Original Article
DOI: https://doi.org/10.70749/ijbr.v3i3.2195

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

Frequency of Postpartum Hemorrhage in Women with Twin's Gestation in Mardan Medical Complex Mardan

Hafsa Irshad[1], Samina Jadoon[1], Uzma Khan[1], Nayab Sanga Bali[1]

[1]Mardan Medical Complex, Mardan, Pakistan.

ARTICLE INFO

Keywords: Postpartum hemorrhage, Twin gestation, Cesarean section, Maternal outcomes, Blood loss.

Correspondence to: Hafsa Irshad, Mardan Medical Complex, Mardan, Pakistan.
Email: drhafsairshad@gmail.com

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: 07-01-2025 Revised: 13-03-2025
Accepted: 19-03-2025 Published: 31-03-2025

ABSTRACT

Background: Twin pregnancies have high risk of obstetric complications, especially postpartum hemorrhage, currently the leading cause of maternal morbidity and mortality. It is important to define its incidence and risk factors for twin gestations to ensure prompt intervention especially where resources are not adequate. **Objective:** To determine the frequency of postpartum hemorrhage in women with twins gestation in Mardan medical complex Mardan. **Study Design:** Descriptive cross-sectional study. **Duration and Place of Study:** This study was conducted from February 2024 to July 2024 at the Department of Obstetrics and Gynecology, Mardan Medical Complex, Mardan. **Methodology:** Eighty-five women aged 18–40 years with ultrasound-confirmed twin pregnancies at gestational age >36 weeks were enrolled using non-probability consecutive sampling. Deliveries were performed per clinical indications, including elective and emergency cesarean sections, as well as assisted vaginal deliveries. PPH was defined as ≥500 mL blood loss following vaginal delivery or ≥1000 mL after cesarean, measured using the gravimetric method within 24 hours postpartum. **Results:** The mean age was 29.52 ± 6.57 years. Cesarean section was the predominant mode of delivery (72.9%). PPH occurred in 12 women (14.1%). No statistically significant association was found between PPH and age, gestational age, parity, BMI, socioeconomic or residential status, or mode of delivery ($p > 0.05$). **Conclusion:** Postpartum hemorrhage is a notable complication in twin pregnancies, though no specific maternal factor showed significant association in this cohort.

INTRODUCTION

Postpartum hemorrhage is one of the greatest causes of maternal morbidity and death globally, and its risk is particularly high for women with twin gestations.[1] The greater uterine distension with multiple pregnancies results in uterine atony as the most frequent underlying cause for postpartum hemorrhage.[2] The over-distended uterus with twin gestations can fail to contract down efficiently after delivery and hence impair the natural mechanism for the achievement of hemostasis at the site of the placenta.[3] Further compromising the achievement of postpartum hemostasis are the prolonged labor and instrumental delivery and the greater numbers of cesarean sections with twin gestations.[4]

The women with twins are more susceptible to the conclusion of antenatal disease such as preeclampsia, polyhydramnios, and anemia that are all known cofactors for poor uterine tone and increased risk of bleeding.[5] Placental disease such as placenta previa and abruption are more frequent with multiple gestations and contribute to the complexity of delivery outcomes.[6] Further operative procedures such as cesarean delivery is more frequent with twin gestations due to malpresentation or fetal distress, all of which individually are more frequently associated with increased rates of PPH.[7] Increasing numbers of placental tissue with vascular ties with twin gestations can equally culminate in increased bleeding if the uterus fails to contract and compress the vessels efficiently post-delivery.[8]

Successful twin pregnancy PPH management is one of anticipation and planning.[9] Antenatal recognition of the high-risk women allows specific planning for delivery with availability of blood products, uterotonic agents, and experienced staff for advanced obstetric procedures.[10] Active third stage management is essential, and prophylactic intervention with uterine massage and oxytocin infusion and prompt second-line intervention with misoprostol or tranexamic acid is reasonable for the high-risk group.[11] In facilities where resources permit, multidisciplinary working between obstetricians, anesthetists, and blood banks is required to prevent maternal morbidity and optimize the high-risk group's outcome.

A study conducted by Marco G. et al. reported a postpartum hemorrhage incidence of 16.97% among women with twin gestation.[12]

Performance of research on postpartum hemorrhage for women with twin gestation in Mardan is equally essential

as the region lacks good accessibility to specialty-based facilities for the care of mothers and is more endowed with disorders of obstetrics. Peripheral installations are often not able to monitor twin pregnancies effectively, with the resultant danger of silent complication such as uterine atony and anemia. As the rates of multiple births are rising and antenatal care is not optimally managed, identification of the regional pattern and determinants of PPH for twin gestations can guide measures based on evidence and improve the outcome for mothers in the underserviced region.

METHODOLOGY

This descriptive cross-sectional study was conducted over a six-month period, from February to July 2024, in the Department of Obstetrics and Gynaecology at Mardan Medical Complex, Mardan. A total of 85 participants were recruited using non-probability consecutive sampling. The sample size was calculated with a 95% confidence level, 8% margin of error, and an anticipated frequency of postpartum hemorrhage of 16.97% in women with twin pregnancies.

Women aged 18 to 40 years with a gestational age of more than 36 weeks, determined by the date of their last menstrual period, and carrying twin pregnancies confirmed on ultrasound were included. Twin gestation was identified by the presence of two fetuses in either separate or shared placental sacs, indicating bichorionic or monochorionic biamniotic configuration. Women with a history of placenta previa, uterine fibroids, fetal anomalies on ultrasound, bleeding disorders, or current use of anticoagulant therapy were excluded. Written informed consent was obtained from all eligible participants after explaining the study purpose and procedures.

Deliveries were conducted according to clinical indications. Elective cesarean sections were performed for conditions such as previous cesarean delivery, non-cephalic presentation of the leading twin, complicated monochorionic pregnancies, maternal medical conditions, or suspected placental abnormalities. Emergency cesarean deliveries were reserved for urgent indications including fetal distress, placental abruption, premature rupture of membranes with malpresentation, cord prolapse, or hypertensive emergencies. Assisted vaginal delivery was undertaken when medically necessary, including in cases where the second twin was not delivered within 20 minutes after the first. The primary outcome was postpartum blood loss, considered excessive if equal to or more than 500 milliliters following vaginal delivery or 1000 milliliters after cesarean delivery, measured within the first 24 hours postpartum. Blood loss was quantified using a gravimetric method—by subtracting the dry weight of pads, gauzes, and collected clots from their soaked weight, using the approximation that 1 gram equals 1 milliliter of blood. All observations were documented using a predesigned data collection form. Data analysis was performed using IBM SPSS version 26. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Stratification was performed for key variables, and associations were evaluated using the chi-square test, with a p-value of ≤0.05 considered statistically significant.

RESULTS

This study examined the frequency of postpartum hemorrhage in women with twin gestation, involving 85 participants with specific demographic and clinical characteristics. The study population had a mean age of 29.52 ± 6.57 years, mean gestational age of 38.50 ± 0.67 weeks, mean parity of 2.34 ± 1.82, and mean BMI of 26.03 ± 3.22 kg/m^2 (as shown in Table-I). Regarding residential distribution, 47 participants (55.3%) were from rural areas while 38 (44.7%) were from urban areas. Socioeconomic stratification revealed that 38 participants (44.7%) were classified as poor, 32 (37.6%) as middle class, and 15 (17.6%) as wealthy. The mode of delivery showed a predominance of cesarean sections in 62 cases (72.9%) compared to vaginal deliveries in 23 cases (27.1%) (as shown in Table 1).

Table 1

Patient Demographics (n=85)

Demographics		Mean ± SD
Age (years)		29.52 ± 6.57
Gestational Age (weeks)		38.50 ± 0.67
Parity		2.34 ± 1.82
BMI (kg/m^2)		26.03 ± 3.22
Residential Status	Rural n (%)	47 (55.3%)
	Urban n (%)	38 (44.7%)
Socioeconomic Status	Poor n (%)	38 (44.7%)
	Middle n (%)	32 (37.6%)
	Rich n (%)	15 (17.6%)
Mode of Delivery	Vaginal n (%)	23 (27.1%)
	C-section n (%)	62 (72.9%)

The primary outcome analysis demonstrated that postpartum hemorrhage occurred in 12 participants (14.10%) while 73 participants (85.90%) did not experience this complication (as shown in Table 2).

Table 2

Frequency of Postpartum Hemorrhage in Women with Twin's Gestation

Postpartum Hemorrhage	Frequency	%age
Yes	12	14.10%
No	73	85.90%

Statistical analysis examining associations between demographic factors and postpartum hemorrhage revealed no significant relationships across all variables tested. Specifically, age stratification (≤30 vs >30 years) showed hemorrhage rates of 13.6% versus 14.6% respectively (p=0.895), gestational age (≤39 vs >39 weeks) demonstrated rates of 16.7% versus 5.3% (p=0.284), parity (≤3 vs >3) showed 13.1% versus 16.7% (p=0.733), BMI (≤25 vs >25 kg/m^2) revealed 9.1% versus 17.3% (p=0.353), residential status (rural vs urban) indicated 14.9% versus 13.2% (p=1.000), socioeconomic status (poor, middle, rich) demonstrated rates of 15.8%, 18.8%, and 0.0% respectively (p=0.209), and mode of delivery (vaginal vs cesarean) showed 17.4% versus 12.9% (p=0.727), with Fischer Exact Test applied where appropriate (as shown in Table 3).

Table 3
Association of Postpartum Hemorrhage with Demographic Factors

Demographic Factors		Postpartum Hemorrhage		p-value
		Yes n(%)	No n(%)	
Age (years)	≤30	6 (13.6%)	38 (86.4%)	0.895
	>30	6 (14.6%)	35 (85.4%)	
Gestational Age (weeks)	≤39	11 (16.7%)	55 (83.3%)	0.284*
	>39	1 (5.3%)	18 (94.7%)	
Parity	≤3	8 (13.1%)	53 (86.9%)	0.733*
	>3	4 (16.7%)	20 (83.3%)	
BMI (Kg/m^2)	≤25	3 (9.1%)	30 (90.9%)	0.353*
	>25	9 (17.3%)	43 (82.7%)	
Residential Status	Rural	7 (14.9%)	40 (85.1%)	1.000*
	Urban	5 (13.2%)	33 (86.8%)	
Socioeconomic Status	Poor	6 (15.8%)	32 (84.2%)	0.209*
	Middle	6 (18.8%)	26 (81.3%)	
	Rich	0 (0.0%)	15 (100.0%)	
Mode of Delivery	Vaginal	4 (17.4%)	19 (82.6%)	0.727*
	C-section	8 (12.9%)	54 (87.1%)	

*Fischer Exact Test

DISCUSSION

Our research revealed the rate of postpartum hemorrhage to be 14.10% in twin pregnancies, which is much higher for twin pregnancies when compared to singleton pregnancies. It is due to the different mechanisms of physiology with multiple gestations like overdistension of the uterine muscle with impaired contractility, increased placental surface for more potent hemostatic capacity, and the increased risk of uterine atony with protracted labor and mechanical distortion of the myometrium fibers.

The high rate of cesarean sections (72.9%) for our twin set mirrors the challenging considerations for the obstetric management of multiple gestations. This high rate is medically rationalized based on the elevated risks of malpresentation, cord prolapse, and fetal distress characteristic of twin pregnancies, where the second twin is particularly exposed to risks at delivery. The surgical method decreases the risk of certain fetal morbidity to some extent but may indirectly incur the risk of hemorrhage through surgical injury, postoperative impaired contractibility of the uterus at the operative site, and failure of the uterus to compress the bleeding vessels as efficiently as with the normal physiological vaginal delivery.

The observation that overweight and obese women demonstrated higher hemorrhage rates (17.3% versus 9.1% in normal-weight women) can be explained through multiple pathophysiological mechanisms. Obesity is associated with chronic low-grade inflammation, altered coagulation profiles, and increased insulin resistance, all of which can impair normal hemostatic mechanisms. Furthermore, increased maternal weight correlates with larger babies and more distended uteri, leading to greater mechanical stress on uterine muscle fibers and subsequent contractile dysfunction. The adipose tissue also produces various cytokines and hormones that can interfere with normal postpartum uterine involution and vascular constriction.

Our study results demonstrated a postpartum hemorrhage incidence of 14.10% in twin pregnancies, which falls within the range reported by previous studies but shows notable variations when compared to existing literature. This rate is comparable to the findings of di Marco et al. [13] who reported a 16.97% PPH incidence in their Italian cohort, and aligns closely with Zheng et al. [14] who found an 11% incidence rate in twin pregnancies. However, our findings contrast significantly with Kong and To [15] who reported a much higher incidence of 27.8% for PPH ≥500 mL in their Hong Kong study, though their major PPH rate (>1000 mL) of 7.6% was lower than our overall rate. The variation in PPH rates across studies can be attributed to differences in diagnostic criteria, with some studies using ≥500 mL as the threshold while others employed ≥1000 mL, as well as variations in study populations and healthcare settings.

The demographic characteristics of our study population showed similarities and differences with previous research. Our mean maternal age of 29.52 ± 6.57 years was consistent with typical twin pregnancy populations, and our mean parity of 2.34 ± 1.82 was lower than that reported by Al-Kadri et al. [16] who found higher parity (3.5 vs. 2.8) to be significantly associated with PPH risk. Interestingly, our analysis revealed no significant association between parity and PPH occurrence (p=0.733), which differs from Al-Kadri et al.'s findings where high parity was identified as a significant risk factor (aOR 1.17, 95% CI 1.05–1.30). This discrepancy might be explained by the different study populations, as Al-Kadri et al. studied singleton pregnancies in Saudi women, while our focus was specifically on twin pregnancies.

Our study's predominance of cesarean deliveries (72.9%) aligns with the high cesarean rates reported in twin pregnancy literature, including Zheng et al. [14] who reported 93.7% cesarean sections and Lan et al. [17] who exclusively studied cesarean deliveries in twins. However, unlike Al-Kadri et al. [16] who found vaginal delivery to be a risk factor for PPH (aOR 1.93), our analysis showed no significant association between mode of delivery and PPH occurrence (p=0.727), with slightly higher rates in vaginal deliveries (17.4%) compared to cesarean sections (12.9%). This finding is consistent with di Marco et al. [13] who reported the highest PPH risk with operative vaginal delivery (55.56%) but did not find routine vaginal delivery to be significantly associated with increased PPH risk.

Gestational age patterns in our study (mean 38.50 ± 0.67 weeks) were similar to other twin pregnancy studies, with Zheng et al. [14] reporting a mean of 37 weeks. Our finding of no significant association between gestational age and PPH risk contrasts with di Marco et al. [13] who identified preterm delivery as protective (OR 0.62). The lack of significant associations in our study between various demographic factors and PPH occurrence may be attributed to our relatively smaller sample size (n=85) compared to larger studies like Zheng et al. [14] with 839 participants or Lan et al. [17] with 1,649 participants, which may have provided greater statistical power to detect significant associations.

The absence of significant risk factors in our study differs markedly from the comprehensive risk factor profiles identified in other studies. Lan et al. [17] identified multiple independent risk factors including assisted reproductive technology (OR 2.354), preeclampsia/HELLP (OR 2.605),

and placenta previa (OR 7.325), while Kong and To [15] found IVF (OR 28.6), placenta praevia (OR 24.1), and obesity (OR 22) to be significant risk factors for severe PPH. Similarly, Zheng et al. [14] identified placenta previa (OR 4.586), polyhydramnios (OR 7.168), and anemia (OR 4.918) as significant risk factors. The lack of these associations in our study may reflect differences in the prevalence of these conditions in our population or limitations in data collection regarding specific obstetric complications.

Our study's socioeconomic analysis, showing higher PPH rates in poor (15.8%) and middle-class (18.8%) participants compared to wealthy participants (0.0%), though not statistically significant (p=0.209), suggests potential socioeconomic influences on PPH risk that have not been extensively explored in previous twin pregnancy studies. This finding warrants further investigation in larger studies, as socioeconomic factors may influence access to prenatal care, nutritional status, and overall maternal health, all of which could impact PPH risk. The systematic review by Abdulsalam et al. [18] encompassing 21 studies and 23,330 twin pregnancies provides a broader perspective, reporting PPH rates of 10.9% for vaginal deliveries and 27.0% for cesarean deliveries, with our overall rate falling between these values, supporting the validity of our findings within the global context of twin pregnancy outcomes.

A few limitations must be taken into account for our study. The study based on the single-center might limit the overall generalizability of the findings to other healthcare centers or populations with varying clinical practices and demographic profiles. The comparatively small sample size of 85 cases may have been too small to define statistically significant correlations between various risk factors and the development of PPH with the potential for type II errors. Additionally, the descriptive cross sectional nature of data collection may have resulted in the incomplete capture of some clinical variables or the obstetric complications serving as good risk factors. The scarcity of data on specific causes of PPH such as uterine atony, abnormalities of the placenta, or disorders of coagulation precludes us from tabulating the full risk stratification. Finally, the absence of long-term postpartum follow-up data prevents assessment of the postpartum outcome beyond the immediate postpartum period.

CONCLUSION

Our study concluded that postpartum hemorrhage is still a relevant complication for twin pregnancies and occurs approximately one-seventh of the time for women within our population. Despite the established risk factors outlined through previous research, our data failed to show any statistically significant relationships between the demographic characteristics of age, parity, gestational age at delivery, body mass index, residential and socioeconomic status and the development of postpartum hemorrhage for twin pregnancies. The percentage we discovered for the population was analogous to worldwide studies and suggests that twin pregnancies as a group have an overall higher risk for postpartum hemorrhage beyond individual factors for the mother.

Acknowledgments

Gratitude is extended to the department's healthcare staff for their dedicated efforts, particularly in ensuring accurate documentation and careful handling of patient information throughout the study.

REFERENCES

1. Federspiel JJ, Eke AC, Eppes CS. Postpartum hemorrhage protocols and benchmarks: improving care through standardization. Am J Obstet Gynecol MFM. 2023;5(2S):100740. https://doi.org/10.1016/j.ajogmf.2022.100740.
2. Loussert L, Schmitz T, Korb D, Seco A, Azria E, Sentilhes L, et al. Risk of severe postpartum hemorrhage in twin pregnancies according to the sum of birth weights. Obstet Gynecol. 2022;140(6):958-964. https://doi.org/10.1097/AOG.0000000000004993.
3. Alonso-Burgos A, Díaz-Lorenzo I, Muñoz-Saá L, Gallardo G, Castellanos T, Cardenas R, et al. Primary and secondary postpartum haemorrhage: a review for a rationale endovascular approach. CVIR Endovasc. 2024;7(1):17. https://doi.org/10.1186/s42155-024-00429-7.
4. Almutairi WM. Literature review: physiological management for preventing postpartum hemorrhage. Healthcare (Basel). 2021;9(6):658. https://doi.org/10.3390/healthcare9060658.
5. Ende HB, Lozada MJ, Chestnut DH, Osmundson SS, Walden RL, Shotwell MS, et al. Risk factors for atonic postpartum hemorrhage: a systematic review and meta-analysis. Obstet Gynecol. 2021;137(2):305-323. https://doi.org/10.1097/AOG.0000000000004228.
6. Guo Z, Han X, Zheng W, Yang H, Ma J. Placenta accreta spectrum among multiple gestation: a retrospective analysis based on a Chinese population. Front Endocrinol (Lausanne). 2022;13:862785. https://doi.org/10.3389/fendo.2022.862785.
7. Abraham M, Ali N, Shivani Garapati SSL, Pandey P, Nair S, Swarna S, et al. Delivery methods in twin gestations: evaluating outcomes, risk factors, and the paradigm shift towards elective cesarean deliveries. Cureus. 2023;15(10):e46514. https://doi.org/10.7759/cureus.46514.
8. Masserdotti A, Gasik M, Grillari-Voglauer R, Grillari J, Cargnoni A, Chiodelli P, et al. Unveiling the human fetal-maternal interface during the first trimester: biophysical knowledge and gaps. Front Cell Dev Biol. 2024;12:1411582. https://doi.org/10.3389/fcell.2024.1411582.
9. Reale SC, Farber MK. Management of patients with suspected placenta accreta spectrum. BJA Educ. 2022;22(2):43-51. https://doi.org/10.1016/j.bjae.2021.10.002.
10. Akter S, Forbes G, Vazquez Corona M, Miller S, Althabe F, Coomarasamy A, et al. Perceptions and experiences of the prevention, detection, and management of postpartum haemorrhage: a qualitative evidence synthesis. Cochrane Database Syst Rev. 2023;11(11):CD013795. https://doi.org/10.1002/14651858.CD013795.pub2.
11. Fissahaye B, Dheresa M, Assefa N, Tesfaye D, Eyeberu A, Balis B, et al. Active management of the third stage of labor and associated factors among maternity care providers in public health facilities in Eastern Ethiopia: a multi-center study. BMC Pregnancy Childbirth. 2023;23(1):701. https://doi.org/10.1186/s12884-023-06009-2.

12. Abdulrazzak M, Alshaghel MM, Alhashemi M, Mayo W, Oubari S, Jamal BR, et al. Prevalence and risk factors associated with cesarean section in Syria: a cross-sectional study of the two largest health centers. Health Sci Rep. 2025;8(4):e70604. https://doi.org/10.1002/hsr2.70604.
13. di Marco G, Bevilacqua E, Passananti E, et al. Multiple pregnancy and the risk of postpartum hemorrhage: retrospective analysis in a tertiary level center of care. Diagnostics. 2023;13:446. https://doi.org/10.3390/diagnostics13030446.
14. Zheng JS, Wang Y, Xu S, et al. Analysis of factors affecting postpartum hemorrhage in twin pregnancy. Austin J Womens Health. 2022;9(1):1060. https://doi.org/10.26420/austinjwomenshealth.2022.1060
15. Kong CW, To WWK. Risk factors for postpartum haemorrhage in twin pregnancies and haemorrhage severity. Hong Kong Med J. 2023;29(4):295-300. https://doi.org/10.12809/hkmj219830
16. Al-Kadri HM, Tariq S, Tamim HM. Risk factors for postpartum hemorrhage among Saudi women. Saudi Med J. 2009;30(10):1305-1310. https://doi.org/10.1016/s0020-7292(09)61704-5
17. Lan Y, Xu A, Lu X, et al. Risk factors for postpartum hemorrhage in twin pregnancies with cesarean section. Front Med. 2024;10:1301807. https://doi.org/10.3389/fmed.2023.1301807.
18. Abdulsalam FAM, Bourdakos NE, Burns JWF, et al. Twin pregnancy and postpartum haemorrhage: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2024;24:649. https://doi.org/10.1186/s12884-024-06798-0.