

Original Article

Outcome of Postpartum Hemorrhage among Patients Managed with the Modified Emotive Bundle at a Tertiary Care Center

Syeda Amna Asim Kazmi¹, Bushra Iftikhar², Nasreen Hassan Niazi³, Ayesha Mushtaq⁴, Asma Sattar⁵, Summiya Manzoor⁶

¹Postgraduate resident Dept of Gynae & Obs, CMH Malir, Karachi

²Professor of Gynae & Obs, CMH Malir, Karachi

³Associate Professor of Gynae & Obs, CMH Malir, Karachi, ⁴Senior Registrar of Gynae and OBS, Sir Syed Hospital, Karachi

⁵Senior Registrar of Gynae and OBS, Sir Syed Girls College/Hospital Karachi

⁶Consultant Gynecologist, Usman Memorial Hospital Karachi

Correspondence: Dr. Syeda Amna Asim Kazmi

Postgraduate resident Dept of Gynae & Obs, CMH Malir, Karachi

amna.kaz95@gmail.com

Abstract

Objective: To determine the outcomes of postpartum hemorrhage (PPH) among patients managed with the Modified Emotive Bundle at a tertiary care health center.

Methodology: This prospective cohort study was conducted at the Department of Gynaecology and Obstetrics, CMH Malir, Karachi, from April to September 2025. A total of 68 women aged 18–55 years, with a gestational age of ≥ 34 weeks and diagnosed with PPH, were included. Patients were managed using the Modified Emotive Bundle, and blood loss was measured with calibrated drapes. Outcomes were assessed in terms of the incidence of severe PPH, need for blood transfusion, surgical intervention, and intensive care unit (ICU) admission. Data were collected using a predefined study proforma and entered and analyzed using SPSS version 26.0. Data were stratified according to potential effect modifiers, and associations were assessed using the chi-square test. A p-value of ≤ 0.05 was considered statistically significant.

Results: The mean maternal age was 35.36 ± 11.10 years, mean gestational age was 37.38 ± 1.93 weeks, and mean BMI was 27.26 ± 5.81 kg/m². Severe PPH occurred in 5 patients (7.4%). Blood transfusion was required in 9 patients (13.2%), surgical intervention in 3 (4.4%), and ICU admission in 2 (2.9%). No significant associations were found between the assessed outcomes and maternal or obstetric characteristics ($p > 0.05$).

Conclusion: The Modified Emotive Bundle was associated with effective control of PPH, with low rates of blood transfusion, surgical intervention, and ICU admission.

Keywords: Postpartum hemorrhage; Modified Emotive Bundle; outcomes.

Cite this article as: Kazmi SAA, Iftikhar B, Niazi NH, Mushtaq A, Sattar A, Manzoor S. Outcome of Postpartum Hemorrhage among Patients Managed with the Modified Emotive Bundle at a Tertiary Care Center. J Soc Obstet Gynaecol Pak. 2026;16(3):209-214. DOI: 0.71104/jsogp.v16i3.1101



This article is licensed under the [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/) International License, which permits non-commercial use, sharing, adaptation, distribution and reproduction in any medium or format, provided that the original author(s) and source are properly cited

Introduction

Maternal mortality remains a major global health issue, with the highest burden in low- and middle-income countries, including Pakistan, where the maternal mortality rate is reported at 186 deaths per 100,000 live births and is considerably higher in rural populations.^{1,2} Postpartum hemorrhage (PPH) is the leading cause of maternal death, responsible for nearly one-quarter of cases worldwide. Important risk factors include uterine atony, placental abnormalities, genital tract trauma, prolonged labor, and coagulation disorders.^{3,4} It remains an important cause of maternal morbidity and mortality

in South Asia. In Pakistan, a population-based survey from Gilgit-Baltistan reported that 13% of women experienced PPH.⁶ In neighboring India, a large facility-based analysis involving 55,938 deliveries reported PPH in approximately 2% of deliveries,⁷ indicating the PPH continues to represent a significant obstetric problem in South Asian regions. The Preventive measures such as prophylactic uterotonics, early detection of risk, and patient education are central, while treatment strategies range from uterotonic drugs and uterine massage to fluid resuscitation, balloon tamponade, and surgical

Authorship Contribution: ^{1,5}Substantial contributions to the conception or design of the work or the acquisition, ²Final approval of the version to be published, ^{1,3,6} Drafting the work or revising it critically for important intellectual content, ⁴Active participation in methodology.

Funding Source: none

Conflict of Interest: none

Received: May 11, 2026

Revised: Aug 16, 2026

Accepted Aug 21, 2026

procedures.⁵ Despite these options, delayed recognition and inconsistent management contribute to preventable mortality.^{6,7}

To address these gaps, the Modified Emotive intervention was developed, focusing on early recognition and simultaneous application of multiple treatments. This bundle incorporates uterine massage, oxytocics, tranexamic acid, intravenous fluids, systematic examination, and balloon tamponade when needed. The E-Motive Trial demonstrated encouraging outcomes, with a severe PPH incidence of 1.6% and maternal deaths below 0.1%⁸. Similar reductions in severe PPH and mortality were reported in East and Central Africa, with consistent bundle use.⁹ Conversely, findings from high-resource centers showed less impact, with persistent high rates of severe PPH and blood transfusion despite bundle adoption.¹⁰

According to these conflicting results and most subsequent studies carried out at African countries along with limited evidences on the outcomes of the Modified E-MOTIVE bundle in the other developing nations including Pakistan, this study was conducted to assess the outcomes of postpartum hemorrhage (PPH) among patients managed with the Modified Emotive Bundle. Since the effectiveness of a locally adapted bundle may vary between healthcare systems, evaluating maternal outcomes after implementing the modified E-MOTIVE bundle in each setting is important before its routine adoption into local practice. Therefore, this study supports the local evidence to support its use in routine PPH care.

Methodology

This prospective cohort study was conducted in the Department of Gynaecology and Obstetrics at CMH Malir, Karachi, over a six-month period from April to September 2025, following approval from the Institutional Ethics Committee (No. 139/2024/Trg/ERC). A sample size of 68 patients was calculated using the WHO sample size calculator, with a 95% confidence level, 3% absolute precision, and an expected incidence of severe postpartum hemorrhage (PPH) of 1.6% among patients managed with the Modified Emotive Bundle.⁸ Non-probability consecutive sampling was employed.

Women aged 18–55 years, with a gestational age of ≥ 34 weeks and diagnosed with PPH, were included. Pregnant women with coagulopathies, chronic liver or kidney disease, current anticoagulant therapy, hypersensitivity to any drug used in the Modified

Emotive Bundle, or morbidly adherent placenta were excluded.

Written informed consent was obtained from all patients and their caregivers after clearly explaining the purpose and procedures of the study. Patients were reassured that participation was entirely voluntary and that they could withdraw from the study at any time without any effect on their ongoing medical care or treatment.

Following consent, demographic and obstetric information, including maternal age, booking status, body mass index (BMI), duration of labour, and mode of delivery, was systematically recorded. All patients were managed using the Modified Emotive Bundle, and blood loss was quantified using calibrated drapes. The bundle consisted of uterine massage, intramuscular oxytocin (10 IU), intravenous tranexamic acid (1 g administered over 10 minutes), fluid resuscitation according to the degree of hypovolemia, and repeated clinical assessments at 15-minute intervals. Uterine balloon tamponade was performed if bleeding persisted for one hour despite initial management.

Patients were subsequently monitored following management, and clinical outcomes were recorded. The primary outcome was the incidence of severe PPH. Secondary outcomes included the requirement for blood transfusion, surgical intervention, and intensive care unit (ICU) admission.

Data were collected using a predefined study proforma and entered and analyzed using SPSS version 26.0. Quantitative variables were presented as means and standard deviations, while qualitative variables were expressed as frequencies and percentages. Data were stratified according to potential effect modifiers, and associations were assessed using the chi-square test. A p-value of ≤ 0.05 was considered statistically significant.

Results

The study included a total of 68 patients. The mean maternal age was 35.36 ± 11.10 years, and the mean gestational age was 37.38 ± 1.93 weeks. Of the total participants, 57 (83.8%) were booked, while 11 (16.2%) were unbooked. The mean parity was 2.81 ± 0.43 , and the mean gravidity was 2.82 ± 1.15 . The mean body mass index (BMI) was 27.26 ± 5.81 kg/m², and the mean duration of labour was 6.05 ± 3.94 hours. Regarding the mode of delivery, 20 patients (29.4%) underwent caesarean section, while 48 (70.6%) had spontaneous vaginal delivery.

Severe postpartum hemorrhage (PPH) occurred in 5 patients (7.4%), while 63 (92.6%) did not develop severe PPH. Blood transfusion was required in 13.9% of patients, surgical intervention was performed in 4.1%, and ICU admission was required in 2.9%. Overall, these findings indicate relatively low rates of major interventions and ICU admission among patients managed with the Modified Emotive Bundle (Figure 1).

No statistically significant differences were observed in the incidence of severe PPH according to maternal and obstetric characteristics ($p > 0.05$). Descriptively, severe PPH was more frequently observed among women aged 25–34 years, those who were overweight or obese, unbooked women, and those who underwent vaginal delivery. However, these differences were not statistically significant and may reflect the distribution of

participants across these categories rather than a true association with severe PPH (Table I).

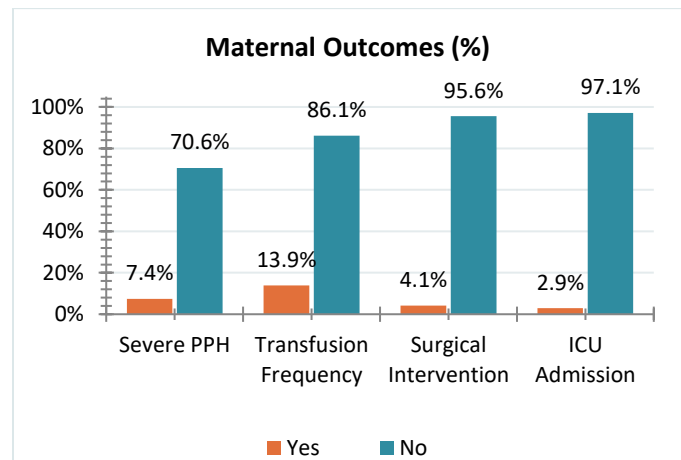


Figure 1. Incidence of severe Postpartum Hemorrhage.

Table I: Incidence of severe PPH by maternal characteristics. (n=68)

Variable	Level	Severe PPH		Total	p-value
		No	Yes		
Maternal Age (years)	18-24	14 (20.6)	0 (0.0)	14 (20.6)	0.484
	25-34	19 (27.9)	3 (4.4)	22 (32.4)	
	35-44	16 (23.5)	1 (1.5)	17 (25.0)	
	45-60	14 (20.6)	1 (1.5)	15 (22.1)	
Gestational Age (weeks)	36-37 weeks	22 (32.4)	2 (2.9)	24 (35.3)	0.781
	38-39 weeks	18 (26.5)	1 (1.5)	19 (27.9)	
	<36 weeks	16 (23.5)	2 (2.9)	18 (26.5)	
	≥40 weeks	7 (10.3)	0 (0.0)	7 (10.3)	
BMI	Normal	19 (27.9)	0 (0.0)	19 (27.9)	0.411
	Obese	20 (29.4)	2 (2.9)	22 (32.4)	
	Overweight	20 (29.4)	2 (2.9)	22 (32.4)	
	Underweight	4 (5.9)	1 (1.5)	5 (7.4)	
Booking Status	Booked	52 (76.5)	5 (7.4)	57 (83.8)	0.307
	Unbooked	11 (16.2)	0 (0.0)	11 (16.2)	
Mode of Delivery	C-Section	18 (26.5)	2 (2.9)	20 (29.4)	0.589
	SVD	45 (66.2)	3 (4.4)	48 (70.6)	

Table II: Transfusion frequency according to maternal characteristics. (n=68)

Variable	Level	Transfusion frequency		Total	p-value
		No	Yes		
Maternal Age (years)	18-24	11 (16.2)	3 (4.4)	14 (20.6)	0.702
	25-34	19 (27.9)	3 (4.4)	22 (32.4)	
	35-44	15 (22.1)	2 (2.9)	17 (25.0)	
	45-60	14 (20.6)	1 (1.5)	15 (22.1)	
Gestational Age (weeks)	36-37 weeks	21 (30.9)	3 (4.4)	24 (35.3)	0.54
	38-39 weeks	15 (22.1)	4 (5.9)	19 (27.9)	
	<36 weeks	16 (23.5)	2 (2.9)	18 (26.5)	
	≥40 weeks	7 (10.3)	0 (0.0)	7 (10.3)	
BMI	Normal	16 (23.5)	3 (4.4)	19 (27.9)	0.887
	Obese	19 (27.9)	3 (4.4)	22 (32.4)	
	Overweight	20 (29.4)	2 (2.9)	22 (32.4)	
	Underweight	4 (5.9)	1 (1.5)	5 (7.4)	
Booking Status	Booked	49 (72.1)	8 (11.8)	57 (83.8)	0.658
	Unbooked	10 (14.7)	1 (1.5)	11 (16.2)	
Mode of Delivery	C-Section	18 (26.5)	2 (2.9)	20 (29.4)	0.611
	SVD	41 (60.3)	7 (10.3)	48 (70.6)	

Table III: Surgical intervention and ICU admission frequency according to maternal characteristics. (n=68)

Variable	Level	Surgical intervention		p-value	ICU admission		p-value
		No	Yes		No	Yes	
Maternal Age (years)	18-24	14 (20.6)	0 (0.0)	0.087	14 (20.6)	0 (0.0)	0.643
	25-34	19 (27.9)	3 (4.4)		21 (30.9)	1 (1.5)	
	35-44	17 (25.0)	0 (0.0)		17 (25.0)	0 (0.0)	
	45-60	15 (22.1)	0 (0.0)		14 (20.6)	1 (1.5)	
Gestational Age (weeks)	36-37 weeks	22 (32.4)	2 (2.9)	0.546	22 (32.4)	2 (2.9)	0.286
	38-39 weeks	19 (27.9)	0 (0.0)		19 (27.9)	0 (0.0)	
	<36 weeks	17 (25.0)	1 (1.5)		18 (26.5)	0 (0.0)	
	≥40 weeks	7 (10.3)	0 (0.0)		7 (10.3)	0 (0.0)	
BMI	Normal	19 (27.9)	0 (0.0)	0.289	19 (27.9)	0 (0.0)	0.771
	Obese	21 (30.9)	1 (1.5)		21 (30.9)	1 (1.5)	
	Overweight	21 (30.9)	1 (1.5)		21 (30.9)	1 (1.5)	
	Underweight	4 (5.9)	1 (1.5)		5 (7.4)	0 (0.0)	
Booking Status	Booked	54 (79.4)	3 (4.4)	0.436	55 (80.9)	2 (2.9)	0.528
	Unbooked	11 (16.2)	0 (0.0)		11 (16.2)	0 (0.0)	
Mode of Delivery	C-Section	18 (26.5)	2 (2.9)	0.147	20 (29.4)	0 (0.0)	0.354
	SVD	47 (69.1)	1 (1.5)		46 (67.6)	2 (2.9)	

Similarly, no statistically significant associations were observed between maternal characteristics and the requirements for blood transfusion, surgical intervention, or ICU admission ($p > 0.05$), as presented in Tables II and III.

Discussion

The PPH remains an important obstetric emergency and a major cause of maternal morbidity and mortality, specifically in resource-limited regions including Pakistan. This study assessed the outcomes of women with postpartum hemorrhage who were managed with the Modified Emotive bundle and found a relatively low incidence of severe PPH at 7.4%, blood transfusion in 13.2%, surgical intervention in 4.4%, and intensive care unit (ICU) admission in 2.9%. These findings were in line with the international evidence on the Modified Emotive bundle, like a landmark E-Motive trial by Gallos et al conducted across the multiple low-resource countries reported a severe PPH incidence only 1.6% among 48,678 women, with transfusion rates of 2.2% and maternal deaths below 0.1%.⁸ The findings were further supported by the Oyoo et al⁹ who demonstrated a severe PPH rate only 2% across seven facilities where the bundle was implemented, with only three maternal deaths reported. In contrast, Hamm et al. reported less favorable results in high-resource settings where, despite bundle adoption, severe PPH (blood loss >1000 mL) occurred in 12.2% of cases and transfusions in 5.1%.¹⁰

The variations reflect not only differences in patient populations and baseline risk but also in health system readiness, fidelity of bundle use, and supply chain reliability. The higher transfusion rates of this study compared to Gallos et al. and Oyoo et al. could be

attributed to different characteristics of the patients, like already anemic patients, late presentation and differences in adherence to clinical protocols.

Other supporting evidence has demonstrated both the effectiveness and the challenges associated with implementing bundled care. Bohren et al. conducted a mixed-methods evaluation of the E-MOTIVE intervention across Kenya, Nigeria, South Africa, and Tanzania and reported high fidelity to both calibrated drape use and bundle delivery, with treatment initiated within 15 minutes in the majority of cases. The authors concluded that the intervention was feasible and acceptable across diverse settings.¹² Similarly, Durocher et al. reviewed implementation outcomes and highlighted the importance of reliable supply chains, staff training, and adequate monitoring to ensure the sustainability of the intervention.¹³

Several studies have also emphasized the role of nursing competence and training in the successful implementation of PPH care bundles. Mohamed et al. found that introducing an evidence-based nursing intervention package improved the knowledge and clinical practices of maternity nurses involved in PPH management.¹⁴ Likewise, Mahmoud Radwan et al. reported improvements in nurses' self-efficacy and skills following the implementation of a new PPH care bundle in Egypt, suggesting that structured training can enhance preparedness for the early detection and initial management of PPH.¹⁵

The care bundle approach has also been endorsed at policy levels. Ratnasiri et al. mentioned recommendations from the Asia Oceania Federation of Obstetrics and Gynaecology (AFOG), aligning with World Health Organization (WHO) guidance to promote

bundle use for reducing morbidity and mortality from obstetric hemorrhage.¹⁶

Williams et al., in an economic evaluation alongside the E-Motive trial, showed that the intervention was cost-effective in low- resource countries, reducing severe PPH and disability-adjusted life-years (DALYs) at acceptable cost ratios.¹⁷ Nausheen et al. reported implementation outcomes from Pakistan, showing that after bundle introduction, detection rates rose to 100% compared to 50.9% at baseline, bundle compliance improved from 40.8% to 100%, and the composite adverse outcome decreased from 2% to less than 0.1%.¹⁸ Similarly, Devall et al. studied bundle implementation in Sindh and Punjab provinces and reported significant reductions in severe hemorrhage, laparotomy, and death, with nearly universal adoption of calibrated drapes and bundle components¹⁹. These findings provide strong contextual relevance to the present study, affirming that bundle adoption in Pakistan is feasible and impactful.

The South African experience described by Singata-Madliki et al. also demonstrated a 60% reduction in severe PPH when the E-Motive trial was integrated into national strategies, though challenges in sustaining practice outside research settings were noted²⁰. Akter et al, through qualitative interviews in Kenya, Nigeria, and South Africa, observed that subjective blood loss estimation and limited provider expertise led to delays in initiating treatment, but the E-Motive trial's use of calibrated drapes and structured bundle addressed these gaps. These findings document the broader applicability of bundle strategies across different health systems.

Overall, the findings of this study align with international evidence showing that the Modified Emotive bundle improves early recognition and management of PPH, reducing the need for advanced interventions. While transfusion rates were higher than in multicounty trials, surgical and ICU requirements remained low, demonstrating that the bundle effectively prevented progression to life-threatening morbidity. Evidence from global studies consistently supports the role of bundled care in improving maternal outcomes when adequately implemented. For Pakistan, where PPH contributes substantially to maternal mortality, the integration of the Modified Emotive bundle into national protocols, combined with workforce training, reliable supply chains, and multicenter research, has the potential to reduce preventable deaths and strengthen maternal health services across diverse settings.

Conclusion

Study revealed that the application of the Modified Emotive bundle in the management of postpartum hemorrhage is associated with terms of low incidence of severe hemorrhage, limited transfusion requirements, and minimal need for surgical or intensive care interventions, indicating that this structured approach is feasible and effective in a resource-limited Pakistani healthcare setting.

References

1. Midhet F, Khalid SN, Baqai S, Khan SA. Trends in the levels, causes, and risk factors of maternal mortality in Pakistan: a comparative analysis of national surveys of 2007 and 2019. *PLoS One*. 2025;20(1): e0311730. <https://doi.org/10.1371/journal.pone.0311730>
2. Wasim T, Yunus S, Gul ER, Wasim A. Maternal mortality: causes, trends and delays in care at tertiary care hospital, Pakistan. *Pak J Med Sci*. 2025;41(2):420-5. <https://doi.org/10.12669/pjms.41.2.9974>
3. Blaha J, Bartosova T. Epidemiology and definition of PPH worldwide. *Best Pract Res Clin Anaesthesiol*. 2022;36(3-4):325-39. <https://doi.org/10.1016/j.bpa.2022.11.001>
4. Li J, Zhang D, Lin H, Shao M, Wang X, Chen X, et al. Postpartum haemorrhage following vaginal delivery: a comprehensive analysis and development of predictive models for aetiological subgroups in Chinese women. *BMJ Open*. 2025;15(1):e089734. <https://doi.org/10.1136/bmjopen-2024-089734>
5. Ubom A, Ijarotimi O, Nyeche S, Oriji P, Ayegbusi E, Appiah-Kubi A. A review of nonpharmacologic prevention and management of postpartum haemorrhage in low resource settings. *Niger J Med*. 2023;32(2):109-12. https://doi.org/10.4103/NJM.NJM_14_23
6. Farrak DS, Pell LG, Muhammad Y, Khan SH, Tanner Z, Bassani DG, et al. Association of maternal, obstetric, fetal, and neonatal mortality outcomes with Lady Health Worker coverage from a cross-sectional survey of >10,000 households in Gilgit-Baltistan, Pakistan. *PLoS Glob Public Health*. 2024;4(2):e0002693. <https://doi.org/10.1371/journal.pgph.0002693>
7. Ghosh R, Spindler H, Morgan MC, Cohen SR, Begum N, Gore A, et al. Diagnosis and management of postpartum hemorrhage and intrapartum asphyxia in a quality improvement initiative using nurse-mentoring and simulation in Bihar, India. *PLoS One*. 2019;14(7): e0216654. <https://doi.org/10.1371/journal.pone.0216654>
8. Kurjak A, Stanojevic M, Dudenhausen J. Why maternal mortality in the world remains tragedy in low-income countries and shame for high-income ones: will sustainable development goals (SDG) help? *J Perinat Med*. 2023;51(2):170-81. <https://doi.org/10.1515/jpm-2022-0061>
9. Lawrence ER, Klein TJ, Beyuo TK. Maternal mortality in low and middle-income countries. *Obstet Gynecol Clin North Am*. 2022;49(4):713-33. <https://doi.org/10.1016/j.ogc.2022.07.001>
10. Gallos I, Devall A, Martin J, Middleton L, Beeson L, Galadanci H, et al. Randomized trial of early detection and treatment of postpartum hemorrhage. *N Engl J Med*. 2023;389(1):11-21. doi:10.1056/NEJMoa2303966. <https://doi.org/10.1056/NEJMoa2303966>
11. Oyoo P, Qureshi Z, Osoti A, Mwendu J, Okore J, Mugambi J. Postpartum hemorrhage champions: sustaining gains beyond the E-MOTIVE trial. *J Obstet Gynaecol East Cent Afr*. 2024;36(1). doi:10.59692/jogeca.v36i1.133. <https://doi.org/10.59692/jogeca.v36i1.133>
12. Hamm RF, Wang E, O'Rourke K, Romanos A, Srinivas SK. Institution of a comprehensive postpartum hemorrhage bundle at a large

- academic center does not immediately reduce maternal morbidity. *Am J Perinatol.* 2019;36(1):15-21. <https://doi.org/10.1055/s-0038-1629910>
13. Forbes G, Akter S, Miller S, Galadanci H, Qureshi Z, Fawcus S, et al. Factors influencing postpartum haemorrhage detection and management and the implementation of a new postpartum haemorrhage care bundle (E-MOTIVE) in Kenya, Nigeria, and South Africa. *Implement Sci.* 2023;18(1):1-23. <https://doi.org/10.1186/s13012-022-01253-0>
 14. Bohren MA, Miller S, Mammoliti KM, Galadanci H, Fawcus S, Moran N, et al. Early detection and a treatment bundle strategy for postpartum haemorrhage: a mixed-methods process evaluation. *Lancet Glob Health.* 2025;13(2):e329-44. [https://doi.org/10.1016/S2214-109X\(24\)00454-6](https://doi.org/10.1016/S2214-109X(24)00454-6)
 15. Durocher J, Ononge S. Lessons for future implementation of the E-MOTIVE bundle. *Lancet Glob Health.* 2025;13(2). doi:10.1016/S2214-109X(25)00001-4. [https://doi.org/10.1016/S2214-109X\(25\)00001-4](https://doi.org/10.1016/S2214-109X(25)00001-4)
 16. Mohamed MG, Belal GAE-S, El-Nagar AE. Effect of evidence-based nursing interventions package implementation on maternity nurses' performance regarding postpartum hemorrhage. *Int Egypt J Nurs Sci Res.* 2025;6(2):13-47. <https://doi.org/10.21608/ejnsr.2025.370010.1433>
 17. Mahmoud Radwan NE, Elsayed AM, Attia Ahmed NM. Effect of new care bundle on enhancing nurses' knowledge, practice and self-efficacy regarding primary postpartum hemorrhage. *Assiut Sci Nurs J.* 2024;12(46):390-404. <https://doi.org/10.21608/asnj.2024.316857.1897>
 18. Ratnasiri UDP, Lumbiganon P, Tait J, Haththotuwa R, Gupta K. AFOG recommendation on postpartum hemorrhage care bundle approach to improve adherence to the WHO guidelines. *J Obstet Gynaecol Res.* 2025;51(4). <https://doi.org/10.1111/jog.16288>
 19. Williams EV, Goranitis I, Oppong R, Perry SJ, Devall AJ, Martin JT, et al. A cost-effectiveness analysis of early detection and bundled treatment of postpartum hemorrhage alongside the E-MOTIVE trial. *Nat Med.* 2024;30(8):2343-8. <https://doi.org/10.1038/s41591-024-03069-5>
 20. Nausheen S, Sheikh L, Beeson L, Muhammad S, Devall A, Coomarasamy A. Early detection and treatment of postpartum hemorrhage using the E-MOTIVE intervention: a before-and-after implementation study in Pakistan. *Obstet Gynecol.* 2025;145(6S):44S-5S. <https://doi.org/10.1097/AOG.0000000000005917.053>
 21. Devall AJ, Nausheen S, Muhammad S, Soofi S, Karmaliani R, Lakhani A, et al. Early detection and bundled treatment of postpartum haemorrhage with the E-MOTIVE intervention: a prospective pre-post intervention study in Pakistan. *Lancet Obstet Gynaecol Womens Health.* 2025;0(0):1-8. <https://doi.org/10.1016/j.lanogw.2025.100010>
 22. Singata-Madliki M, Fawcus S, Moran N, Arends E, Muller E, Mandoondo S, et al. Implementing E-MOTIVE for detection and treatment of postpartum haemorrhage in South Africa. *S Afr Med J.* 2023;113(12):1526-30. <https://doi.org/10.7196/SAMJ.2023.v113i12.1164>
 23. Akter S, Forbes G, Miller S, Galadanci H, Qureshi Z, Fawcus S, et al. Detection and management of postpartum haemorrhage: qualitative evidence on healthcare providers' knowledge and practices in Kenya, Nigeria, and South Africa. *Front Glob Womens Health.* 2022;3:1020163. <https://doi.org/10.3389/fgwh.2022.1020163>