

From Visual Estimation to Bundled Care: Previous Postpartum Haemorrhage Practices, Experiences and Perceived Effectiveness of the E-MOTIVE Bundle among Healthcare Providers in Ondo State, Nigeria

Titilayo Joy Amachi-Ayeni

Department of Maternal and Child Health Nursing
Faculty of Nursing Science, Achievers University, Owo, Ondo State, Nigeria

Gbemisola Bolanle Ogbeye

Department of Nursing Science, Federal University Oye-Ekiti

doi: <https://doi.org/10.37745/ijnmh.15/vol12n25972>

Published October 04, 2026

Citation: Amachi-Ayeni T.J. and Ogbeye G.B. (2026) From Visual Estimation to Bundled Care: Previous Postpartum Haemorrhage Practices, Experiences and Perceived Effectiveness of the E-MOTIVE Bundle among Healthcare Providers in Ondo State, Nigeria, *International Journal of Nursing, Midwife and Health Related Cases*, 12(2),59-72

Abstract: *Postpartum haemorrhage (PPH) is a leading cause of maternal death, and Nigeria accounted for 28.7% of global maternal deaths in 2023. The E-MOTIVE bundle, pairing objective blood-loss measurement with standardised first-response treatment, is being scaled up in Ondo State, but evidence on the practices it replaces and on providers' experiences is limited. To describe healthcare providers' previous methods of PPH prevention and management, and to explore their experiences of, and the perceived effectiveness of, the E-MOTIVE bundle in Ondo State. A sequential exploratory mixed-methods study was conducted in nine designated facilities. Key informant interviews with 18 purposively selected doctors, nurses and midwives were analysed thematically using NVivo 11. A structured electronic questionnaire was completed by 208 providers selected by multistage sampling and analysed descriptively. Findings were integrated using a joint display. Before E-MOTIVE, providers reported near-universal active management of the third stage of labour, including uterotonic administration (98.1%), controlled cord traction (99.0%) and uterine massage (96.2%), whereas balloon tamponade (50.5%) and the non-pneumatic anti-shock garment (57.2%) were less used. Interviews revealed reliance on visual estimation of blood loss, repeated sequential uterotonic doses and referral when bleeding persisted. Since adoption, providers described averted maternal deaths and perceived the bundle as effective for accurate blood-loss measurement, earlier detection, reduced need for transfusion and surgery, and improved maternal outcomes. The E-MOTIVE bundle addresses the diagnostic and sequencing gaps of previous practice and is perceived as highly effective. Sustained training, commodity supply and outcome surveillance are needed to confirm these benefits.*

Keywords: postpartum haemorrhage, E-MOTIVE, calibrated drape, maternal mortality, mixed methods, Nigeria

INTRODUCTION

Postpartum haemorrhage (PPH), defined as a loss of 500 mL or more of blood in 24 hours after birth, is one of the most common causes of maternal mortality globally. In 2023, an estimated 260,000 maternal deaths took place worldwide, with PPH responsible for approximately 45,000 of them, and sub-Saharan Africa seeing 70% of all maternal deaths (World Health Organization [WHO] et al., 2025; WHO, 2025). Nigeria has the largest single country share of maternal deaths, accounting for about 75,000 maternal deaths in 2023 which is 28.7% of the global total (WHO et al., 2025). Most PPH deaths happen within a few hours of delivery and are preventable if bleeding is promptly recognised and treated, so the speed and consistency of recognition and treatment is of utmost importance (Ajayi et al., 2025; Akute et al., 2024; Abioye et al., 2024).

Traditionally, PPH prevention and management in the facilities in Nigeria has been based on active management of third stage of labour (AMTSL) followed by sequential, clinician-dependent interventions in the event of bleeding. One of the core problems with this is the diagnosis. Blood loss has been estimated visually in general, which underestimates blood loss and delays treatment until women are haemodynamically compromised. Prior to the E-MOTIVE trial, formative research was carried out with maternity providers in Kenya, Nigeria and South Africa, which revealed that visual estimation was the most common method of detection and treatment was often tried in a step-by-step manner, with each intervention attempted before the next was considered (Akter et al., 2022). In that study, providers also reported having little in-service training on emergency obstetric care and inconsistent knowledge of PPH.

The E-MOTIVE strategy has been developed to fill these gaps. It incorporates two innovations: Early detection of PPH through a calibrated blood-collection drape, and delivery of the MOTIVE bundle of first-response treatments concurrently, instead of sequentially: uterine Massage, Oxytocic drugs, Tranexamic acid, IntraVenous fluids, and Examination of genital tract with Escalation of care if bleeding persists. In a cluster-randomised trial, 210,132 women in 80 hospitals across Kenya, Nigeria, South Africa and Tanzania had a 1.6% to 4.3% reduction in the composite outcome of severe PPH, laparotomy for bleeding or maternal death (Gallos et al., 2023). A mixed methods process evaluation of the trial revealed the drape and bundle were feasible, in use, and health workers were favourable towards them (Bohren et al., 2025). In October 2025, the WHO, the International Federation of Gynecology and Obstetrics and the International Confederation of Midwives (ICM) released consolidated PPH guidelines that incorporated objective diagnostic guidelines, such as treatment for 300 mL blood loss with abnormal clinical signs, and immediate use of the E-MOTIVE bundle upon PPH diagnosis (WHO, 2025).

Based on the trial evidence, the Federal Ministry of Health has approved the national rollout of E-MOTIVE bundle in 2025, starting with 9 designated facilities in Ondo State. Initial feedback from this rollout has reported high acceptability, accessibility and utilisation of the bundle by providers, as well as system-level challenges in implementing the bundle. But two questions that are key to understanding the change have not been discussed. First, what were

the practices before the bundle and what were the areas of weakness? Second, what is the provider's experience of the bundle in everyday practice and what is the provider's assessment of the effectiveness of the bundle? The answers to these questions matter because a new practice is more likely to be sustained when providers can see how the practice is better than what they did before and when they attribute better outcomes to the practice (Forbes et al., 2023). This study therefore set out to describe the past practices of PPH prevention and management in the designated facilities in Ondo State and to gain insight from healthcare providers and their experiences of PPH prevention and management and the perceived effectiveness of the E-MOTIVE bundle.

METHODS

Study Design

This paper reports three objectives of a sequential exploratory mixed-methods study (Creswell & Plano Clark, 2018) that evaluated implementation of the E-MOTIVE bundle in Ondo State. In the qualitative phase, key informant interviews explored providers' previous practices, experiences and perceptions of the bundle. In the quantitative phase, a structured survey measured prior practices across the provider population. Other objectives of the parent study, concerning acceptability, accessibility, utilisation and implementation barriers, are reported elsewhere. Reporting of the qualitative component followed the Consolidated Criteria for Reporting Qualitative Research (Tong et al., 2007).

Setting

The study was undertaken in the nine facilities slated for the first phase of E-MOTIVE rollout in the Ondo Central and Ondo North senatorial districts of Ondo State in the south-west of Nigeria. These included two tertiary hospitals (Federal Medical Centre, Owo and the University of Medical Sciences Teaching Hospital, Akure), two general hospitals (Owo and Idanre) and one comprehensive health centre (Arakale, Akure) and four primary health centres (Oke-Ijebu, Orita Obele and Isolo in Akure and Alade in Idanre). 100% of facilities had been trained in E-MOTIVE and had supplies of calibrated drapes, with support from implementing partners.

Qualitative Phase

Participants were doctors, registered nurses and registered midwives working for a designated facility for at least 2 years in the maternity unit who did not participate in the survey. Two participants were purposively selected from each facility; if there were more than two eligible providers, two were selected randomly. Data saturation was determined after 18 key informant interviews. The first author conducted face-to-face interviews in English with a semi-structured interview guide, which included questions on previous experiences with PPH prevention and management, experiences of implementing and using the E-MOTIVE bundle, and perceived effectiveness of the bundle. Interviews were conducted for 45-90 minutes and were audio recorded with consent.

The recordings were transcribed verbatim and analysed thematically (Braun & Clarke, 2006) using NVivo 11. Initial codes were inductively derived from the transcripts, grouped into categories and subsequently organised into themes and sub-themes according to the objectives

of the study. Member checking with participants by providing them with transcripts and the use of thick description and sampling across all nine facilities supported credibility. An audit trail, reflexive journaling and second author analysis review were used to establish dependability and confirmability. Intra-coder consistency was established by recoding a subsample of transcripts, as only one researcher coded the data.

Quantitative Phase

The survey respondents included 351 doctors, nurses and midwives in maternity and related units of the nine facilities. The sample size was determined using Yamane's formula with an allowable error of 5% and a 10% non-response rate, resulting in a sample of 208 participants who were allocated to facilities according to the number of staff. Eligible providers were registered doctors, nurses or midwives directly involved in intrapartum or postpartum care who consented to participate. The first author and four trained research assistants collected data over four months using a structured electronic questionnaire (Open Data Kit). There were 26 dichotomous (yes/no) items in the section reported here on previous methods of PPH prevention and management: antenatal prevention, AMTSL, community awareness, first-line pharmacological treatment, non-surgical and surgical management. Content validity was done using literature review and supervisor, subject experts and a statistician. Test retest was done to 10% of the sample size at Federal Teaching Hospital, Birnin Kebbi, the second state in Nigeria to adopt the bundle, to assess reliability. Descriptive statistics (frequencies and percentages) were used to analyse the data in SPSS version 32 and Stata 19.

Integration

In line with the sequential exploratory design, qualitative themes were used as the basis for interpreting the data from the surveys, and the two data sets were then integrated at the interpretation stage, using a joint display (Fetters et al., 2013), where the quantitative results and qualitative themes were displayed together and described as confirmation, expansion or discordance for each domain.

Ethical Considerations

Ethical clearance was obtained from the Research Ethics Committees of Achievers University, Owo, Ondo State Ministry of Health and the Federal Medical Centre, Owo and permission was sought from each of the facilities that participated. Information about the study and consent for audio-recording was provided to all participants and informed consent was obtained. Everyone was free to join or leave, and no personal information was collected. Data was kept on a computer which was password protected and only accessible to the research team.

RESULTS

Characteristics of Participants

All 208 survey respondents completed the questionnaire. Most were female (82.2%) and married (68.8%), and their mean age was 34.6 years. Midwives (37.5%) and nurses (36.1%) formed the majority, and 41.8% had five years or less of working experience (Table 1). The 18 key informants had a mean age of 39.17 years; 12 (66.7%) were female and 15 (83.3%) were married. Their working experience ranged from 1 to 25 years, with the largest group (33.3%) having 11 to 15 years, and they practised in Owo (50.0%), Akure (38.9%) and Idanre (11.1%).

Table 1*Socio-demographic characteristics of survey respondents (n = 208)*

Characteristic	Category	n	%
Age group (years)	21–30	82	39.4
	31–40	59	28.4
	>40	67	32.2
Gender	Male	37	17.8
	Female	171	82.2
Marital status	Single	65	31.3
	Married	143	68.8
Religion	Christianity	197	94.7
	Islam	11	5.3
Professional role	Doctor	55	26.4
	Nurse	75	36.1
	Midwife	78	37.5
Working experience (years)	0–5	87	41.8
	6–10	39	18.8
	11–15	31	14.9
	>15	51	24.5
Delivery experience (years)	<5	114	54.8
	5–9	27	13.0
	>9	67	32.2
Perceived PPH caseload	Low	156	75.0
	Medium	48	23.1
	High	4	1.9

Note. Mean age = 34.6 years. PPH = postpartum haemorrhage.

Previous Methods of PPH Prevention and Management

Survey respondents reported near-universal use of standard preventive practices before introduction of the E-MOTIVE bundle (Table 2). Almost all identified risk factors for PPH (99.5%), maintained hydration and nutrition in labour (97.1%) and addressed anaemia early in pregnancy (92.3%), although fewer (89.4%) ensured a haemoglobin concentration of at least 10 g/dL at delivery. Adherence to the components of AMTSL was similarly high, with 98.1% administering a uterotonic, 99.0% performing controlled cord traction and 96.2% performing uterine massage. Nearly all respondents (97.6%) reported first-line pharmacological treatment for PPH.

In contrast, use of second-line non-surgical and surgical measures was markedly lower and more variable. Bimanual uterine compression was reported by 83.2% of respondents, but only 57.2% had used the non-pneumatic anti-shock garment, 50.5% intrauterine balloon tamponade, 46.2% external aortic compression and 40.9% vacuum-induced haemorrhage-control devices.

Among surgical measures, 57.2% reported uterine compression sutures, 51.0% stepwise uterine devascularisation and 46.6% uterine artery ligation.

Table 2

Previous methods used for the prevention and management of postpartum haemorrhage (n = 208)

Domain and practice	Yes, n (%)	No, n (%)
Antenatal and intrapartum prevention		
Addressing anaemia early in pregnancy	192 (92.3)	16 (7.7)
Ensuring haemoglobin ≥ 10 g/dL at delivery	186 (89.4)	22 (10.6)
Maintaining hydration and nutrition during labour	202 (97.1)	6 (2.9)
Identifying risk factors for PPH	207 (99.5)	1 (0.5)
Active management of the third stage of labour		
Administering a uterotonic agent	204 (98.1)	4 (1.9)
Controlled cord traction	206 (99.0)	2 (1.0)
Uterine massage	200 (96.2)	8 (3.8)
Community awareness		
Health education campaigns on PPH	183 (88.0)	25 (12.0)
Campaigns on skilled birth attendance and timely emergency care	194 (93.3)	14 (6.7)
Community education on antenatal care, facility birth and postpartum monitoring	201 (96.6)	7 (3.4)
Other preventive measures		
Laceration repair after delivery	205 (98.6)	3 (1.4)
Routine inspection of the genital tract	197 (94.7)	11 (5.3)
Post-placental uterine massage	203 (97.6)	5 (2.4)
Post-placental prophylactic agent (item worded "tocolytic") ^a	180 (86.5)	28 (13.5)
First-line treatment		
Medication (pharmacological) interventions	203 (97.6)	5 (2.4)
Non-surgical management		
Bimanual uterine compression	173 (83.2)	35 (16.8)
Non-pneumatic anti-shock garment	119 (57.2)	89 (42.8)
Intrauterine balloon tamponade	105 (50.5)	103 (49.5)
Suction cannula for evacuation of blood and clots	106 (51.0)	102 (49.0)
External aortic compression	96 (46.2)	112 (53.8)
Vacuum-induced haemorrhage-control device	85 (40.9)	123 (59.1)
Surgical management		
Uterine compression sutures (B-Lynch)	119 (57.2)	89 (42.8)
Stepwise uterine devascularization	106 (51.0)	102 (49.0)
Uterine artery ligation (O'Leary technique)	97 (46.6)	111 (53.4)

Note. PPH = postpartum haemorrhage. ^aResponses most likely reflect uterotonic use; see Strengths and Limitations.

The interviews added depth to these figures. Three sub-themes described previous practice. The first, reliance on visual estimation and personal judgement, captured providers' descriptions of diagnosing PPH by sight, often with anxiety about the accuracy of their judgement:

If after a delivery PPH occurs, which means blood comes out excessively more than normal, we used to use our eyes and initiative to diagnose and measure blood loss, which was not the proper way to diagnose. We did that with fear and fidgeting. (Female, 48 years, Akure)

Before, we used visual estimation in estimating the blood loss; we just used sight, and even if a patient had bled more than 500 mls, we could just say let me write 100 mls, since there was no standard measurement to know the actual loss. (Female, 40 years, Idanre)

The second sub-theme, sequential and repeated uterotonic treatment, described a stepwise response in which uterotonics were given repeatedly, other causes were addressed one at a time and women were referred when bleeding persisted. Participants also described practical constraints on oxytocin effectiveness where the cold chain could not be maintained:

We used to put IV fluid and put some oxytocin; you can even put two ampoules of oxytocin inside normal saline to make sure the uterus contracts. If there is a tear, we repair, but if after repair there is still bleeding, we refer; that's all we used to do. (Female, 48 years, Akure)

Oxytocin is supposed to be in the cold chamber, and there is poor power supply in our facility most of the time, so it takes up to 20 to 30 minutes before it is effective. We can also administer ergometrine, misoprostol, and then check for a full bladder and tears. (Female, 42 years, Idanre)

The third sub-theme, AMTSL as the core of prevention, confirmed the survey findings that prophylactic uterotonics and controlled cord traction were routine:

Once the woman has delivered, we give parenteral oxytocin, 10 international units intramuscularly or 5 international units intravenously, and then controlled cord traction is done to deliver the placenta, and after that we also placed her on intravenous infusion of oxytocin to encourage myometrial contraction. (Male, 35 years, Owo)

Experiences of Using the E-MOTIVE Bundle

Providers' experiences since the introduction of the bundle were overwhelmingly positive and were expressed largely through success stories: specific cases in which they believed the bundle had prevented severe haemorrhage or death. Several accounts involved women with a history of PPH in previous births who bled little when managed under the bundle, including with heat-stable carbetocin for prevention:

She had a fear of dying because of her past experiences and the extra money she used to pay in her former hospital. When she eventually came to deliver, I had already prepared everything under the E-MOTIVE bundle. She only lost 60 mls of blood and did not need any transfusion. There was a lot of celebration. After that, she started referring other women to our hospital. (Female, 40 years, Akure)

Other accounts described women referred from lower-level or private facilities with heavy bleeding in whom rapid activation of the bundle controlled haemorrhage:

I remember a night when I was on call around 10 p.m., one of those patients was transferred from a primary health care centre in the town, bleeding torrentially, drenched with blood. We instituted E-MOTIVE in less than 10 minutes. The bleeding stopped, and the woman was okay. If not for E-MOTIVE, I'm sure we would have lost that woman. (Male, 41 years, Owo)

These experiences had a professional and social dimension. Providers described a sense of surprise and collective excitement when they first saw the bundle work, growing confidence in managing PPH, and gratitude from women and families that, in some cases, attracted new clients to the facility:

The first time we used it, everybody gathered to come and check. One of them said, "Boss, this HSC is the best." When one of them encountered PPH, she told me that immediately she gave the tranexamic acid, everything was going back gradually, and when she finished giving it in ten minutes, the patient was ready to be transferred as everything had stopped. (Female, 44 years, Idanre)

Perceived Effectiveness of the E-MOTIVE Bundle

Participants consistently described the bundle as effective, and four sub-themes explained why (Table 3). The first was accurate measurement of blood loss. The calibrated drape replaced guesswork with a visible, measurable volume, which providers linked to earlier action and more appropriate treatment and documentation:

With the use of the drape, when we see that the patient is losing blood up to 300 ml, you know the woman is bleeding with a warning sign, so you take action immediately to manage the PPH. (Female, 50 years, Akure)

The second sub-theme was early detection and a standardised response. Providers valued the fixed trigger and the simultaneous delivery of treatments, which they contrasted with previous sequential care:

Unlike when we were making use of a single visual response, we can pick PPH earlier, and we are also able to institute those bundles of care simultaneously at the same time. (Male, 35 years, Owo)
It actually assists us in detecting postpartum haemorrhage faster, and there is a particular line of treatment that everyone follows, not like how we used to guess before. It has a standing order. Once a woman bleeds 350 ml, we already know what to do. (Female, 26 years, Owo)

The third sub-theme was reduced need for blood transfusion, surgery and referral. Participants perceived that earlier and combined treatment prevented progression to severe haemorrhage:

It has reduced our need for transfusing the patient because of anaemia following excess blood loss, or even needing to go to theatre to remove the uterus in recalcitrant bleeding. (Male, 35 years, Owo)

The fourth sub-theme was improved maternal outcomes. Participants attributed fewer maternal deaths and referrals to the bundle and described the satisfaction of seeing mothers and babies discharged well:

Your joy is when your patient delivers safely and you have a healthy mother and a healthy baby, but when you take delivery and you still have to carry a patient to another facility for treatment, you won't know the outcome of the mother's condition. With this new method, we are very happy. (Female, 48 years, Idanre)

Table 3

Qualitative themes and sub-themes (n = 18 key informants)

Theme	Sub-themes
Previous practice	Reliance on visual estimation and personal judgement; sequential and repeated uterotonic treatment with referral when bleeding persisted; AMTSL as the core of prevention
Experiences of using the bundle	Success stories of averted severe haemorrhage and death; growing confidence and collective enthusiasm; gratitude from women and families
Perceived effectiveness	Accurate measurement of blood loss; early detection and a standardised, simultaneous response; reduced need for transfusion, surgery and referral; improved maternal outcomes

Note. AMTSL = active management of the third stage of labour.

Integration of Findings

Table 4 presents the joint display. The survey confirmed the qualitative finding that AMTSL was already routine, while the interviews expanded on the survey by revealing the two gaps that the numbers alone could not show: reliance on visual estimation for diagnosis and a sequential, repeated approach to treatment. The lower reported use of second-line and surgical measures was consistent with participants' descriptions of referral as the default when first-line treatment failed. The perceived effectiveness themes corresponded directly to these gaps, since providers attributed the bundle's benefits to objective measurement and to simultaneous, protocol-driven treatment.

Table 4*Joint display integrating quantitative and qualitative findings*

Domain	Quantitative finding	Qualitative finding	Integration
Prevention and AMTSL	Uterotonic 98.1%, controlled cord traction 99.0%, uterine massage 96.2%	Oxytocin and cord traction routine after every birth	Confirmation
Diagnosis of PPH	Not directly measured in survey	Visual estimation and personal judgement; blood loss often under-recorded	Expansion
Treatment of established PPH	First-line medication 97.6%; second-line and surgical measures 40.9%–57.2%	Repeated uterotonics given in sequence; referral when bleeding persisted	Confirmation and expansion
Perceived effect of bundle	Not measured in this component	Accurate measurement, early detection, simultaneous treatment, fewer transfusions and referrals, better outcomes	Expansion; perceived benefits map onto gaps in previous practice

Note. AMTSL = active management of the third stage of labour; PPH = postpartum haemorrhage.

DISCUSSION

This study sought to understand the process of preventing and managing PPH before the bundle, the experiences and perceptions of healthcare providers after implementing the bundle in the first E-MOTIVE rollout facilities in Nigeria. Three key conclusions were found. First, AMTSL and antenatal prevention were already almost universally practised by providers, so the bundle was introduced in a context where there was a strong foundation for prevention. Second, the main limitations of past practice were not in preventing PPH, but in the recognition and management of established PPH, using visual estimation and a step-wise approach which culminated in referral. Third, providers felt the bundle was very effective because it corrected these weaknesses and they provided specific examples of women who had their haemorrhage controlled.

High adherence to AMTSL is consistent with the long-standing emphasis on uterotonic prophylaxis in Nigerian obstetric care, and is an important starting point, as the bundle is not a replacement for prevention. The use of balloon tamponade, anti-shock garment, external aortic compression and surgery was lower and varied suggesting that experience in managing refractory PPH was inconsistent, as would be expected as primary and secondary facilities usually refer such cases. This distribution helps to cement the importance of the escalation element of the bundle – the clear, time-bound pathway to senior review and referral – and to prevent escalation being left to the individual's discretion.

The most notable qualitative phase discovery was the providers' frankness regarding the inaccuracy and anxiety of visual estimation, as well as the provider's acknowledgements that the actual amount of blood loss had been quite a bit less than the recorded amount. These accounts are similar to the formative research that led to the E-MOTIVE trial, where visual estimation was the most prevalent detection method in Kenya, Nigeria and South Africa, and PPH was often detected late (Akter et al., 2022). They also provide an explanation for the high

level of importance given to the calibrated drape in providers' perceptions of effectiveness. During the process evaluation of the trial, 97% of health workers found the drape to be useful in detecting PPH and they liked using the drape (Bohren et al., 2025). We found that our participants' reference for treatment was 300-350 mL, which aligns with the new WHO guideline for treatment, which is 300 mL plus abnormal clinical signs (WHO, 2025), and indicates that the lower threshold has been adopted in practice during training in the rollout sites.

Providers' difference between former sequential care and the simultaneous care within the bundle is an expression of the essence of the E-MOTIVE strategy. During the trial, the combined delivery of the MOTIVE components following objective detection resulted in a 60% reduction in severe PPH, laparotomy, and death, and an increase in the proportion of PPH detected (51.1% to 93.1%) and treated with the bundle (19.4% to 91.2%) (Gallos et al., 2023). This effect is reflected in the perceived reduction in transfusion and surgery reported here. Tranexamic acid is a new addition to most providers' practice and has been shown to reduce death from bleeding if administered early (WOMAN Trial Collaborators, 2017) and several providers specifically attributed this to rapid control of haemorrhage. Participants also linked better outcomes to the use of heat-stable carbetocin, which requires no cold chain and is found to be non-inferior to oxytocin in preventing PPH (Widmer et al., 2018). This is especially important for facilities where electric power is unstable, which our respondents spoke of first-hand, as this affects the storage of oxytocin.

Providers' success stories should not be overlooked, as they extend beyond the clinical content. The dramatic rescues, the collective excitement when the bundle was first used and the families' gratitude indicate that positive experiences in the early years helped to establish confidence and professional identity around the bundle. Provider beliefs about consequences and confidence in performing the bundle are identified as influences on adoption in implementation research on E-MOTIVE (Forbes et al., 2023). Positive experiences of this kind are therefore likely to encourage ongoing use, and they can be used purposefully, such as via case reviews and peer learning events which share good practice across facilities.

Meanwhile, caution should be used in interpreting the perceived effectiveness reported here. The fact that no maternal deaths or referrals had been reported since adoption was implemented is a reflection of providers' perceptions and not a check against facility records, and positive experiences are more easily remembered than failures. Concurrent inputs to the bundle, including training and supervision and provision of heat stable carbetocin, may also be a factor in some cases of attribution of benefit to the bundle. The evidence in the trial is very promising for the bundle (Gallos et al., 2023); however, there is a need for routine monitoring of PPH incidence, blood loss, transfusion, referral and maternal deaths in rollout facilities to ensure that the benefits providers describe are being realised at scale.

Strengths and Limitations

The study's strengths are that it included all nine rollout facilities (both primary, secondary, and tertiary), it used a combination of population-level survey data and in-depth interviews, and it focused on a time just after national adoption, when providers could vividly compare old and new practice. Some caveats should be added. Previous practice was reported after the fact

and might be subject to recall and social desirability bias, especially in the context of the high adherence reported. One survey question was phrased as having a "tocolytic" agent given after the placenta was delivered, and the responses to that question (86.5%) are most likely related to uterotonic use and should be interpreted with caution. There was no clinical outcomes validation of perceived effectiveness. Interviews were carried out and coded by one researcher only and transferability is restricted to contexts where training and supply support is similar. Lastly, the survey was limited to providers in two out of three senatorial districts, and to providers outside the rollout, which makes generalisability to Ondo South only.

Implications for Practice and Policy

The results have a number of implications. The training for the next stages of rollout should highlight a sharp contrast between visual estimation and calibrated measurement, as providers' understanding of the limitations of their existing practice seems to be a strong driver of adoption. The robust preventive base developed in AMTSL should be continued and the supply of heat-stable carbetocin and tranexamic acid should be ensured, as the benefits providers attribute to these interventions should be sustained, especially in areas with unreliable oxytocin cold chain. Systematic spaces for peer learning and sharing success stories may help to build confidence and learning. Finally, routine monitoring of PPH outcomes should be implemented in facilities and the State Ministry of Health to confirm the effectiveness and inform further scale-up, using the new WHO diagnostic criteria (WHO, 2025).

CONCLUSION

Prior to the E-MOTIVE bundle, almost all healthcare providers in the designated facilities in Ondo State were using the preventive approach and active management of third stage of labour, however, PPH was diagnosed based on visual estimation and treated in sequence with referral for persistent bleeding. Providers found the E-MOTIVE bundle to be very effective, as it takes out the guesswork and measures objectively, and also provides treatment at the same time; they noted benefits such as earlier detection, reduced transfusions and surgery, and improved maternal outcomes. In order to maintain these gains, further training, a steady flow of drapes and medicines, and regular monitoring of outcomes to ensure that the benefits providers see are actually being realised throughout the state and as the bundle is rolled out at a national level will be required.

Declarations

Acknowledgements: The authors thank the healthcare providers who participated in the study and the management of the designated facilities.

Conflict of interest: The authors declare no conflict of interest.

Funding: This study received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

REFERENCES

- Abioye, A.A., Owopetu, C.A., Adamu-Adedipe, F.O., Odesanya, L.O., & Olofin-Samuel, M.A. (2024). Anemia prevention among pregnant women. *International journal of nursing midwife and health related cases*. 10(12), 1-11
<https://doi.org/10.37745/ijnmh.15/vol10n2111>

- Ajayi A.O., Sodiya O.O., Arogundade T.A., Aderibigbe S.C., Olofin-Samuel M.A., Sulyman F., Ogunrinde B.A. (2025) Factors Influencing Anticipatory Self-efficacy of Pregnant Women in Coping with Labour Pain in First Stage of Labour in a Secondary Health Facility in Ogun State, *International Journal of Health and Psychology Research*, 13(1), 31-42 doi: <https://doi.org/10.37745/ijhpr.13/vol13n13142>
- Akter, S., Forbes, G., Miller, S., Galadanci, H., Qureshi, Z., Fawcus, S., Hofmeyr, G. J., Moran, N., Singata-Madliki, M., Amole, T. G., Gwako, G., Osoti, A., Thomas, E., Gallos, I., Mammoliti, K.-M., Coomarasamy, A., Althabe, F., Lorencatto, F., & Bohren, M. A. (2022). Detection and management of postpartum haemorrhage: Qualitative evidence on healthcare providers' knowledge and practices in Kenya, Nigeria, and South Africa. *Frontiers in Global Women's Health*, 3, Article 1020163. <https://doi.org/10.3389/fgwh.2022.1020163>
- Akute, Y.I., Elusoji, C.I., Munge M., Olawale, Y.A., & Olofin-Samuel, M.A. (2024). Collaboration Processes between skilled and traditional birth attendants on maternal and newborn care in Ekiti State. *Journal of Liaoning technical university (natural science edition)*18(4), 189-204 https://www.lgjdxcn.asia/public_article.php?article=284
- Bohren, M. A., Miller, S., Mammoliti, K.-M., Galadanci, H., Fawcus, S., Moran, N., Hofmeyr, G. J., Qureshi, Z., Alwy Al-Beity, F., Forbes, G., Akter, S., Osoti, A., Gwako, G., Melo Santos, T., Evans, C., Wakili, A. A., Bakari, M., Takai, I. U., Umar, M., ... Lorencatto, F. (2025). Early detection and a treatment bundle strategy for postpartum haemorrhage: A mixed-methods process evaluation. *The Lancet Global Health*, 13(2), e329–e344. [https://doi.org/10.1016/S2214-109X\(24\)00454-6](https://doi.org/10.1016/S2214-109X(24)00454-6)
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.
- Fetters, M. D., Curry, L. A., & Creswell, J. W. (2013). Achieving integration in mixed methods designs: Principles and practices. *Health Services Research*, 48(6 Pt 2), 2134–2156. <https://doi.org/10.1111/1475-6773.12117>
- Forbes, G., Akter, S., Miller, S., Galadanci, H., Qureshi, Z., Fawcus, S., Hofmeyr, G. J., Moran, N., Singata-Madliki, M., Dankishiya, F., Gwako, G., Osoti, A., Thomas, E., Gallos, I., Mammoliti, K.-M., Devall, A., Coomarasamy, A., Althabe, F., Atkins, L., ... Lorencatto, F. (2023). 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. *Implementation Science*, 18, Article 1. <https://doi.org/10.1186/s13012-022-01253-0>
- Gallos, I., Devall, A., Martin, J., Middleton, L., Beeson, L., Galadanci, H., Alwy Al-Beity, F., Qureshi, Z., Hofmeyr, G. J., Moran, N., Fawcus, S., Sheikh, L., Gwako, G., Osoti, A., Aswat, A., Mammoliti, K.-M., Sindhu, K. N., Podeseck, M., Horne, I., ... Coomarasamy, A. (2023). Randomized trial of early detection and treatment of postpartum hemorrhage. *New England Journal of Medicine*, 389(1), 11–21. <https://doi.org/10.1056/NEJMoa2303966>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International*

Journal for Quality in Health Care, 19(6), 349–357.
<https://doi.org/10.1093/intqhc/mzm042>

Widmer, M., Piaggio, G., Nguyen, T. M. H., Osoti, A., Owa, O. O., Misra, S., Coomarasamy, A., Abdel-Aleem, H., Mallapur, A. A., Qureshi, Z., Lumbiganon, P., Patel, A. B., Carroli, G., Fawole, B., Goudar, S. S., Pujar, Y. V., Neilson, J., Hofmeyr, G. J., Su, L. L., ... Gülmezoglu, A. M. (2018). Heat-stable carbetocin versus oxytocin to prevent hemorrhage after vaginal birth. *New England Journal of Medicine*, 379(8), 743–752. <https://doi.org/10.1056/NEJMoa1805489>

WOMAN Trial Collaborators. (2017). Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): An international, randomised, double-blind, placebo-controlled trial. *The Lancet*, 389(10084), 2105–2116. [https://doi.org/10.1016/S0140-6736\(17\)30638-4](https://doi.org/10.1016/S0140-6736(17)30638-4)

World Health Organization. (2025). *WHO consolidated guidelines on the prevention, diagnosis and treatment of postpartum haemorrhage*. World Health Organization.

World Health Organization, UNICEF, UNFPA, World Bank Group, & UNDESA/Population Division. (2025). *Trends in maternal mortality 2000 to 2023: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division*. World Health Organization.