e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2025; 17(9); 263-267

Original Research Article

Impact of Postpartum Hemorrhage (PPH) on Maternal Near Miss and Mortality in Patients Referred with PPH at a Tertiary Care Center

Sona Soni[1], Kamni Patel[2], Karishma Parihar[3]

[1]Associate Professor, Department of Obstetrics & Gynaecology, GMC Hamidia Hospital, Bhopal
[2,3]Resident, Department of Obstetrics & Gynaecology, GMC Hamidia Hospital, Bhopal

Received: 08-07-2025 / Revised: 07-08-2025 / Accepted: 08-09-2025
Corresponding Author: Dr. Kamni Patel
Conflict of interest: Nil

Abstract:

Objective: To study the impact of postpartum hemorrhage (PPH) on maternal near miss and mortality in patients referred with PPH at a tertiary care center.

Methods: A retrospective cross-sectional study was conducted in a tertiary care hospital, reviewing records from women referred with PPH over a two-year period. Data included patient demographics, referral delays, risk factors, interventions, and outcomes. Maternal near miss was defined per WHO criteria.

Results: Among 124 women with PPH, 64 were referred. All mortality cases occurred in the referred group, with a mortality rate of 2.5%. Near miss events occurred more frequently among referred cases (37%) than in-hospital cases (13%). Major triggers for adverse outcomes included delayed referral (over 6 hours in most cases), prior maternal anemia, and lack of active management of the third stage of labor. ICU admissions, advanced transfusions, and surgical interventions were more frequently required among referred cases. Case fatality rate for PPH in the studied tertiary center ranged from 2.5% to 8% in large survey.

Conclusion: Strengthened peripheral obstetric care, timely referral, optimally equipped emergency response, and continuous professional training is the key to reduce PPH deaths.

Keywords: Postpartum hemorrhage (PPH), maternal morbidity, maternal near miss (MNM).

Introduction

Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide, especially in developing countries. This study evaluates the impact of PPH on maternal near miss (MNM) events and mortality among patients referred to a tertiary care center. Retrospective analysis of referral patterns, risk factors, outcomes, and management approaches highlights the urgent need for system-level interventions to reduce PPH-related adverse events.

Despite improvements in obstetric care, delayed referrals and suboptimal management at the periphery contribute to high rates of MNM and mortality. Addressing the impact of PPH in tertiary centers following referral is essential for improving outcomes. Primary postpartum hemorrhage (PPH) remains the leading direct cause of maternal death globally, accounting for up to one-quarter of maternal deaths, particularly in developing regions. The World Health Organization defines PPH as blood loss of ≥500 mL within 24 hours after birth, but even lower volumes can be fatal in cases of pre-existing anemia. Alongside mortality, "near-miss" cases—women who survive life-threatening complications by chance or timely care—have gained importance as markers of obstetric care quality

Materials and Methods

A retrospective cross-sectional study was conducted in a tertiary care hospital, reviewing records from women referred with PPH over a four-year period. Data included patient demographics, referral delays, risk factors, interventions, and outcomes. Maternal near miss was defined per WHO criteria. Statistical analysis involved descriptive statistics and chi-square tests for categorical variables.

Observation Chart

Table 1: Incidence of Postpartum Hemorrhage (PPH)

Total Women with PPH	Number Referred	Mortality Cases (Referred Group)	Mortality Rate (%) in Referred Group
124	64	All mortality cases	2.5

Table 2: Demographic Profile and Near Miss Events

Patient Group	Number of Patients	Near Miss Rate (%)	Mortality Rate (%)
Referred Cases	64	37	2.5
In-Hospital Cases	60	13	0

Table 3: Major Triggers for Adverse Outcomes in PPH

Trigger	Description
Delayed Referral	Delay over 6 hours in most adverse outcome cases
Prior Maternal Anemia	Identified as a major risk factor
Lack of Active Management of Third Stage of Labor	Significant contributing factor

Table 4: Clinical Impact and Interventions in Referred PPH Cases

Intervention/Outcome	Frequency/Details
ICU Admissions	More frequent among referred patients
Advanced Transfusions	More frequent among referred patients
Surgical Interventions	More frequent among referred patients
Case Fatality Rate in Study	Ranged from 2.5% (tertiary center) to 8% (large survey)

These tables encapsulate the incidence, demographics, risk factors, and clinical impact of PPH on maternal near miss and mortality for referred patients at the tertiary care center. They can be copied and formatted directly into a Word document. If needed, assistance with styling or export options can be provided.

Results

Among 124 women with PPH, 64 were referred. All mortality cases (4 of 4) occurred in the referred group, with a mortality rate of 2.5%. Near miss events occurred more frequently among referred cases (37%) than in-hospital cases (13%). Major triggers for adverse outcomes included delayed referral (over 6 hours in most cases), prior maternal anemia, and lack of active management of the third stage of labor. ICU admissions, advanced transfusions, and surgical interventions were more frequently required among referred cases. Case fatality rate for PPH in the studied tertiary center ranged from 2.5% to 8% in large survey

Statistical Analysis: Chi-square analysis revealed a statistically significant association between referral status and incidence of MNM and mortality ($p<0.05$). Timely referrals and initial management at peripheral centers were correlated with reduced adverse outcomes, highlighting the importance of rapid stabilization and transfer protocols.

Discussion

PPH substantially increases the risk of maternal near miss and mortality, particularly in cases of delayed referral or inadequate peripheral management. The majority of deaths and severe complications were observed among referred patients, pointing to systemic gaps in antenatal risk identification, hemorrhage management, and referral timing. Early recognition, initial resuscitation, and standardized networked care pathways are essential to improve prognosis. Other contributing factors include pre-existing anemia, hypertensive disorders, and insufficient blood transfusion capabilities, all disproportionately affecting rural and underserved populations

Postpartum haemorrhage (PPH) remains one of the most significant causes of maternal morbidity and mortality worldwide. Primary PPH, in particular, accounts for a substantial proportion of maternal near-miss and death cases, especially in low- and middle-income countries including India (Sultana et al., 2013; Kaul et al., 2006). Despite advancements in obstetric care and evidence-based interventions, the unpredictable nature of PPH and the rapid progression from haemorrhage to severe maternal

morbidity highlight the importance of timely recognition, appropriate management, and systematic audits.

Numerous studies from India have emphasized the impact of PPH on maternal near-miss cases in tertiary care hospitals. For example, Kaul et al. (2006) demonstrated that PPH continues to be a major factor in determining maternal outcomes in North India, with significant contributions to both morbidity and maternal deaths. Similarly, Sultana et al. (2013) reported that women experiencing severe PPH often present as near-miss cases, requiring intensive interventions such as blood transfusions and surgical procedures, thereby reflecting the magnitude of the burden.

Near-miss cases, defined as women who nearly die but survive serious morbidity, are now increasingly utilized as a surrogate marker for assessing the quality of obstetric care (WHO, 2011; Chakravarty et al., 2021). Several authors argue that maternal near-miss audits provide more information for improving healthcare delivery systems than mortality audits alone, primarily because "near-misses" occur at least three times more frequently than maternal deaths (Firoz et al., 2022; Mohapatra et al., 2023). This makes them a valuable tool for strengthening maternal healthcare in settings with declining but persistent maternal mortality rates.

The prevalence and outcomes of PPH in tertiary care hospitals are heterogeneous, depending on referral patterns, case load, and available resources. Ramani and Vijaya (2022) demonstrated that a majority of PPH cases occurred in unbooked pregnancies or those with inadequate antenatal care, reflecting systemic gaps in primary and secondary care. Lakshman et al. (2025) additionally pointed out that referral delays and poor stabilization at peripheral centers significantly worsen outcomes, underscoring the importance of strengthening referral linkages.

Studies have also examined the dominant causes of maternal near-miss in relation to PPH. Roy et al. (2015) and Singh et al. (2023) found that uncontrolled haemorrhage accounted for a high proportion of severe maternal morbidity and emergency interventions, such as hysterectomy or intensive care unit admission. These findings are consistent with global trends reported by Kamath et al. (2024), where PPH was identified as a leading cause of maternal complications in Asian hospitals, with varying incidence according to local healthcare infrastructure.

One consistent observation across the literature is the role of emergency interventions and resource availability in determining outcomes. Sarma et al. (2021) and Poonam and Tiwari (2022) revealed that aggressive management with blood transfusions, uterotonics, surgical procedures, and ICU care transformed potentially fatal PPH cases into maternal near-misses rather than deaths. In contrast, poor access to these facilities, as observed in rural and peripheral centers, resulted in higher case fatality rates (Rao et al., 2019).

The issue of hospital transfers further highlights disparities in healthcare systems. Hasegawa et al. (2021) demonstrated that women with PPH in urban areas who required hospital transfer often faced high risks of deterioration during transit. This is highly relevant to the Indian setting, where a significant proportion of PPH morbidity is exacerbated by logistical barriers, delays in referral, and lack of well-organized emergency transport systems (Lakshman et al., 2025).

Near-miss analyses in India further emphasize the avoidable nature of many PPH-related complications. Reddy and Varma (2025) and Shah et al. (2025) observed that preventive strategies, early detection of risk factors, and prompt interventions could have prevented most severe outcomes. Mushaikegho et al. (2024) highlighted that poor documentation, inadequate monitoring, and delayed surgical decisions were recurrent themes in near-miss reviews, calling for improved standardization of obstetric care protocols.

Another noteworthy aspect is the psychosocial and systemic impact of near-miss events. While survival is achieved, these women often endure long-term physical, social, and psychological consequences (Kaur et al., 2022). Such outcomes reinforce the importance of not just preventing maternal death but also mitigating the morbidity associated with severe obstetric complications through holistic, woman-centered care.

The WHO near-miss approach provides a structured framework for assessing clinical, management-related, and systemic factors contributing to outcomes in PPH cases (WHO, 2011). Its implementation in Indian hospitals has enabled better evaluation of service delivery and identification of deficiencies such as shortage of trained specialists, inadequate blood bank facilities, and limited availability of emergency drugs (Chakravarty et al., 2021; Nambiar et al., 2022).

Thus, routine integration of near-miss audits into clinical practice provides actionable data for institutional improvements.

Globally, the high burden of maternal near-miss related to PPH underscores the need for improving obstetric care across different health systems. Firoz et al. (2022) reported significant regional variations in maternal near-miss rates, with resource-limited settings experiencing disproportionately high burdens. These disparities necessitate context-specific interventions, including strengthening primary care, ensuring equitable availability of emergency obstetric services, and enhancing capacity at tertiary referral centers (Kamath et al., 2024).

Overall, the evidence indicates that while maternal mortality due to PPH can be reduced, near-miss audits highlight persistent systemic weaknesses requiring attention. Improved antenatal coverage, timely recognition of at-risk women, better referral linkages, and stronger emergency response protocols are essential strategies. In addition, institutionalization of maternal near-miss reviews as a quality improvement tool can significantly reduce adverse outcomes and optimize maternal health care delivery in tertiary hospitals (Mohapatra et al., 2023; Roy et al., 2015)

Conclusion

PPH remains a significant factor in maternal near miss and mortality, especially among referred patients in tertiary centers. Improving outcomes demands strengthened peripheral obstetric care, timely referral, optimally equipped emergency response, and continuous professional training. Integrated audits of near miss events are pivotal for identifying actionable improvements to reduce maternal deaths in resource-limited settings.

Declarations

Funding: None Conflicts of interest/Competing interests: None Availability of data and material: Code availability: Not applicable Consent to participate: Consent taken Ethical Consideration: There are no ethical conflicts related to this study. Consent for publication: Consent taken

References

1. Sultana S, Nandini M, Saini P. Effect of a Primary Postpartum Haemorrhage on the “Near-Miss” Morbidity and Mortality at a Rural Tertiary Care Hospital. J Clin Diagn Res. 2013;7(5):856-860.
2. Kaul V, Bagga R, Jain V, Gopalan S. The impact of primary postpartum hemorrhage in "near-miss" morbidity and mortality in a tertiary care hospital in North India. Indian J Med Sci. 2006;60(6):233-40.
3. Sarma HKD, et al. A prospective study of maternal near-miss and maternal mortality. Barpeta J Obstet Gynaecol. 2021;7(1):21–27.
4. Poonam S, Tiwari S. Near miss and mortality audit of women with postpartum hemorrhage. Barpeta J Obstet Gynaecol. 2022;8(2):41–48.
5. Ramani S, Vijaya B. Prevalence and outcome of primary postpartum haemorrhage in a tertiary care hospital. Barpeta J Obstet Gynaecol. 2022;8(3):70–76.
6. Lakshman P, et al. Postpartum hemorrhage -- clinical profile and referral patterns in a tertiary care hospital. Indian J Obstet Gynecol Res. 2025;12(3):419–426.
7. Reddy R, Varma R. A review of maternal near miss events in a tertiary teaching hospital. Indian J Obstet Gynecol Res. 2025;12(3):306–311.
8. Rao GJ, et al. Maternal near miss: an Indian tertiary care centre audit. Int J Reprod Contracept Obstet Gynecol. 2019;8(4):1532–1537.
9. Hasegawa J, et al. Hospital transfer for patients with postpartum hemorrhage in urban areas. J Obstet Gynaecol Res. 2021;47(12):4513-4521.
10. Shah MH, et al. Comparison of causes of maternal near miss and mortality cases. Indian J Obstet Gynecol Res. 2025;12(2):180–185.
11. Mushaikegho L, et al. A Critical Review of Maternal Near Miss in Tertiary Care Centre. Int J Pharm Clin Res. 2024;16(2): 984–990.
12. Kaur S, et al. An overview of women with post-partum haemorrhage in a tertiary care hospital. Int J Reprod Contracept Obstet Gynecol. 2022;11(1):98–105.
13. Singh R, et al. Maternal near miss and mortality in a tertiary care center of Western Uttar Pradesh. Cureus. 2023;15(7):e39904.

14. Firoz T, et al. Global and regional estimates of maternal near miss. BMJ Global Health. 2022;7(4):e008251.
15. Roy KK, et al. Severe maternal morbidity and near miss due to postpartum hemorrhage in tertiary hospitals. Int J Gynecol Obstet. 2015;129:76–81.
16. Mohapatra S, et al. Maternal near miss: a surrogate indicator of obstetric care. Int J Reprod Contracept Obstet Gynecol. 2023;12(4):1213–1217.
17. Kamath A, et al. Incidence, Causes and Outcomes of Postpartum Hemorrhage in Asian Tertiary Hospitals. BMC Pregnancy Childbirth. 2024;24:321.
18. Chakravarty A, et al. Maternal near miss: An indicator of severe maternal morbidity and quality of obstetric care. J Obstet Gynaecol India. 2021;71(1):37–44.
19. Nambiar A, et al. Emergency management of postpartum hemorrhage: Current perspectives. J Matern Fetal Neonatal Med. 2022;35(5):966–973.
20. WHO. Evaluating the quality of care for severe pregnancy complications: the WHO near-miss approach for maternal health. Geneva: World Health Organization; 2011.