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Original Research Article

Postpartum hemorrhage prevention through audit and review of literature

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ABSTRACT

Background: Postpartum haemorrhage (PPH), particularly significant cases with blood loss >1000 ml, is a critical obstetric emergency. This audit evaluated PPH management at Khaja Banda Nawaz Teaching and General Hospital, addressing a high incidence of PPH (29.5%).
Methods: A retrospective audit, at Khaja Banda Nawaz Teaching and General Hospital, Kalburgi, Karnataka, India conducted between period of February and May 2024, reviewed 1786 vaginal births from 2022 to 2023, identifying 526 PPH cases (>500 ml), including 71 cases of PPH>1000 ml (4%) and 20 cases ≥2000 ml (1.1%). Compliance with NICE guideline NG235 standards was assessed. Recommendations were implemented from June 2024 to February 2025, followed by a reaudit of 500 vaginal births from February to May 2025, focusing on 14 cases of PPH >1000 ml (2.8%).
Results: The initial audit revealed deficiencies in 56% of PPH records, including inadequate monitoring (35%), delayed uterotonic administration (15%), and delayed transfer from the postpartum ward to the emergency operating unit (59%). Post-intervention, documentation of informed choice improved (78% versus 49%), and significant PPH incidence decreased (2.8% versus 4%). Active third stage management increased (73% versus 27% physiological).
Conclusions: The audit cycle reduced significant PPH through standardized protocols and team engagement, underscoring the value of continuous auditing in midwifery-led units.

Keywords: Clinical audit, Midwifery, Obstetrics, Postpartum hemorrhage, Quality improvement

INTRODUCTION

Postpartum hemorrhage (PPH), defined as blood loss exceeding 500 ml within 24 hours post-delivery, is a leading cause of maternal morbidity and mortality worldwide, accounting for approximately 25% of global maternal deaths.[1,2] Significant PPH, exceeding 1000 ml, poses severe health risks, requiring prompt intervention. The condition is often unpredictable but manageable with timely interventions, guided by frameworks like the "4 Ts": tone (uterine atony), tissue (retained placenta), trauma (lacerations), and thrombin (coagulopathy).[3,4] Prevention strategies, such as active management of the third stage of labor (AMTSL) with uterotonics, are critical.[5,6]

At Khaja Banda Nawaz Teaching and General Hospital in Gulbarga, India, a high incidence of PPH (29.5%, 526/1,786 vaginal births) from 2022 to 2023, including 71 cases with blood loss >1000 ml (4%) and 20 cases ≥2000 ml (1.1%), prompted a clinical audit. The significant PPH rate exceeds typical benchmarks of 1-2% for major PPH, suggesting gaps in prevention or management.[7] Accurate blood loss estimation, particularly challenging in waterbirths due to dilution effects, complicates timely intervention.[8] The hospital's frequent use of physiological

third stage management, avoiding routine uterotonics, raised safety concerns given the elevated PPH rates. This audit aimed to identify deficiencies in PPH management, assess compliance with National Institute for Health and Care Excellence (NICE) guideline NG235 standards, and implement improvements to reduce significant PPH, balancing medical and midwifery-led care while ensuring informed patient choices.[9]

METHODS

A retrospective audit was conducted between February and May 2024 at the Khaja Banda Nawaz Teaching and General Hospital's obstetrics and gynecology department, Gulbarga, India, reviewing health records of 1,786 women with vaginal births from 2022 to 2023. The audit identified 526 cases of PPH with blood loss >500 ml (29.5%), including 71 cases with blood loss >1000 ml (4%) and 20 cases ≥2000 ml (1.1%). A standardized proforma ensured consistent data collection on: i) Documentation of informed discussions about third stage management options (active vs. physiological). ii) Compliance with six NICE NG235-based standards: uterine atony management with uterine massage, clot expulsion, and bladder catheterization; i.v. access and blood tests for blood loss >500 ml or continuing bleeding; Vital signs monitoring every 15 minutes for blood loss >500 ml or symptomatic patients; uterotonics within 10 minutes for excessive bleeding; transfer to an obstetrician within 15 minutes for blood loss >1000 ml or symptomatic hypovolemia; emergency call if initial treatment fails. iii) Clinical outcomes, including transfusion or surgical needs.[9]

Deficiencies were categorized as inadequate monitoring (35%), failure to administer primary uterotonics promptly (15%), and delayed transfer from monitoring ward to main labor table (59%), with a 15-minute transfer standard. Compliance rates were calculated as the percentage of applicable cases meeting each standard.

Findings were shared with the obstetrics team, leading to recommendations (Table 1) implemented from June 2024 to February 2025: Holistic post-birth assessment, including blood loss. i.v. cannulation for delayed third stage, blood loss >600 ml, hypovolemia, or ongoing bleeding.[10] Enhanced skills in PPH recognition and uterotonic administration within 10 minutes.[11] Closer monitoring for blood loss >500 mL with 15-minute observations.[12] Proactive uterine massage, clot expulsion, and bladder emptying.[13] Advising active management for women and reviewing physiological third stage practices for consistency with holistic approaches.[9,14-16] Proactive oxytocin administration for excess bleeding post-physiological management.[17]

Table 1: Key recommendations from initial audit.

Category	Recommendation
Post-birth assessment	Perform holistic assessment after birth, including estimated blood loss
I.v. cannulation	Ensure i.v. cannulation for women with delay in third stage, EBL>600 ml, symptoms of hypovolemia, or ongoing bleeding
PPH recognition and treatment	Improve skills in recognition of PPH and administration of uterotonics within 10 minutes
Monitoring	Provide closer monitoring with full assessment and 15-minute observations for women with EBL>500 ml
Uterine management	Be proactive in massaging the uterus, expelling clots, and emptying the bladder in response to bleeding
Third stage management	Advise active management for women Review physiological third stage practices for consistency with holistic approaches Be more proactive in administering oxytocin for excess bleeding after physiological management

Following the initial audit, the obstetrics team implemented these recommendations through:

Case discussions: regular meetings reviewed PPH cases and facilitated learning. These addressed reluctance among some experienced nursing staff to recognize and treat excess bleeding promptly, emphasizing that delays could lead to unsafe practice.

Staff training: sessions enhanced skills in PPH recognition, timely administration of uterotonics, and monitoring protocols.

Protocol updates: clinical protocols were revised to ensure timely i.v. cannulation, closer monitoring, and proactive management of uterine atony.

PPH boxes: emergency kits with uterotonics, i.v. fluids, and catheterization equipment were introduced for rapid response.

A reaudit reviewed 500 vaginal births from February to May 2025, focusing on 14 cases of PPH >1000 ml (2.8%), using the same methodology.

RESULTS

The initial audit identified deficiencies in 56% of the 71 PPH>1000 ml records (Table 3). Key issues included inadequate monitoring (35%), delayed uterotonic administration (15%), and delayed transfer (59%). PPH>500 ml occurred in 526 women (29.5%), with 71 cases >1000 ml (4%) and 20 cases ≥2000 ml (1.1%). Only 49% of records documented informed discussions about third stage options.

Post-intervention, the reaudit showed significant improvements (Table 3). Documentation of informed choice rose to 78%. Third stage management shifted, with 73% opting for active management (versus 27% physiological). The incidence of PPH>1000 ml decreased to 2.8% (14/500), with 3 cases ≥2000 ml (0.6%). PPH>1000 ml occurred in 3% of physiological management cases (4 women) and 2.8% of active management cases (10 women).

Table 2: Demographic characteristics of study population.

Characteristic	Initial audit (2022-2023)	Reaudit (2025)
Total vaginal births	1,786	500
Age (years)		
Mean±SD	23.5±5.0	27.5±5.0
Range	18-40	18-40
Parity		
Mean	1.8	2
Primiparous (%)	45	42
Multiparous (%)	55	58

Table 3: Compliance with NICE standards and key metrics.

Metric	Initial audit (2022-2023) (%)	Reaudit (2025) (%)
Standard 1: uterine atony management	80	95
Standard 2: iv access and blood tests	90	95
Standard 3: vital signs monitoring	70	85
Standard 4: uterotonics within 10 minutes	65	85
Standard 5: transfer within 15 minutes	75	90
Standard 6: emergency call	80	90
Informed choice documentation	49	78
PPH >1000 ml incidence	4 (71/1,786)	2.8 (14/500)
PPH ≥2000 ml incidence	1.1 (20/1,786)	0.6 (3/500)

DISCUSSION

This clinical audit at Khaja Banda Nawaz Teaching and General Hospital demonstrated the efficacy of systematic auditing in enhancing postpartum hemorrhage (PPH) management, reducing the incidence of significant PPH from 4% (71/1,786) to 2.8% (14/500) through targeted interventions. The initial audit, conducted between February and May 2024, revealed a high overall PPH incidence (29.5%, 526/1,786) and deficiencies in 56% of the 71 significant PPH records, including inadequate monitoring (35%), delayed uterotonic administration (15%), and delayed transfer from the monitoring ward to the main labor table (59%). These gaps, particularly in waterbirths where blood loss estimation is challenging due to dilution effects, likely exacerbated outcomes.[8] The 15-minute transfer standard highlighted logistical barriers, which were addressed through standardized pathways and PPH boxes containing uterotonics, i.v. fluids, and catheterization supplies.

The audit's interventions, including improved monitoring protocols and staff training, aligned with the NICE 2024 guideline's emphasis on early detection and bundled interventions, such as uterine massage, oxytocics, tranexamic acid, and i.v. fluids, which have been shown to reduce severe PPH outcomes by 60% in clinical trials.[9,18,19] Case discussions addressed midwives' reluctance to intervene promptly, often due to a preference for physiological processes or concern for the mother-infant dyad, fostering safer practices through enhanced team collaboration. The reaudit's improved documentation (78% versus 49%) and compliance with NICE standards (85-95% versus 65-90%) reflect strengthened adherence to evidence-based practices. The shift to active management of the third stage of labor (73% versus 27% physiological) mirrors evidence that AMTSL reduces blood loss by approximately 120 cases per 1,000 for >500 ml.[9,19] Consequently, significant PPH incidence decreased to 2.8%, and severe cases (≥2000 ml) to 0.6%, indicating improved patient safety.

Comparison with other studies

The audit's findings align with global research demonstrating that clinical audits and standardized protocols can significantly reduce PPH incidence. A French study reported a decline in severe PPH (defined as blood loss >1000 ml or requiring transfusion, embolization, or surgery) from 1.52% to 0.96% in a level

III hospital and from 2.08% to 0.57% in a level II hospital following regular clinical audits from 2005 to 2008.[21] The audit's reduction from 4% to 2.8% for PPH>1000 ml is comparable, though the final rate remains higher, possibly due to differences in patient demographics, healthcare resources, or blood loss estimation methods. The French study included both vaginal and cesarean deliveries, whereas this audit focused solely on vaginal births, which may influence reported rates.

Similarly, a study in North India evaluated a bundle approach to PPH emergency care at a tertiary care hospital, comparing pre-training (January-June 2021) and post-training (August 2021-January 2022) outcomes.[22] While specific incidence rates were not detailed, the study reported significant reductions in maternal morbidity, blood transfusion rates, and the need for surgical interventions post-training, mirroring the audit's outcomes. The use of PPH boxes in the audit, containing essential supplies like uterotonics and i.v. fluids, parallels the bundled interventions in the Indian study and the E-MOTIVE trial, which demonstrated that early detection with calibrated blood-collection drapes and bundled treatments reduced severe PPH and transfusion needs.[18] The audit's focus on timely uterotonic administration (compliance rising from 65% to 85%) aligns with evidence that rapid intervention is critical for preventing severe PPH.[11,18]

In contrast, a retrospective cohort study in China reported a severe PPH incidence of 1.56% (defined as blood loss ≥1000 ml and transfusion ≥4 units) among 34,178 deliveries, lower than the audit's initial 4%.[23] This discrepancy may reflect the audit's setting in a teaching hospital in India, where higher baseline PPH rates (up to 12% for blood loss >500 mLl in rural areas) are reported due to factors like anemia, malnutrition, or limited access to care.[24] The audit's final rate of 2.8% approaches these benchmarks, suggesting significant progress within the local context.

Broader context and challenges

The audit's emphasis on addressing care deficiencies, such as inadequate monitoring and delayed transfers, addresses common challenges in PPH management. Delayed recognition of hypovolemia, noted as a barrier in global studies, can exacerbate outcomes, particularly in settings reliant on visual blood loss estimation, which often underestimates volume.[8,12] The audit's interventions, including standardized monitoring protocols, align with recommendations for objective measurement tools like calibrated drapes.[18,19] The high initial PPH rate (29.5%) may reflect regional challenges, such as higher prevalence of uterine atony (70-80% of PPH cases globally) or obstetric trauma, consistent with the "4 Ts" framework.[3,4]

Resource limitations, a persistent challenge in low- and middle-income countries, may have contributed to the audit's higher baseline rates compared to high-resource settings.[12] For instance, access to blood products or advanced interventions like uterine artery embolization is limited in many Indian hospitals, increasing reliance on medical management.[7] The audit's success in reducing PPH incidence despite these constraints highlights the value of low-cost interventions like PPH boxes and staff training.

PPH remains a significant challenge in obstetric care, but advancements in prevention and management, such as early detection and bundled interventions, offer hope for improved outcomes.[18,19] The NICE 2024 guideline's emphasis on calibrated blood-collection drapes and multidisciplinary teamwork has been shown to reduce severe PPH outcomes by 60% in clinical trials.[18,19] Challenges persist, including resource limitations in low- and middle-income countries and delayed recognition of hypovolemia.[12] Future research into predictive models and simulation-based training could further enhance outcomes.[13,20]

Implications and future directions

The audit's findings underscore the importance of continuous quality improvement in midwifery-led units, where balancing autonomy with timely escalation is critical. The shift to active management aligns with NICE and WHO recommendations, which advocate AMTSL for all women to reduce PPH risk.[9,25] However, the persistence of physiological management in 27% of cases suggests ongoing cultural or patient preferences for natural approaches, necessitating further education on risk-benefit profiles.[14-16]

This study has some limitations also. The retrospective design may introduce documentation biases, potentially affecting data accuracy. The persistence of physiological third-stage management in 27% of cases post-intervention suggests ongoing cultural or patient preferences that may limit the full adoption of recommended practices. Fifth, the study was conducted in a resource-constrained setting, which may influence the applicability of the findings to hospitals with varying levels of resource availability. Finally, regional factors such as higher baseline PPH rates due to anemia, malnutrition, or limited access to care may affect the generalizability of the results to other regions populations.

CONCLUSION

This audit cycle significantly improved PPH management at Khaja Banda Nawaz Teaching and General Hospital, reducing significant PPH incidence from 4% to 2.8% through standardized protocols and team engagement. The findings align with global evidence that clinical audits enhance maternal safety, offering a scalable approach for midwifery-led units. Continuous auditing and training are critical to sustain these gains and address ongoing challenges in PPH management.

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REFERENCES

1. Mohamed T, Chandraharan E. Recognition and management of postpartum hemorrhage. Matern Fet Med. 2024;7(1):29-37.
2. Felis S. Postpartum hemorrhage. Am J Med Clin Res Rev. 2023:1-28.
3. Guasch E, Brogly N, Gilsanz F. Improving outcomes in postpartum haemorrhage: recognition and resuscitation. Reg Anesth Pain Med. 2023;48:A369-71.
4. Giouleka S. Postpartum hemorrhage: a comprehensive review of guidelines. Obstet Gynecol Surv. 2022;77(11):665-82.
5. Sadiku OD, Aina SA, Odoemene CC, Ogunmoyin TE, Adedara VO, Olasimbo O, et al. Approaches to the prevention and treatment of postpartum hemorrhage: a systematic review of past advances, recent developments, and best practices. Cureus. 2024;16(8):e65096.
6. Liu LY, Nathan L, Sheen JJ, Goffman D. Review of current insights and therapeutic approaches for the treatment of refractory postpartum hemorrhage. Int J Women's Health. 2023:905-26.
7. Kumar S, Gaiwal A. Management of postpartum hemorrhage- current strategies. MGM J Med Sci. 2022;9(4):374-8.
8. Kubuka AE, Humbuyu JM, Mkangala GJ. Postpartum haemorrhage: a review from evidence. Nurs Care Open Access J. 2023;9(2):74-8.
9. National Institute for Health and Care Excellence. Intrapartum care for healthy women and babies. NICE guideline [NG235]. London: NICE; 2024.
10. Mavrides E, Allard S, Chandraharan E, Collins P, Green L, Hunt BJ, et al. Prevention and management of postpartum haemorrhage: Green-top Guideline No. 52. BJOG. 2016;124(5):e106-49.
11. Driessen M, Bouvier-Colle MH, Dupont C, Khoshnood B, Rudigoz RC, Deneux-Tharaux C. Postpartum hemorrhage resulting from uterine atony after vaginal delivery: factors associated with severity. Obstet Gynecol. 2011;117(1):21-31.
12. Akter S, Forbes G, Corona MV, 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):CD013795.
13. Kaur K, Grover S, Garg S, Sharma A, Ravi R. Updates on postpartum hemorrhage: prediction, early detection and management. Int J Reprod Contracept Obstet Gynecol. 2024;13(8):2849-56.
14. Fahy K, Foureur M, Hastie C. Birth territory and midwifery guardianship: theory for practice, education and research. Edinburgh: Elsevier; 2010.
15. Cohain JS. Proposed protocol for third stage management. Midwife Today. 2010;95:24-5.
16. Begley CM, Gyte GM, Murphy DJ, Devane D, McDonald SJ, McGuire W. Active versus expectant management in the third stage of labour. Cochrane Database Syst Rev. 2012;(3):CD007412.
17. Davis D. Physiological third stage of labour: support it or lose it. Br J Midwife. 2012;20(12):848-54.
18. Gallos ID, Devall AJ, Martin J, Middleton LJ, Beeson L, Galadanci HS, et al. Randomized Trial of Early Detection and Treatment of Postpartum Hemorrhage. N Engl J Med. 2023;389(1):11-21.
19. Oyoo P, Qureshi Z, Osoti A, Gwako G, Okore J, Mugambi JK, et al. Randomized trial of early detection and treatment of postpartum hemorrhage. J Obstet Gynecol East Cent Afr. 2024;36(1):149-56.
20. World Health Organization. A roadmap to combat postpartum haemorrhage between 2023 and 2030. Geneva: WHO; 2023.
21. Dupont C, Deneux-Tharaux C, Touzet S, Colin C, Bouvier-Colle MH, Lansac J, et al. Clinical audit: a useful tool for reducing severe postpartum haemorrhages? Int J Qual Health Care. 2014;26(3):262-9.
22. Yadav A, Mathur R, Pandita A, Sharma S, Gupta S, Mehra S, et al. Implementation of postpartum hemorrhage emergency care using a bundle approach at a tertiary care hospital in north India. J Obstet Gynecol India. 2022;72(Suppl 1):S146-52.
23. Lao O, Zhang X, Zhang J, Wang Y, Li Z, Chen L, et al. Prevalence and risk factors of severe postpartum hemorrhage: a retrospective cohort study. BMC Pregnancy Childbirth. 2021;21(1):332.
24. Singh S, McClure EM, Koti M, Moore JL, Goldenberg RL, Patel AB, et al. Incidence and risk factors for postpartum hemorrhage in rural India: a prospective cohort study. BMC Pregnancy Childbirth. 2020;20(1):1-9.
25. Escobar MF, Nassar AH, Theron G, Barnea ER, Nicholson W, Ramasauskaite D, et al. FIGO recommendations on the management of postpartum hemorrhage 2022. Int J Gynecol Obstet. 2022;157:3-50.

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