin deliveries. This discrepancy may be explained by our specific twin pregnancy population where the inherent risk factors associated with multiple gestation may overshadow the additional surgical risks of

cesarean delivery, or potentially reflect differences in PPH definitions and measurement techniques across studies.

The significantly higher mean blood loss in cesarean sections (755.15±247.31 ml) compared to vaginal deliveries (396.11±170.32 ml, p<0.001) in our study is consistent with findings by Fenn et al. [17] who reported mean blood losses of 1,400 ml after cesarean and 860 ml after vaginal delivery. This pattern reflects the inherent surgical trauma associated with cesarean delivery, including incision through the uterine muscle, potential for surgical complications, and the additive effect of both surgical and obstetric bleeding sources. The absolute volumes in our study were lower than those reported by Fenn et al. [17] which may reflect differences in measurement techniques, patient populations, or institutional practices in blood loss estimation.

The absence of significant associations between demographic factors and PPH occurrence in our study differs from several reports that identified specific risk factors. Kebede et al. [14] demonstrated that maternal age ≥35 years increased PPH odds 6.8-fold, while Kong & To [18] found that obesity (BMI ≥25) increased severe PPH odds 22-fold in twin pregnancies. Lan et al. [19] identified multiple risk factors including assisted reproductive technology and preeclampsia in twin cesarean deliveries, while Tegene et al. [20] confirmed twin pregnancy as an independent risk factor with 3.97-fold increased odds. The lack of demographic associations in our cohort may reflect the relatively homogeneous population characteristics, limited sample size, or the overwhelming influence of twin pregnancy itself as the primary risk factor, potentially masking the effects of other demographic variables that become apparent in larger, more diverse populations or singleton pregnancies.

Several limitations should be acknowledged in interpreting these findings. This was a single-center study conducted at one tertiary care facility, which may limit the generalizability of results to other healthcare settings with different patient populations, resource availability, or clinical protocols. The relatively small sample size of 85 twin pregnancies may have been insufficient to detect significant associations between demographic factors and primary PPH, particularly for less common variables such as socioeconomic status categories where only 3 patients were classified as rich. Blood loss estimation relied on clinical assessment methods which are subject to inter-observer variability and may underestimate actual volumes compared to more objective measurement techniques. The study lacked standardized protocols for PPH management and prevention strategies, which could influence both the occurrence and severity of bleeding episodes. Additionally, the absence of long-term follow-up data prevents assessment of maternal morbidity outcomes beyond the immediate postpartum period. The homogeneous population characteristics and single institutional setting may not reflect the diversity of twin pregnancy outcomes across different geographic regions or healthcare systems with varying levels of obstetric care.

Conclusion:

Our study has concluded that primary postpartum hemorrhage occurs in approximately one in six twin pregnancies, with no significant difference in occurrence rates between vaginal delivery and cesarean section, though cesarean deliveries are associated with substantially higher blood loss volumes. These results emphasize the importance of heightened vigilance and preparedness for all twin deliveries regardless of maternal characteristics or planned mode of delivery, with particular attention to blood loss management in cesarean sections.

Acknowledgments

Our gratitude is extended to the department's healthcare staff for their dedicated efforts in ensuring meticulous documentation and systematic handling of patient information, which played a vital role in the completion of this work.

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