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Provider Insights on Health System Bottlenecks in Postpartum Hemorrhage Management in Malawi: A COM-B and CoP-E-MOTIVE Framework Analysis

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ABSTRACT

Background: Postpartum hemorrhage (PPH) remains the leading cause of maternal mortality globally and in Malawi, where it accounts for 20.4% of all maternal deaths. Despite high facility birth rates (91%), quality gaps in early recognition, timely intervention, and adherence to guidelines persist. The PPH Community of Practice (CoP) -E-MOTIVE approach, a bundle of evidence-based interventions supported by behavioural change strategies from the COM-B model, emphasizes capability, opportunity, and motivation for improving PPH outcomes.

Methods: This qualitative study, part of the Advancing Postpartum Hemorrhage Care (APPHC) initiative, explored provider perspectives on PPH management in Malawi. In-depth interviews were conducted with 85 frontline healthcare providers across 25 facilities in four districts. Data were thematically analyzed using the COM-B framework and mapped to E-MOTIVE bundle implementation strategies.

Results: Barriers to effective PPH management included:

- **Capability:** Limited knowledge and skills, lack of self-efficacy, and absence of structured simulation practice.
- **Opportunity:** Stock-outs of essential commodities, poor referral systems, workflow inefficiencies, and inadequate staffing.
- **Motivation:** Low engagement, absence of champions, and fear of blame.

Proposed E-MOTIVE strategies included simulation-based team learning, peer-assisted refresher training, MOTIVE emergency kits, calibrated drapes with trigger lines for early detection, local champions, and actionable feedback loops.

Conclusion: Applying the COM-B lens to PPH care in Malawi reveals that closing the gap between guidelines and practice requires both health system strengthening and targeted behavioural interventions. Embedding the PPH CoP-E-MOTIVE bundles with capacity building, resource facilitation, and motivation-enhancing strategies could reduce PPH-related mortality.

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Introduction

Globally, Postpartum Haemorrhage (PPH) accounts for over a quarter of all maternal deaths and remains the leading cause of maternal mortality in most low-income settings [1]. In Malawi, the maternal mortality ratio is estimated at 381 per 100,000 live births, with PPH contributing to approximately 20.4% of maternal deaths [2,3]. PPH can occur without warning and progress rapidly to death if not recognised and treated promptly. Most PPH-related deaths are preventable with timely, evidence-based interventions delivered by skilled health personnel in adequately resourced facilities.

The 2016 *Lancet Maternal Health Series* highlighted persistent global gaps in maternal care, summarised as "Too Little, Too Late" (TLTL) and "Too Much, Too Soon" (TMTS), and identified lack of dignity and respect during childbirth, delays in early recognition and response to complications, and limited adherence to evidence-based guidelines as major contributors to preventable maternal deaths [4].

Although Malawi has achieved a high facility delivery rate of 91%, postnatal care coverage remains low, with only 42% of women receiving skilled care within 48 hours of birth [5]. The first 24 hours postpartum are particularly critical, as most PPH deaths occur on the day of birth [6]. A review of 121 maternal deaths in one district found that nearly two-thirds occurred in health facilities, with delays in admission and incorrect assessment or treatment frequently implicated [7].

Health system constraints further compromise PPH management. Only 54% of Malawian health facilities are staffed 24 hours a day [3]. Human resource shortages, high workloads, frequent staff rotations, and shortages of essential commodities such as oxytocin, intravenous fluids, blood products, and non-pneumatic anti-shock garments (NASGs) limit the ability of facilities to manage PPH effectively. Poor road infrastructure, transport challenges, and workflow inefficiencies add to these barriers.

To address these challenges, this study employs the COM-B model of behaviour change, operationalised within the PPH CoP-E-MOTIVE bundle approach to explore provider perspectives and identify strategies to improve PPH care in Malawi [8].

Methods

Study Design and Setting

This descriptive qualitative study was conducted within the Advancing Postpartum Hemorrhage Care (APPHC) initiative (Sub-award #SR2001), an implementation science programme aimed at improving facility-based PPH prevention and management and promoting respectful maternity care in Malawi.

Healthcare providers including doctors, clinical officers, nurses, and midwives were purposively selected if they were working in departments providing Emergency Obstetric and Neonatal Care (EmONC) or immediate postnatal care (PNC) services and had managed a case of PPH within the previous 30 days. Participants were drawn from 25 health facilities across Balaka, Dowa, Lilongwe, and Zomba districts, chosen to reflect variation in facility readiness, service coverage, and geographic location.

Data were collected through one-to-one, in-depth interviews using a semi-structured guide. Discussions explored recent experiences with PPH management, perceived barriers, and suggestions for improvement. All interviews were audio-recorded, transcribed verbatim, and translated from Chichewa to English under close supervision to ensure accuracy and consistency.

Ethical approval was obtained from the College of Medicine Research and Ethics Committee (COMREC), Malawi (Protocol #P.10/19/2822). Written informed consent was obtained from all participants. Data were thematically analysed using a coding framework informed by COM-B domains, and findings were mapped to -E-MOTIVE bundle components to identify feasible implementation strategies.

Conceptual Framework

The study was guided by the COM-B model, which posits that behaviour change occurs when individuals have the capability, opportunity, and motivation to act. Capability refers to the knowledge, technical skills, and psychological confidence needed to recognise and manage PPH effectively. Opportunity includes both the physical resources and functional systems, as well as the supportive social environment, that enable providers to apply their skills. Motivation encompasses the internal drive, professional commitment, and reinforcement required to act consistently according to best practice guidelines.

We applied this behavioural framework within the CoP-E-MOTIVE bundle, an evidence-based, WHO-endorsed approach to improving PPH outcomes through early detection and coordinated, rapid response. The CoP-E-MOTIVE strategy integrates simulation-based team learning, peer-assisted refresher training, designation of local champions to model best practice, calibrated drapes for objective blood loss measurement, MOTIVE emergency kits containing all bundle components, and actionable feedback loops to sustain improvements.

Using COM-B as an organising lens allowed us to categorise the barriers described by providers into capability, opportunity, and motivation domains, and to align each with specific CoP-E-MOTIVE strategies that could feasibly be implemented in Malawi to strengthen PPH care.

Findings

Participant Demographics

A total of 85 healthcare providers participated in the study, with the majority working at community hospitals (46%) and health centres (40%). Most were Nurse Midwife Technicians (65%), followed by Registered Nurses/Midwives (29%). The sample was predominantly female (69%), and most participants were aged between 26–35 years (55%). Regarding work experience, 56% had between 0–10 years of service. Additional details are summarized in Table 1.

Table 1: Demographic Data of Participants

	Description	Frequency (n=85)	%
Facility type	Central Hospital	3	4
	District Hospital	9	11
	Community Hospital	39	46
	Health Centre	34	40
Provider Cadre	Obstetric & Gynaecological Officer	1	1
	Registered Nurse/Midwife	25	29
	Nurse Midwife Technician	55	65
	Community Nurse/Midwife	2	2
	Clinical Officer	2	2
Sex	Female	59	69
	Male	25	29
	Not indicated	1	1
Age group	20-25	7	8
	26-30	24	28
	31-35	23	27
	36-40	4	5
	41-45	10	12
	46-50	4	5
	Unknown	13	15
Work Experience	0-5 years	23	27
	6-10 years	25	29

	11-15 year	14	16
	16-20 years	4	5
	21-25	2	2
	Unknown	17	20

Bottlenecks to Postpartum Hemorrhage (PPH) Management: A COM-B Perspective

The findings are presented through the lens of the COM-B behavioural framework, Capability, Opportunity, and Motivation, which provides insight into the barriers faced by healthcare providers in delivering effective PPH care. Each domain is linked to components of the COP-E-MOTIVE bundle that address these behavioural determinants.

Capability: Knowledge, Skills and Confidence Gaps

Healthcare providers identified significant gaps in their capability to manage PPH optimally. Despite availability of some lifesaving tools like the Non-pneumatic Anti-Shock Garment (NASG), providers lacked adequate knowledge and skills to use them confidently. Lack of updated training and limited hands-on practice contributed to low self-efficacy in recognizing and managing PPH cases promptly.

"*If our knowledge isn't being updated and also if we do not get new resources. For example, that dressing (NASG), which you put on women, I do not know it, I forget the name, but I have heard that it is very effective, but we do not have it here and even if we did, we wouldn't know how to use it."* **(Provider IDI, Mayaka Health Centre)**.

"*A challenge that is there is that you might have doubts whether it's actually PPH due to lack of confidence in yourself. Sometimes you might get confused and by the time you are sure it might be too late*." **(Provider IDI, Mayaka Health Centre)**.

Many providers reported that refresher trainings and simulation-based exercises, integral components of the PPH-CoP-E-MOTIVE bundle, were either irregular or missing, limiting their ability to maintain skills and confidence.

Additionally, some providers lacked the capability to perform critical assessments, such as careful examination of the placenta to identify retained membranes, which contributed to delayed or improper management.

"*Improper examination where you remove the placenta without careful examination, and you later find that she's bleeding because of a membrane that was left*." **(Provider IDI, Mayaka Health Centre)**.

Lack of specialist personnel further limited clinical capacity.
"*We don't have a specialist, like [facility], we only have clinical officers; thus, why we refer*." **(Provider IDI, Mtengowamthenga Community Hospital)**.

Opportunity: Physical and Social Environment Barriers
Referral System and Transportation

The physical opportunity to deliver timely PPH care was compromised by multiple system-level challenges in referral and transport. Ambulance availability was limited, drivers were often unavailable or had to be borrowed, and poor road infrastructure. especially during rainy seasons and floods, restricted women's access to facilities.

"*The problem is we don't have our own driver... we use drivers from the mission hospital, so they need to be sent here... in cases that there is no driver, the administrator should look for another person*." **(Provider IDI, Namikango Health Centre)**.

"*During the rainy season, floods and mud prevent women from reaching the hospital; some pay for boats they cannot afford and thus deliver (give birth) at home.*" **(Provider IDI, Matiya Health Centre)**.

Delays caused by these physical barriers led to adverse maternal outcomes.
"*They were referred multiple times, and by the time they arrived, the mother was dead*." **(Provider IDI, Mtengowamthenga Community Hospital)**.

Supply Chain and Infrastructure

Frequent shortages of essential commodities such as oxytocin, misoprostol, intravenous fluids, and blood products limited providers' ability to follow evidence-based protocols. The absence of fully stocked emergency kits, like those recommended in E-MOTIVE, undermined rapid response capacity.

"*…sometimes it happens that we don't have even intravenous fluids, so we must go fetch into other wards to get the fluids and it is an inconvenience.*" **(Provider IDI, Mitundu Community Hospital)**.

"*Sometimes when you don't have instruments or there is a blackout, you cannot do a caesarean section.*" **(Provider IDI, St Luke's Mission Hospital).**

Protective equipment shortages and inadequate maternity unit space further constrained care provision.

"*We need an autoclave for sterilization; sometimes we use a stove.*" **(Provider IDI, Mponela Rural Hospital)**

"*Our maternity unit is too small and staffing shortages are overwhelming.*" **(Provider IDI, Mponela Rural Hospital)**

"*We sometimes use personal materials due to lack of gloves and protective wear*." **(Provider IDI, Mponela Rural Hospital)**

Staffing and Workload

Severe shortages of trained staff across facilities reduced the opportunity for providers to perform their roles effectively. Overlapping duties and lone working during shifts increased the risk of missed or delayed interventions.

"*Sometimes you are alone on duty; you have to examine, document, discharge, and attend to labouring women simultaneously*." **(Provider IDI, Mtengowamthenga Community Hospital)**

"*Here we can be only three providers on duty covering labour, antenatal, and postnatal wards.*" **(Provider IDI, Mitundu Community Hospital)**

These workload pressures reduced the quality and timeliness of care, as well as provider morale.

Motivation: Psychological and Social Influences on Provider Behaviour

Providers' motivation to consistently follow PPH management

guidelines was undermined by fear of blame or reprisals for poor outcomes, lack of leadership or champions to support practice change, and absence of peer encouragement. This social environment limited uptake of new practices and adherence to protocols.

"*Sometimes you fear reprisals if you make mistakes, which affects how you manage emergencies*." **(Provider IDI, St Luke's Mission Hospital)**

CoP-E-MOTIVE strategies that involve introducing local champions and peer-assisted learning aim to build supportive environments and enhance motivation.

"*Introduction of local Mentors (E-MOTIVE champions) who encourage, support, and model bundle use would be very helpful*." **(Provider IDI, Matiya Health Centre)**

Use of calibrated blood loss measurement tools also increased provider confidence and motivation.

Discussion

This study explored provider insights on health system bottlenecks in postpartum hemorrhage (PPH) management in Malawi using the COM-B behavior change model and the COP-E-MOTIVE bundle framework. The findings highlight that despite a relatively high rate of facility-based deliveries, the capability of healthcare providers is limited by skill gaps and lack of confidence; the opportunity to provide timely, quality care is restricted by referral and transport barriers, commodity shortages, and inadequate staffing; and motivation is diminished by fear of negative consequences and absence of leadership support. These barriers map closely onto the COM-B behavioural system and correspond to gaps targeted by the CoP-E-MOTIVE implementation bundle [8].

Capability: Knowledge, Skills and Confidence

The study highlighted significant gaps in healthcare providers' capability, including insufficient skills and knowledge related to PPH management innovations such as the Non-Pneumatic Anti-Shock Garment (NASG). This is consistent with the COM-B model's emphasis that capability encompasses both physical and psychological capacity to engage in the behavior, in this case, the timely and correct management of PPH. Lack of confidence and clinical uncertainty, as reported by providers, reduce their ability to recognize and manage PPH effectively, delaying life-saving interventions [9]. This is further exacerbated by high staff turnover and insufficient ongoing training, which undermine skill retention and competence [10].

The PPH CoP-E-MOTIVE bundle's emphasis on simulation-based team learning and peer-assisted refresher training aligns well with these findings, offering practical strategies to build provider capability through deliberate practice and skill reinforcement [11]. Enhancing provider capability can foster greater adherence to evidence-based PPH guidelines and increase the appropriate use of key interventions like the NASG [12].

Opportunity: System and Environmental Factors

Opportunity barriers in this study predominantly relate to physical and social environment constraints within the health system. Limited ambulance availability, poor transport infrastructure, seasonal flooding, and long distances between facilities all reflect a lack of physical opportunity to deliver timely PPH care. The absence of essential commodities, including uterotonics like oxytocin, intravenous fluids, blood for transfusion, and sterilized equipment, further restrict providers' ability to act effectively [13].

The social environment also hinders optimal care delivery; understaffing and heavy workloads reduce the opportunity for health workers to provide focused, timely interventions [14]. These conditions can lead to burnout and decreased motivation, impacting quality of care. The CoP-E-MOTIVE bundle's strategy of introducing emergency MOTIVE kits containing all PPH bundle components addresses physical opportunity by streamlining access to necessary supplies at the point of care [15]. Similarly, the appointment of local E-MOTIVE champions and fostering peer learning communities create social opportunities that encourage teamwork, communication, and adherence to PPH protocols [16].

Motivation: Behavioral Drivers and Leadership

Motivation emerged as a critical determinant of providers' engagement with PPH management guidelines. Fear of reprisals, lack of buy-in from leadership, and limited awareness or belief in the effectiveness of interventions reduce intrinsic and extrinsic motivation to change behavior [15]. The COM-B model recognizes motivation as encompassing reflective processes (such as beliefs about capabilities and consequences) and automatic processes (such as emotional responses).

Interventions fostering motivation could include introducing actionable data feedback loops to demonstrate impact, recognizing champions who model best practices, and employing motivational tools such as calibrated blood loss measurement drapes to reinforce the urgency and importance of timely intervention [16]. Building leadership support and embedding respectful maternity care principles also sustain motivation by creating an enabling environment where providers feel valued and empowered [17].

Integrating COM-B and CoP-E-MOTIVE for Improved PPH Care

By mapping identified bottlenecks onto the COM-B framework and aligning them with the PPH CoP-E-MOTIVE bundle components, this study demonstrates the importance of a multi-dimensional approach that simultaneously builds capability, enhances opportunity, and fosters motivation. Addressing only one domain is insufficient to change provider behavior or improve outcomes sustainably. Instead, integrated interventions, such as combining skills training (capability), ensuring availability of emergency kits and transport (opportunity), and introducing leadership and feedback mechanisms (motivation), are essential.

This comprehensive approach is supported by global evidence emphasizing that multifaceted, context-adapted strategies are necessary to overcome systemic barriers in low-resource settings and reduce PPH-related morbidity and mortality [18,19].

Conclusion

The persistent high rates of maternal morbidity and mortality due to postpartum hemorrhage in Malawi are driven by interrelated deficits in provider capability, health system opportunity, and motivational factors. Poor functional referral systems, shortages of skilled personnel, and frequent stock-outs of essential PPH commodities represent significant barriers that impede timely and effective care. The COM-B framework and PPH CoP-E-MOTIVE bundle offer an actionable lens to understand and address these bottlenecks by targeting behavioral and systemic change.

For Malawi to accelerate reductions in PPH-related deaths, efforts must prioritize building provider skills through continuous, simulation-based training; strengthening health system

infrastructure to improve physical and social opportunities; and fostering motivation through leadership support, data-driven feedback, and peer mentorship. The introduction of emergency MOTIVE kits, deployment of local champions, and scale-up of innovative tools like the NASG should be integral to national strategies.

Ultimately, a coordinated, behaviorally informed implementation approach that considers the interplay between capability, opportunity, and motivation at individual, facility, and system levels can enhance PPH management and save lives.

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