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[Qualitative Review]

Perceptions and experiences of the prevention, detection, and management of postpartum haemorrhage: a qualitative evidence synthesis

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ABSTRACT

Background

Postpartum haemorrhage (PPH), defined as blood loss of 500 mL or more after childbirth, is the leading cause of maternal mortality worldwide. It is possible to prevent complications of PPH with timely and appropriate detection and management. However, implementing the best methods of PPH prevention, detection and management can be challenging, particularly in low- and middle-income countries.

Objectives

Our overall objective was to explore the perceptions and experiences of women, community members, lay health workers, and skilled healthcare providers who have experience with PPH or with preventing, detecting, and managing PPH, in community or health facility settings.

Search methods

We searched MEDLINE, CINAHL, Scopus, and grey literature on 13 November 2022 with no language restrictions. We then performed reference checking and forward citation searching of the included studies.

Selection criteria

We included qualitative studies and mixed-methods studies with an identifiable qualitative component. We included studies that explored perceptions and experiences of PPH prevention, detection, and management among women, community members, traditional birth attendants, healthcare providers, and managers.

Data collection and analysis

We used three-stage maximum variation sampling to ensure diversity in terms of relevance of the study to the review objectives, richness of data, and coverage of critical contextual elements: setting (region, country income level), perspective (type of participant), and topic (prevention, detection, management). We extracted data using a data extraction form designed for this review. We used thematic synthesis to analyse and synthesise the evidence, and we used the GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative research) approach to assess our confidence in each finding. To identify factors that may influence intervention implementation, we mapped each review finding to the Theoretical Domains Framework (TDF) and the Capability, Motivation, and Opportunity model of Behaviour change (COM-B). We used the Behaviour Change Wheel to explore implications for practice.

Main results

We included 67 studies and sampled 43 studies for our analysis. Most were from low- or middle-income countries (33 studies), and most included the perspectives of women and health workers. We downgraded our confidence in several findings from high confidence to moderate, low, or very-low confidence, mainly due to concerns about how the studies were conducted (methodological limitations) or concerns about missing important perspectives from some types of participants or in some settings (relevance).

In many communities, bleeding during and after childbirth is considered "normal" and necessary to expel "impurities" and restore and cleanse the woman's body after pregnancy and birth (moderate confidence). In some communities, people have misconceptions about causes of PPH or believe that PPH is caused by supernatural powers or evil spirits that punish women for ignoring or disobeying social rules or for past mistakes (high confidence).

For women who give birth at home or in the community, female family members or traditional birth attendants are the first to recognise excess bleeding after birth (high confidence). Family members typically take the decision of whether and when to seek care if PPH is suspected, and these family members are often influenced by trusted traditional birth attendants or community midwives (high confidence). If PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multifaceted and complex (high confidence).

First responders to PPH are not always skilled or trained healthcare providers (high confidence). In health facilities, midwives may consider it easy to implement visual estimation of blood loss with a kidney dish or under-pad, but difficult to accurately interpret the amount of blood loss (very low confidence). Quantifying (rather than estimating) blood loss may be a complex and contentious change of practice for health workers (low confidence). Women who gave birth in health facilities and experienced PPH described it as painful, embarrassing, and traumatic. Partners or other family members also found the experience stressful. While some women were dissatisfied with their level of involvement in decision-making for PPH management, others felt health workers were best placed to make decisions (moderate confidence).

Inconsistent availability of resources (drugs, medical supplies, blood) causes delays in the timely management of PPH (high confidence). There is limited availability of misoprostol in the community owing to stockouts, poor supply systems, and the difficulty of navigating misoprostol procurement for community health workers (moderate confidence). Health workers described working on the maternity ward as stressful and intense due to short staffing, long shifts, and the unpredictability of emergencies. Exhausted and overwhelmed staff may be unable to appropriately monitor all women, particularly when multiple women are giving birth simultaneously or on the floor of the health facility; this could lead to delays in detecting PPH (moderate confidence). Inadequate staffing, high turnover of skilled health workers, and appointment of lower-level cadres of health workers are key challenges to the provision of quality PPH care (high confidence).

Through team-based simulation training, health workers of different cadres (doctors, midwives, lay health workers) can develop a shared mental model to help them work quickly, efficiently, and amicably as a team when managing women with PPH (moderate confidence).

Authors' conclusions

Our findings highlight how improving PPH prevention, detection, and management is underpinned by a complex system of interacting roles and behaviours (community, women, health workers of different types and with different experiences). Multiple individual, sociocultural, and environmental factors influence the decisions and behaviours of women, families, communities, health workers, and managers. It is crucial to consider the broader health and social systems when designing and implementing PPH interventions to change or influence these behaviours. We have developed a set of prompts that may help programme managers, policymakers, researchers, and other key stakeholders to identify and address factors that affect implementation and scale-up of interventions to improve PPH prevention, detection, and management.

PLAIN LANGUAGE SUMMARY

Perceptions and experiences of the prevention, detection and management of postpartum haemorrhage: a qualitative evidence synthesis

What is the aim of this synthesis?

Postpartum haemorrhage (PPH) is when women experience excessive blood loss after birth. PPH is the leading cause of maternal death. The aim of this Cochrane synthesis of qualitative evidence was to explore factors that influence PPH prevention, detection (identifying women with excessive blood loss), and management (treating women with PPH). To answer this question, we searched for and analysed qualitative studies that explored the views and experiences of women, community members, and health workers.

Key messages

Cultural beliefs around postpartum bleeding influence individual and community perspectives on PPH. When women give birth at home or in communities, cultural beliefs lead to delays in seeking care. In health facilities, health workers have difficulty estimating blood loss after birth. Common challenges in managing PPH include insufficient staffing, stressful working conditions, insufficient training, and lack of medication and supplies.

What was studied in this synthesis?

It is possible to prevent complications of PPH with timely detection and initiation of appropriate evidence-based treatments. However, detection and management of PPH can be challenging, especially in low- and middle-income countries. Challenges include unequal access to hospitals and limited access to effective medicines. We sought to collect the views of women and community members on the causes and consequences of PPH, to record the experiences of women who survived PPH, and to discover how PPH is managed in home or community settings. We also sought to understand health workers' views on and experiences with PPH, including perceived barriers to PPH prevention, detection, and management.

What are the main findings of this synthesis?

We sampled 43 studies from 26 countries for our analysis. Most studies were from low- or middle-income countries (33 studies) and included the perspectives of women and health workers. We downgraded our confidence in several findings from high confidence to moderate, low, or very-low confidence, mainly because we had concerns about how the studies were conducted (methodological limitations) or about missing important perspectives from some types of participants or in some settings (relevance).

In many communities, bleeding during and after childbirth is considered "normal" and necessary to expel "impurities" and restore and cleanse the woman's body after pregnancy and birth (moderate confidence). In some communities, people have misconceptions about causes of PPH, including that PPH is caused by supernatural powers or evil spirits that punish women for ignoring or disobeying social rules or for past mistakes (high confidence).

For women who give birth at home or in the community, female family members or traditional birth attendants are the first to recognise excess bleeding after birth (high confidence). Family members typically take the decision of whether and when to seek care if PPH is suspected, and these family members are often influenced by trusted traditional birth attendants or community midwives (high confidence). If PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multi-faceted and complex (high confidence).

First responders to PPH are not always skilled or trained healthcare providers (high confidence). In health facilities, midwives may consider it easy to implement visual estimation of blood loss with a kidney dish or underpad, but difficult to accurately interpret the amount of blood loss (very low confidence). Quantifying (rather than estimating) blood loss may be a complex and contentious change of practice for health workers (low confidence). Women who gave birth in health facilities and experienced PPH described it as painful, embarrassing, and traumatic. Partners or other family members also found the experience stressful. While some women were dissatisfied with their level of involvement in decision-making for PPH management, others felt health workers were best placed to make these decisions (moderate confidence).

Inconsistent availability of resources (drugs, medical supplies, blood) cause delays in the timely management of PPH (high confidence). Health workers described working on the maternity ward as stressful and intense due to short staffing, long shifts, and the unpredictability of emergencies. Exhausted and overwhelmed staff may be unable to appropriately monitor all women, particularly when multiple women are giving birth simultaneously or on the floor of the health facility; this could lead to delays in detecting PPH (moderate confidence). Inadequate staffing, high turnover of skilled health workers, and appointment of lower-level cadres of health workers make it challenging to provide quality PPH care (high confidence).

Through team-based simulation training, health workers of different cadres (doctors, midwives, lay health workers) can develop a shared mental model to help them work quickly, efficiently, and amicably as a team when managing women with PPH (moderate confidence).

How up-to-date is this review?

We searched for studies published before 13 November 2022.

SUMMARY OF FINDINGS

Summary of findings 1. Summary of qualitative findings: community perspectives about bleeding after birth and postpartum haemorrhage

#	Summary of review finding	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
1	**Postpartum bleeding may be considered "normal" and important to purify the woman's body by expelling the "bad blood".** In many communities, bleeding during and after childbirth is considered "normal" and necessary to expel "impurities" and restore and cleanse the woman's body after pregnancy and birth. As a result, community members and women may not identify severe bleeding as dangerous unless it is gushing, or until the woman is unconscious; and women may not always accept medication to limit bleeding after birth.	Aruldas 2017; Durham 2018; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Sharma 2017; Than 2018a	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), minor concerns about relevance (6 lower-MICs and 1 LIC; mostly community perspectives), and moderate concerns about adequacy (8 studies; 3 with moderate to thick data richness and 5 with thin data richness).
2	**Misconceptions and supernatural causes of PPH.** In some communities, people have misconceptions about causes of PPH, including that PPH is caused by supernatural powers or evil spirits that punish women for ignoring or disobeying social rules or for past mistakes. A woman's death from PPH may be perceived as fate or God's will. As a result, community and family members may lack hope about a woman's survival if she experiences PPH, or may limit their attempts to stop bleeding after birth.	Aruldas 2017; Kalim 2009; Nelson 2013; Ononge 2016; Rosales 2017; Sharma 2017	High confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (recruitment, reflexivity, and data analysis), minor concerns about relevance (4 lower-MICs and 2 LICs; mostly community perspectives), and minor concerns about adequacy (6 studies; 3 with moderate to thick data richness and 3 with thin data richness).
3	**Postpartum bleeding is considered abnormal when it is "pouring".** Women and community members reported that PPH can be identified when blood is "pouring" from a woman's vagina during and after childbirth, and the amount of blood loss is greater than the amount typically lost during menstruation.	Bij de Vaate 2002; Durham 2018; Hose 2020; Ononge 2016; Sharma 2017; Than 2018a	Low confidence	We had no or very minor concerns about coherence and methodological limitations (reflexivity and data analysis), moderate concerns about relevance (3 lower-MICs and 2 LICs; mostly community perspectives), and serious concerns about adequacy (6 studies; 4 with moderate to thick data richness and 2 with thin data richness).
4	**Community beliefs about PPH risk factors.** Women and community members reported that physiological risk factors for PPH include grand multiparity (five or more previous	Kaur 2018; Nelson 2013; Ononge 2016; Than 2018a	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (methodology, reflexivity, and data analysis),

	births), retained placenta, prolonged labour, anaemia, contraceptive-induced amenorrhoea (related to beliefs about accumulation of "bad blood"), previous experience of PPH, and giving birth in a health facility where many women experience PPH.		moderate concerns about relevance (3 lower-MICs and 1 LIC; mostly community perspectives), and moderate concerns about adequacy (4 studies; 3 with thin data richness and 1 with thick data richness).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); lower- MIC: lower middle-income country (per World Bank classification); PPH: postpartum haemorrhage; upper-MIC: upper middle-income country (per World Bank Classification).

Summary of findings 2. Summary of qualitative findings: decision-making to seek and access care

#	Summary of review finding	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
5	**Female relatives and traditional birth attendants were first to recognise PPH in the community.** For women who give birth at home or in the community, female family members or traditional birth attendants are the first to recognise excess bleeding after birth, usually by identifying blood clots, the colour of blood ("black colour"), severe bleeding, and other physiological changes such as pale skin, unconsciousness, weakness, or dizziness.	Aruldas 2017; Bell 2014; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Radoff 2013; Rosales 2017; Sharma 2017; Than 2018a	High confidence	We had minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), no or very minor concerns about coherence and relevance (6 lower-MICs and 2 LICs; mostly community perspectives), and minor concerns about adequacy (11 studies; 5 with moderate to thick data richness, 6 with thin data richness).
6	**Complex decision-making and delays to seek care when PPH is suspected.** When women give birth in the community, family members typically take the decision of whether and when to seek care if PPH is suspected. These family members are often influenced by trusted traditional birth attendants or community midwives. Sociocultural factors influence care-seeking decisions, including limited autonomy for women giving birth, negative community perceptions and beliefs about quality of care at health facilities, and structural barriers to accessing care.	Alwy Al-beity 2020; Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017; Than 2018a	High confidence	We had no or very minor concerns about coherence and relevance (8 lower-MICs and 2 LICs; mostly community perspectives), minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), and no or very minor concerns about adequacy (11 studies; 9 with moderate to thick data richness, 2 with thin data richness).
7	**When PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multifaceted and complex.** Once the decision to seek care is made, there can be further delays related to organising and paying for transportation, the need for onward referral to another	Alwy Al-beity 2020; Aruldas 2017; Bell 2014; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017	High confidence	We had no or very minor concerns about coherence and adequacy, and minor concerns about methodological limitations (appropriateness of qualitative methodology, recruitment, reflexivity, and data analysis) and relevance (1 LIC, 6

	health facility, and unclear referral pathways.	lower-MICs; mostly community perspectives).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); lower- MIC: lower middle-income country (per World Bank classification); PPH: postpartum haemorrhage; upper-MIC: upper middle-income country (per World Bank Classification).

Summary of findings 3. Summary of qualitative findings: perceptions and experiences of postpartum haemorrhage prevention, detection, and management

#	Summary of review finding	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
8	**First responders to PPH are not always skilled or trained healthcare providers.** For women giving birth at home or in the community in LMICs, first-line treatment for excessive blood loss includes the traditional birth attendant or community midwife performing abdominal massage, giving the woman strong tea to drink, bathing the woman, encouraging vomiting to expel retained placenta, and providing medicines from a local pharmacy.	Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Nelson 2013; Ononge 2016; Radoff 2013	High confidence	We had no or very minor concerns about coherence, relevance and adequacy, and minor concerns about methodological limitations (recruitment, reflexivity, and data analysis).
9	**Community-based misoprostol distribution.** Community members are often unaware that misoprostol can be used for PPH prevention; however, women, community members, and health workers consider misoprostol an acceptable option for PPH management, particularly in settings where women give birth at home or where there are delays in seeking care. Some community members are concerned that community-based distribution of misoprostol for PPH has unintended consequences, such as the use of misoprostol for abortion, labour augmentation, or discouraging women from giving birth in a health facility.	Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Hobday 2020; Hose 2020; Koski 2014; Than 2017	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis) and adequacy (9 studies with thick data richness), and moderate concerns about relevance (1 LIC and 5 lower-MICs; healthcare provider and community perspectives).
10	**Visual estimation of blood loss and physiological detection of PPH.** In health facilities, midwives may consider it easy to implement visual estimation of blood loss with a kidney dish or under-pad, but difficult to accurately interpret the amount of blood loss, as there is substantial variation in blood loss estimation. Not all facility settings have clinical protocols or guidelines for measuring blood loss; therefore, midwives often detect blood loss by physiological assessment (e.g. blood pressure, pulse, appearance), which they consider easy	Begley 2012; Rosmaria 2019	Very low confidence	We had no or very minor concerns about coherence, moderate concerns about methodological limitations (data collection, reflexivity, and data analysis), moderate concerns about relevance (2 HICs and 1 lower-MIC; mostly midwives' perspectives) and serious concerns about adequacy (2 studies with moderate to thick data richness).

	to implement. Some health workers believe that clinical signs are more important than the amount of blood lost for detecting PPH; however, they do not feel confident diagnosing women with PPH based solely on physiological signs.			
11	**Challenges with introducing quantification of blood loss.** Quantifying (rather than estimating) blood loss is a complex and contentious change of practice for some health workers. Health workers struggle with changes to the workflow and find it difficult to accurately measure blood loss with under-buttocks drapes or by weighing blood-soaked materials.	Lyndon 2016a; Seacrist 2018	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC; healthcare providers' perspectives) and adequacy (2 studies with moderate to thick data richness).
12	**Acceptability and awareness of uterotonics for PPH prevention and management.** Most health workers are aware of the benefits of uterotonics for PPH prevention and management, particularly oxytocin (the "intervention of choice"), which is routinely given to women after birth for PPH prevention. Some health workers are aware that giving ergometrine too early might impede delivery of the placenta.	Deepak 2013; Koski 2014; Natarajan 2015; Rosmaria 2019; Schack 2014; Than 2017	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and moderate concerns about relevance (5 lower-MICs; both community and healthcare providers' perspectives) and adequacy (6 studies; 2 with thick data richness and 4 with thin data richness).
13	**Uterine massage for PPH prevention and management.** Midwives may be primarily responsible for performing uterine massage for PPH prevention. However, consistent application of uterine massage for PPH prevention is influenced by the midwives' availability and workload, and the practice is prioritised for women with the highest risk factors for uterine atony.	Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about relevance (3 lower-MICs and 1 LIC; healthcare providers' perspectives) and serious concerns about adequacy (4 studies; 1 with moderate to thick data richness and 3 with thin data richness).
14	**Acceptability and use of NASG.** Health workers may consider the NASG an effective and a life-saving solution for PPH management at the community level and during referral. However, not all health workers are aware of how to use or remove NASGs.	Bekele 2020; Berdichevsky 2010; Jordan 2016	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity) and relevance (1 upper-MIC, 3 lower-MICs, and 1 LIC; healthcare providers' perspectives), and serious concerns about adequacy (3 studies with thick data richness).

15	**Acceptability and availability of UBT.** Health workers and community members may consider the UBT a low-cost, life-saving device for managing refractory PPH. Health workers and community members view it as acceptable owing to its ease of use and the availability of necessary supplies to make it (condom, catheter, syringes), even in resource-constrained settings.	Natarajan 2015; Natarajan 2016a; Nelson 2013	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and moderate concerns about relevance (2 lower-MICs and 1 LIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness, 1 with thin data richness).
16	**Women's experiences of PPH management at health facilities.** Women who gave birth in health facilities and experienced PPH described it as painful, embarrassing, and traumatic. Partners and other family members also found the experience stressful. While some women were dissatisfied with their level of involvement in decision-making for PPH management, others felt health workers knew more about PPH management so were best placed to make these decisions. However, women who had hysterectomies for severe PPH strongly believed that rich discussion and informed consent was needed before the procedure, in view of the lasting physical and emotional consequences.	de la Cruz 2013; Dunning 2016; Elmir 2012a; Robertson 2017; Snowdon 2012	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis) and adequacy (5 studies; 4 with moderate to thick data richness and 1 with thin data richness), and serious concerns about relevance (4 HICs; women's and partners' perspectives).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); lower- MIC: lower middle-income country (per World Bank classification); NASG: non-pneumatic anti-shock garment; PPH: postpartum haemorrhage; UBT: uterine balloon tamponade; upper-MIC: upper middle-income country (per World Bank Classification).

Summary of findings 4. Summary of qualitative findings: system-level factors

#	Summary of review finding	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
17	**Limited availability of misoprostol.** There is limited availability of misoprostol in the community owing to stock-outs, poor supply systems, and the difficulty of navigating misoprostol procurement for community health workers. Community health workers and traditional birth attendants believe that endorsement from national stakeholders, robust distribution guidelines, and training for community health workers would improve the sustainability of misoprostol supply in the community.	Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Than 2017	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis) and adequacy (6 studies with moderate to thick data richness), and moderate concerns about relevance (1 LIC and 4 lower-MICs; community and healthcare providers' perspectives).

18	**Cold chain and quality of uterotonics.** Reliability and availability of cold storage for oxytocin may be a key barrier to consistent and quality use of the drug for PPH prevention and management.	Deepak 2013; Koski 2014; Than 2018a	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), serious concerns about relevance (3 lower-MICs; healthcare providers' perspectives), and moderate concerns about adequacy (3 studies with moderate to thick data richness).
19	**Availability of drugs and supplies.** Inconsistent availability of resources (drugs, medical supplies, blood) cause delays in the timely management of PPH. Availability is further exacerbated by procurement challenges, such as poor communication and inefficient technical capacity within facilities to internally allocate supplies.	Akhter 2016; Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017	High confidence	We had no or very minor concerns about coherence and methodological limitations, and minor concerns about relevance (10 countries: 1 HIC, 1 upper-MIC, 5 lower-MICs, 3 LICs) and adequacy (11 studies; 7 with thick data richness, 4 with thin data richness).
20	**Stressful working conditions.** Health workers describe working on the maternity ward as stressful and intense due to short staffing, long shifts, and the unpredictability of emergencies. Exhausted and overwhelmed staff may be unable to appropriately monitor all women, particularly when multiple women are giving birth simultaneously or on the floor of the health facility; this could lead to delays in detecting PPH. As a result, health workers feel dissatisfied and unappreciated, and in some settings fear blame when poor outcomes occur.	Alwy Al-beity 2020; Egenberg 2017a; Schack 2014; Seacrist 2018	Moderate confidence	We had no or very minor concerns about coherence and methodological limitations, serious concerns about relevance (2 lower-MICs and 1 HIC; healthcare providers' perspectives) and minor concerns about adequacy (4 studies with moderate to thick data richness).
21	**Health workforce challenges.** Inadequate staffing, high turnover of skilled health workers, and appointment of lower-level cadres of health workers are key barriers to the provision of quality PPH care, particularly in facilities in rural areas. Health managers reported that many health workers do not have adequate or appropriate skills, even after attending in-service training. Continuous mentoring, coaching, and training is considered necessary to improve this situation.	Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017; Woiski 2015	High confidence	We had no or very minor concerns about coherence, and minor concerns about methodological limitations (reflexivity and data analysis), relevance (3 LICs, 4 lower-MICs, 1 upper-MIC, and 2 HICs; healthcare providers' perspectives), and adequacy (11 studies; 7 with thick data richness and 4 with thin data richness).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); lower- MIC: lower middle-income country (per World Bank classification); PPH: postpartum haemorrhage; upper-MIC: upper middle-income country (per World Bank Classification).

Summary of findings 5. Summary of qualitative findings: intervention implementation strategies and lessons learnt

#	Summary of review finding	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
22	**Teamwork and leadership.** Good leaders and supervisors work "hand in hand" with health workers and help inspire good performance and teamwork as they lead by example. In well-functioning teams, when health workers call for help during a PPH, people immediately organise and work together as a team until the woman is safely managed or referred. Working as a team is highly valued and considered necessary for providing appropriate PPH care and for ensuring health workers feel duty bound to see PPH emergencies through.	Alwy Al-beity 2020; Woiski 2015	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 lower-MIC and 1 HIC; healthcare providers' perspectives) and adequacy (2 studies; 1 with thick data richness and 1 with thin data richness).
23	**Team-based, multidisciplinary simulation training.** Through team-based simulation training, health workers of different cadres (doctors, midwives, lay health workers) can develop a shared mental model to help them to work quickly, efficiently, and amicably as a team to manage women with PPH. Team-based multidisciplinary training may help to challenge existing hierarchical relationships, improve confidence, clarify roles and task management, reduce stress, improve provision of woman-centred care and communication, and encourage health workers to "rehearse, repeat and reinforce" their knowledge.	Egenberg 2017a; Vamos 2017; Woiski 2015	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about relevance (1 lower-MIC and 2 HICs; healthcare providers' perspectives), and serious concerns about adequacy (3 studies; 1 with thick data richness and 2 with thin data richness).
24	**Reflective learning and debriefing.** Debriefing, for example by having a "huddle" after an emergency or at the end of the shift, may help health workers discuss and reflect on what happened, what could be improved, how people are feeling, and the different roles that each person plays and could play in the future when managing a woman with PPH. While debriefing and reflective learning are mostly valued and considered useful by health workers, it can be challenging to consistently implement these strategies after every PPH and sustain them over time, owing to competing demands or staff resistance to the introduction of a new concept.	Egenberg 2017a; Lyndon 2016a; Seacrist 2018; Vamos 2017	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), serious concerns about relevance (1 lower-MIC and 1 HIC; healthcare providers' perspectives), and moderate concerns about adequacy (4 studies; 1 with thick data richness and 3 with thin data richness).
25	**Factors affecting success of champions.** People who assume the role of champion voluntarily seem more enthusiastic	Jordan 2016; Lyndon 2016a;	Moderate confidence	We had no or very minor concerns about coherence, minor concerns

	and more likely to achieve successful implementation in their context compared to people assigned the role of champion. Champions who are given protected time for project implementation within their other work responsibilities may be more likely to sustain success than champions who balance implementation and clinical responsibilities without dedicated time.	Seacrist 2018; Vamos 2017		about methodological limitations (reflexivity and data analysis), and moderate concerns about relevance (1 LIC, 3 lower-MICs, and 1 HIC; healthcare providers' perspectives) and adequacy (4 studies with thick data richness).
26	**Local organisational culture.** Local organisational culture in each facility influences implementation, and existing cultures of safety, quality improvement, evidence-based practice, and change management facilitate success, as facilities have high readiness to engage in PPH initiatives. When faced with resistance, successful facilities focus on the anticipated benefits of implementation as a motivator, believing that changes to practice will become easier with time ("then it stuck" mentality) and that perseverance is critical. In contrast, facilities with less experience in quality improvement find it difficult to continually change practice, and facilities with strong interprofessional hierarchies often delay changes to practice or are unable to obtain consensus or foster a positive learning environment.	Lyndon 2016a; Seacrist 2018; Vamos 2017	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about adequacy (3 studies with moderate to thick data richness), and serious concerns about relevance (1 HIC; healthcare providers' perspectives).
27	**Multidisciplinary collaboration and buy-in.** Implementation of PPH strategies requires multidisciplinary collaboration and buy-in, which could be challenging to co-ordinate but is critical to successful implementation. Collaborating across disciplines (e.g. midwifery, obstetrics) to develop a shared vision of care for women with PPH and streamline processes may require project leaders to appreciate different perspectives and goals of different departments and cadres.	Lyndon 2016a; Seacrist 2018; Vamos 2017	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness and 1 with thin data richness).
28	**Complex data collection and high workloads.** The complexity and time-intensiveness of data collection and high workloads may represent persistent barriers to implementation. Data collection on blood loss, health outcomes, and treatment require different data sources, and cross-departmental collaboration may be necessary to identify treatments. Onerous data collection systems coupled with existing high workloads in some cases discourage health workers from participating in PPH initiatives altogether.	Lyndon 2016a; Seacrist 2018; Vamos 2017	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness and 1 with thin data richness).

29	**Regular and clear communication.** Regular and clear communication and expectations about workflow and responsibilities may be critical to implementation success. Communication styles could be tailored to be responsive to leadership and cultural styles, and include both active communication methods (scheduled meetings, debriefings after PPH, educational meeting, informal discussions) and passive communication methods (flyers, announcements, emails). Less communication and openness may lead to challenges, particularly around problem-solving.	Egenberg 2017a; Lyndon 2016a; Vamos 2017	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC and 1 lower-MIC; healthcare providers' perspectives) and adequacy (3 studies; 1 with moderately thick data richness and 2 with thin data richness).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); lower- MIC: lower middle-income country (per World Bank classification); PPH: postpartum haemorrhage; upper-MIC: upper middle-income country (per World Bank Classification).

BACKGROUND

Postpartum haemorrhage (PPH) is the leading cause of maternal mortality worldwide, and almost all PPH deaths occur in low- and middle-income countries (LMICs; UNICEF 2019). PPH is defined as blood loss of 500 mL or more within 24 hours after birth (WHO 2012), and is a medical emergency that requires immediate intervention to save a woman's life (WHO 2012). Timely and appropriate detection and rapid implementation of evidence-based interventions are essential for effective management of PPH (WHO 2018a).

Since 2012, the World Health Organization (WHO) has published recommendations on prevention and management of PPH (WHO 2012), updating evidence on the use of tranexamic acid (WHO 2017), uterotonics (WHO 2018a), umbilical oxytocin treatment of retained placenta (WHO 2020a), antenatal distribution of misoprostol and routes of oxytocin administration (WHO 2020b), and uterine balloon tamponade (UBT; WHO 2021).

Women in LMICs may be at highest risk of PPH complications due to inequalities in accessing quality care, high prevalence of anaemia, unavailability of skilled birth attendants, limited access to effective uterotonic drugs, lack of co-ordination among healthcare providers during treatment procedures, and delays in implementing PPH detection and management strategies (Finlayson 2019; Nair 2016; Parks 2019; Rath 2012; Sheldon 2014). Although women in high-income countries may have better access to quality childbirth care, including PPH prevention and management, these women and their families may still have difficulty accessing information about PPH prevention and management due to communication gaps with their healthcare providers or lack of accessible communication materials (Snowdon 2012).

Although there is increased attention on the clinical prevention of PPH, it is unclear how the perceptions and experiences of key stakeholders (such as women, family, community members, and healthcare providers) impact PPH detection and management in different settings. Qualitative research can contribute to this understanding and help inform policy and practice, including the development of relevant, acceptable, feasible, and effective implementation strategies to support uptake and use of effective interventions for timely and appropriate detection and management of PPH. Furthermore, even where PPH prevention interventions are well implemented, some women will still experience PPH. As nearly one-quarter (22%) of women who give birth worldwide do so outside a health facility setting, substantial efforts are needed to address PPH both in home and community settings, as well as in health facility settings (UNICEF 2023). Moreover, the detection and management of PPH involves multiple actions (i.e. behaviours) performed by different stakeholders, including women, community members, and healthcare providers. These actions are influenced by a complex set of interacting contextual factors at the individual, sociocultural, and environmental level. Individual factors include knowledge, motivation, and perceived consequences; sociocultural factors include social norms, identity, and culture; and environmental factors include available resources, accessibility, and infrastructure (French 2012; Steinmo 2015). Therefore, identifying factors that affect the prevention, early detection, and management of PPH would provide valuable evidence to inform the design of strategies to address PPH.

Description of the topic

The phenomena of interest in this review are perceptions and experiences of PPH – including PPH prevention, detection, and management – among women, community members, and healthcare providers. To improve maternal health outcomes, all women giving birth need access to evidence-based practices for PPH prevention, detection, and management, as well as access to functional referral systems when higher-level care is required. Healthcare providers who attend births must be prepared to respond to postpartum bleeding quickly, which means physical resources, medicines, and equipment must be readily available. Care providers should focus on the needs of the woman and her family, ensuring effective communication, respect, and emotional support, even when complications arise (Koblinsky 2016; Lalonde 2019; Tunçalp 2012).

PPH mortality and morbidity overwhelmingly affect LMICs, where many women give birth at home or in the community without skilled healthcare providers (UNICEF 2023). This is particularly the case in low-income countries, where women may only attend facilities in the event of complications (Bohren 2014; Tunçalp 2015). If a woman experiences PPH while giving birth at home, traditional birth attendants or a family or community member may be the first responders. In settings where women give birth in health facilities, healthcare providers are primarily responsible for the prevention, detection, and management of PPH. However, critical challenges also exist in health facility settings.

Strategies for preventing, detecting, and managing PPH

WHO recommends that all women giving birth should be offered uterotonics during the third stage of labour to prevent PPH (WHO 2012; WHO 2018a). Intramuscular (IM) or intravenous (IV) oxytocin (10 IU) is the recommended uterotonic, and where oxytocin is unavailable or quality cannot be assured, WHO recommends other injectable uterotonics (carbetocin, ergometrine/methylergometrine, or oxytocin and ergometrine fixed-dose combination) or oral misoprostol (WHO 2018a). Prevention may also include readiness to manage PPH in women with certain risk factors (e.g. anaemia, multiple gestation, or multiparity; WHO 2012; WHO 2018a).

However, most women with PPH have no identifiable risk factors (Hancock 2015; Vogel 2019). Therefore, careful monitoring of cumulative blood loss throughout the third stage of labour and immediate postpartum period is crucial for early detection of PPH (Evensen 2017; Sheldon 2014). The most common practice is a visual subjective estimate of blood loss by the birth attendant (Hancock 2015). Other methods involve directly collecting and measuring the blood by funnelling it into a collection bag, bin, or calibrated drape (Diaz 2018), or weighing blood-soaked pads, mats, sponges, and clots (Evensen 2017; Sheldon 2014). A Cochrane Review of methods for blood loss estimation after vaginal birth found insufficient evidence to support the use of any single method over any other for estimating blood loss during vaginal birth, and did not recognise any method as reliable (Diaz 2018). Since the publication of Diaz 2018, a large multi-country cluster-randomised trial of early detection and first-response management of PPH at vaginal birth showed that real-time blood loss measurement using calibrated blood collection drapes improved PPH detection rate (51% in the control clusters versus 93% in the intervention clusters; Gallos 2023).

PPH management strategies focus on administration of effective uterotonics (oxytocin or misoprostol) and early administration of tranexamic acid, IV fluids, and uterine massage after delivery of the placenta (Althabe 2019; WHO 2012). Although there are effective methods to detect and manage PPH, implementation of these measures is variable, particularly in LMICs.

How PPH might affect women

Common symptoms of PPH include heavy vaginal bleeding, fast heart rate (tachycardia), low blood pressure, blurred vision, chills, and feeling faint. When left untreated, PPH can quickly lead to shock, organ dysfunction, and even death (WHO 2018a). This qualitative evidence synthesis (QES) uses the structure proposed by the three-delays model to conceptualise a woman's experience with PPH, based on the assumption that women give birth either in a home/community setting or in a health facility (Thaddeus 1994). The model identifies the following three main delays in women receiving appropriate care during childbirth (Thaddeus 1994).

- Deciding to seek care
- Identifying and reaching a health facility
- Rapidly receiving adequate and appropriate quality care

Socioeconomic status, knowledge of complications, cultural values around health and mortality, perceived value of women in society, geographical proximity, transportation options, and health systems factors (supplies, personnel, training, organisation) can all influence these delays (Bohren 2014; Thaddeus 1994). We explored how factors across each of these domains influence women's perceptions and experiences of PPH and care received during PPH.

How this review might inform what is already known in this area

Finlayson 2019 is a published QES of women's and healthcare providers' perspectives and experiences of interventions for PPH prevention. We aim to compliment Finlayson 2019 by focusing on the perceptions and experiences of PPH, and the continuum of care related to PPH prevention, detection, and management.

Analyses from hospitals in Nigeria, Tanzania, and Kenya have reported low real-world PPH detection rates (2.2% in Nigeria, 2.5% in Tanzania, and 1.8% in Kenya), in comparison with actual PPH rates when more accurate methods of PPH detection are used (Alwy Al-beity 2019; Sotunsa 2019). These rates suggest that across LMICs, most women with PPH do not receive essential life-saving treatment (Widmer 2018). This QES will help to clarify what factors influence both low rates of PPH detection and subsequent management.

Although the burden of PPH is higher in LMIC settings, we included studies from any country, to identify lessons learnt in different environments. Additionally, PPH may occur at home, in community settings, or in health facilities, as well as during emergency referrals from the community to a health facility, or from a lower-level to a higher-level health facility. All potential pathways leading to PPH prevention, detection, and management were of interest in this QES.

The determinants of behaviour associated with PPH prevention, detection, and management can be understood by using theoretical behaviour change frameworks. Two such behaviour change frameworks are the COM-B model, which recognises Capability, Opportunity, and Motivation as prerequisites to change in Behaviour (Michie 2011); and the Theoretical Domains Framework (TDF), a more granular version of the COM-B model (Atkins 2017). Researchers can combine these two models to identify influences (e.g. barriers and facilitators) of PPH prevention, detection, and management, then use the Behaviour Change Wheel (BCW; an intervention development tool) to select interventions that specifically target these influences (Atkins 2017). This type of theory-informed intervention development can help to unpack potential mechanisms of change (i.e. how and in what context interventions are likely to be effective) and help support effective implementation of interventions (Atkins 2017). This QES used the TDF, the COM-B model, and the BCW to understand which determinants of behaviour around PPH need to change – in community and health facility settings – for behaviour change interventions to be effective.

Why is it important to do this review?

While there are effective strategies to detect and manage PPH, these strategies may not be well implemented, particularly in LMICs. Women's personal preferences and values influence their decision to access facility-based childbirth services (Downe 2018; WHO 2018b). Therefore, it is important to understand women's perceptions and experiences of PPH and assess how individual and community-level factors may influence the prevention, detection, and management of PPH. Furthermore, healthcare providers, as key stakeholders in PPH prevention, detection, and management, are likely to offer valuable insights into the challenges they face and the factors that influence care provision. This QES aimed to synthesise valuable evidence to help researchers and policymakers identify critical gaps in the implementation of evidence-based PPH recommendations in different contexts.

The findings of this QES can support decision-making within PPH policy development and programmes regarding effective strategies to increase and sustain individual- and community-level uptake of interventions for PPH prevention, detection, and management. Given the persisting high rates of PPH, a QES can provide a more nuanced understanding of the factors affecting successful implementation of strategies, as well as the acceptability and feasibility of different interventions. A QES could also aid understanding of the relative importance to women, families, and communities of health and well-being outcomes related to PPH and PPH prevention and management (such as potential drawbacks of different treatment options) across different contexts. This type of evidence is important for the "values" domain of Evidence-to-Decision frameworks used in guideline development (Alonso-Coello 2016). Given the scope of this QES, the evidence synthesised can be used for future WHO PPH guideline development and updates.

OBJECTIVES

Our overall objective was to explore the perceptions and experiences of women, community members, lay health workers, and skilled healthcare providers who have experience with PPH or with preventing, detecting, and managing PPH, in community or health facility settings.

Our specific objectives were as follows.

- To synthesise qualitative studies exploring the understanding of PPH and perceptions regarding the causes and consequences of PPH among women, community members, lay health workers, healthcare providers, and other key stakeholders.
- To develop a conceptual understanding of a woman's journey of surviving PPH, including her experiences, values, and challenges.
- To identify how lay health workers prevent, detect, and manage PPH at home or in community settings, or during transfer or referral to health facilities.
- To synthesise the factors affecting the implementation of different PPH prevention, detection, and management interventions, including perceptions, experiences, values, acceptability, and feasibility, in health facility settings.

METHODS

To prepare this QES, we used the Cochrane Effective Practice and Organisation of Care (EPOC) Template for Qualitative Evidence Synthesis (Glenton 2022).

Criteria for considering studies for this review

Types of studies

We included primary studies that used a qualitative study design (e.g. ethnography, phenomenology, case study, grounded theory study, and qualitative process evaluations). We included studies that used qualitative methods for data collection (e.g. interviews, focus group discussions, observations) and data analysis (e.g. thematic analysis, grounded theory, framework analysis). We excluded studies that used qualitative methods for data collection but did not perform a qualitative analysis (e.g. open-ended survey questions where responses are analysed using descriptive statistics only). We included mixed-methods studies where extraction of qualitative findings resulting from qualitative methods was possible. We included both published and unpublished studies, and we applied no language restrictions. We included studies regardless of whether they were conducted alongside studies of the effectiveness of PPH prevention, detection, or management interventions. We did not exclude studies based on our assessment of methodological limitations; we used this information about methodological limitations to assess our confidence in the review findings. We excluded any conference abstracts without a corresponding full paper, as they were unlikely to provide sufficiently rich qualitative data.

Topic of interest

The phenomenon of interest in this review was PPH and interventions for PPH prevention, detection, and management, as follows.

- Women's perceptions and experiences of PPH, or community members' or traditional birth attendants' experiences of supporting women with PPH
- Healthcare providers' perceptions and experiences of caring for women with PPH
- All methods of PPH prevention, detection, and management, as well as prevention, detection, and management as summary principles (e.g. to understand systems factors related to prevention, detection, and management in general). Specifically, we included the following strategies (Althabe 2019).
  - Prevention methods: oxytocics or other uterotonic drugs
  - Detection methods: calibrated drape, non-calibrated blood collectors, Kelly's pad with basin, standardised cloth mat, Q-Mat (International Centre for Diarrhoeal Disease Research [icddr,b], Bangladesh), Microlife Cradle VSA, modified obstetric early warning system (MOEWS), and visual estimation
  - Management methods: uterine tonus assessment, uterine massage, bimanual uterine compression, oxytocic or other uterotonic drugs, tranexamic acid, IV fluids, examination of the genital tract, manual removal of placenta, external aortic compression, non-pneumatic anti-shock garment (NASG), UBT, referral to higher-level care (higher-level facility or high-dependency care), blood transfusion, and definitive surgical treatment (laparotomy for hysterectomy, compression sutures, or artery ligation)

We included studies that used training or simulation for detecting or managing PPH if the studies linked the training back to clinical practice (e.g. Egenberg 2017a). We excluded studies that reported an evaluation of training methods only, without considering the influence of training on clinical practice (e.g. Amod 2019).

Types of participants

We included the following types of participants.

- Women who had experienced PPH
- Family members or partners of women or other community members who had supported a woman with PPH
- Lay health workers or other community-level traditional carers (e.g. religious leaders or traditional birth attendants) who had supported women during childbirth in the home or community setting, or during a referral to a health facility
- All cadres of skilled healthcare providers and health managers in both community settings (e.g. auxiliary nurse-midwives, community health workers) and facility settings (e.g. doctors, nurses, midwives, head of department, matron-in-charge) who were involved in providing maternity services

Settings

We included studies conducted in any country and any setting, including home, community, and health facility settings (hospitals, health clinics, health centres with maternity services, community clinics).

Search methods for the identification of studies

Electronic searches

We searched Epistemonikos (www.epistemonikos.org) for related reviews to identify eligible studies for inclusion, as well as the following electronic databases.

- MEDLINE
- CINAHL
- Scopus

We developed search strategies for each database, with no search limits on language or publication date (Appendix 1). We searched all databases from inception to the date of search (30 June 2020; search updated on 13 November 2022), using a methodological filter for qualitative studies (Wagner 2020).

Searching other resources

In addition to database searching, we reviewed the reference lists of all included studies and other key references (e.g. references identified in Finlayson 2019). We also conducted a forward citation search for all included studies on Google Scholar. We contacted the authors of included studies to clarify published information and to seek unpublished data. We contacted researchers with expertise relevant to the review topic to request studies that might meet our inclusion criteria.

Grey literature

We searched the following sources to identify studies not indexed in the databases listed above (31 July 2020).

- OpenGrey (www.opengrey.eu)
- Grey Literature Report (www.greylit.org)
- BASE (www.base-search.net/Search/Advanced)
- Eldis (www.eldis.org)

Selection of studies

We collated all titles and abstracts identified from different database searches into EndNote and removed duplicates. At least two review authors (of SA, GF, MVC, FL, SM, and MAB) independently assessed all titles and abstracts of the identified studies to evaluate eligibility using Covidence. We retrieved the full text of all studies identified as potentially relevant by one or more review authors. At least two review authors (of SA, MVC, SM, and MAB) then independently assessed each full text for eligibility. We resolved disagreements by discussion or, when required, by involving a third review author. Where any of the review authors were also authors of identified studies, they did not assess these studies for inclusion. We contacted the study authors for further information to determine study eligibility, where appropriate.

We provided reasons for excluding ineligible articles at full-text review stage in the Characteristics of excluded studies table. Where the same study, using the same sample and methods, was presented in different reports, we collated these reports so that each study (rather than each report) was the unit of interest in our review. We created a PRISMA flow diagram to show our search results and the process of screening and selecting studies for inclusion (Figure 1).

Figure 1. PRISMA flow diagram.

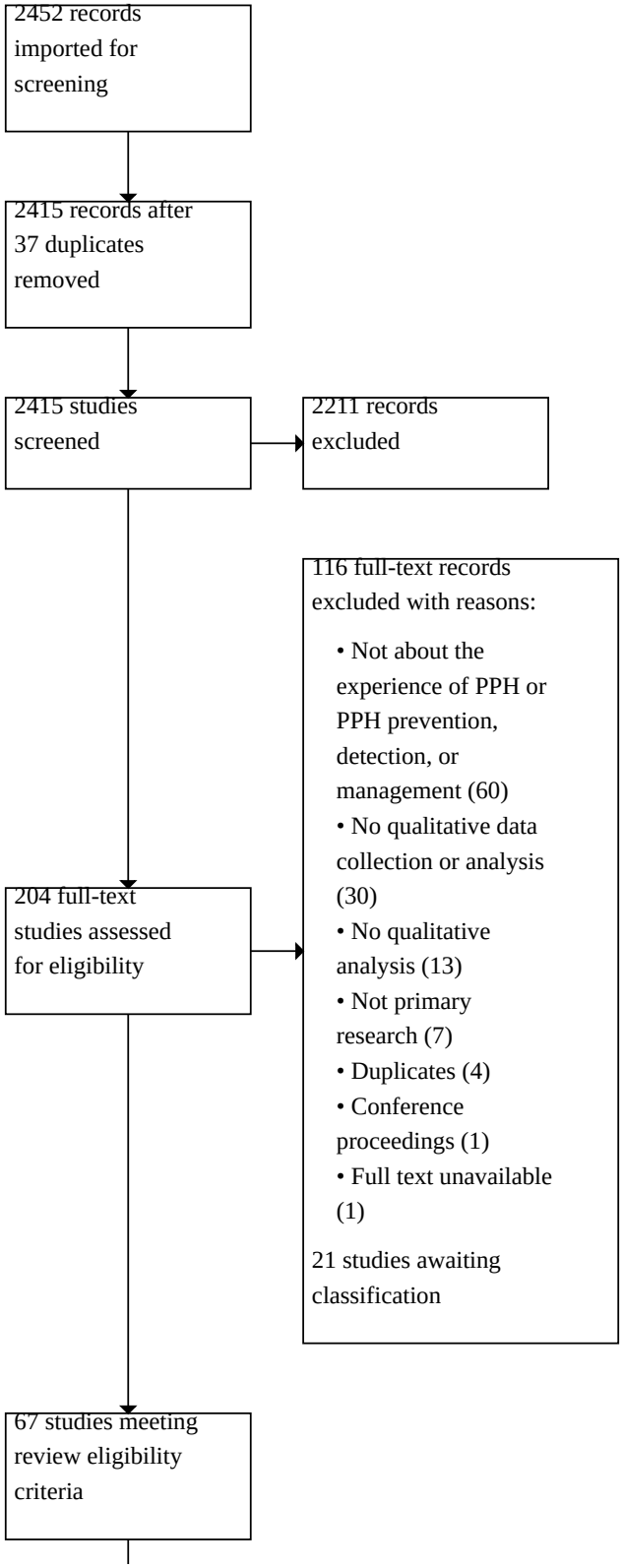
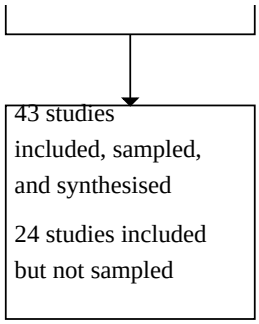


Figure 1. (Continued)



Language translation

For titles and abstracts published in languages that no members of the review team were proficient in (languages other than Bangla, English, French, Greek, Italian, Portuguese, and Spanish), we carried out an initial translation through open-source software (Google Translate). If this translation had indicated inclusion, or if the translation was inadequate to make a decision, we would have retrieved the full text of the paper and asked members of Cochrane networks and other networks who were proficient in that language to assist us in assessing the full text for inclusion. However, no titles or abstracts published in languages other than English were considered potentially relevant, so further stages of translation were unnecessary.

Sampling of studies

QES aims for variation in concepts and depth of understanding of emergent themes, rather than an exhaustive sample, as the quality of the analysis can be compromised by large amounts of study data (number of studies, data richness). Therefore, since 67 studies were eligible for inclusion from the initial search, we decided to sample from the eligible studies. We used maximum variation purposive sampling to allow for the broadest possible variation across the included studies (Suri 2011). We decided on three sampling criteria that would enable us to capture rich data from all settings to best answer the objectives of our review, and we used these criteria to create our three-stage sampling frame. We used an additive approach to sampling, meaning we started with no included studies and added studies at each stage of the sampling frame. First, we assessed the included studies that most closely matched our review objectives, as we considered these studies to be most likely to provide useful data. At this stage, we sampled 32 studies. Next, we used a simple 1–5 scale developed by Ames 2019 for assessing richness of data, with 1 representing very few or thin qualitative data (e.g. from an open-ended survey question), 3 representing a typical qualitative article in a peer-reviewed health services journal, and 5 representing very rich data (e.g. from an ethnographic study). Two review authors (SA, MAB) assessed data richness, resolving any discrepancies by discussion until reaching consensus. We sampled all papers that scored 4 or 5 for data richness to maximise the richness of the data contributing to our analysis, and added 11 studies at this stage, for a total of 43 sampled studies across stages 1 and 2. We then extracted simple descriptive data to map these 43 sampled studies across the following domains.

- Setting: most PPH-related morbidity and mortality occurs in LMICs, specifically in sub-Saharan Africa and Southeast Asia, and any sampling strategy must reflect this aspect of context. At this stage, 33/43 studies were from LMICs (six from low-income countries, 25 from lower-middle-income countries, two from upper-middle-income countries), 16/43 studies were from the African region, and 11/43 studies were from the Southeast Asia region.
- Perspective: as the review questions covered PPH across several different trajectories (home birth, home birth with referral to facility, facility birth, facility birth with referral to higher facility), we considered it important to include a range of perspectives: women, families, other community members, traditional birth attendants, community health workers, health workers (nurses, midwives, doctors), and policy-makers. At this stage, 17/43 studies included the perspectives of women, 21/43 studies included community members, 29/43 studies included health workers, 8/43 studies included health managers, and 12/43 studies included policy-makers and other stakeholders (these were not mutually exclusive categories, as many studies included multiple perspectives).
- Topic: 15/43 studies addressed PPH prevention, 11/43 studies addressed PPH detection, and 21/43 studies addressed PPH management (these were not mutually exclusive categories, as many studies included multiple topics).

We found that the 43 sampled studies from stages 1 and 2 of the sampling frame had very good coverage of each critical domain (PPH prevention, PPH detection, PPH management). Had this not been the case, we would have continued with the additive sampling approach to improve the coverage of setting, perspective, and topic outlined above. Our review findings are based on these 43 sampled studies. See Characteristics of included studies for an explanation of why the remaining studies were not sampled.

Data extraction

We used a form designed specifically for this review to extract data. Two review authors (SA, MAB) independently piloted the form on five randomly selected studies for accuracy and completeness. They made some minor amendments when discussing the results before finalising the form. We extracted data on the study authors, country, study setting (e.g. community level, health facility level), sample characteristics, objectives, guiding framework (if any), study design, data collection and analysis methods, qualitative themes, qualitative findings, supporting quotations, conclusions,

and any relevant tables, figures, or images (Glenton 2020). SA and MAB extracted data from all 43 sampled studies.

Assessing the methodological limitations of included studies

Two review authors (of SA, GF, and MVC) independently assessed the methodological limitations of the included studies using an adapted version of the Critical Appraisal Skills Programme (CASP) tool (casp-uk.net). We resolved disagreements through discussion or by involving a third review author where necessary (MAB). We assessed methodological limitations according to the following domains: aims, methodology, design, recruitment, data collection, data analysis, reflexivity, ethical considerations, and presentation of results. We did not exclude studies based on our assessment of methodological limitations, but the results informed part of the GRADE-CERQual assessment. Appendix 2 summarises the methodological limitations of the 43 sampled studies.

Data management, analysis, and synthesis

We used a two-stage synthesis approach. First, we undertook a thematic synthesis as described by Thomas 2008 to synthesise the qualitative evidence. Thematic synthesis is a useful approach for analysing qualitative evidence to investigate people's perspectives and experiences, acceptability, feasibility, and factors influencing implementation (Thomas 2008). Before carrying out this rigorous analysis, we read the texts several times to familiarise ourselves with and immerse ourselves in the data. We conducted the synthesis in three steps: free line-by-line coding of the key findings of primary studies; development of descriptive themes; and generation of analytical themes and interpretations to generate further ideas, explanations, and hypotheses (Thomas 2008).

One review author (SA) identified articles that were highly relevant to the review question and used these articles as the basis for generating a free code list using NVivo12 (QSR International). To develop a comprehensive codebook, we explored whether and how well the codes could be translated from one study to another by testing with another three relevant studies; in this way, we identified and included new codes as necessary. Coding outputs were run for each code family related to PPH (prevention, detection, management, and implementation strategies). Two review authors (SA and MAB) independently read all the articles, reviewed coding outputs to identify similarities and differences between codes, then adjusted any new codes that emerged during the analysis process. The same two review authors then developed summary statements for each text unit in the coding outputs. The summary statements are short summaries of the text on a per-study basis. Lastly, the same two review authors developed summary findings to synthesise the key findings across multiple studies. These summary findings are presented in five summary of qualitative findings tables, organised according to overarching topics (Summary of findings 1; Summary of findings 2; Summary of findings 3; Summary of findings 4; Summary of findings 5).

We mapped the findings onto the three frameworks that guided our analysis: three-delays (Thaddeus 1994), TDF (Atkins 2017), and COM-B (Michie 2011). We used the three-delays model to examine which delays may lead to negative outcomes following PPH: delays in deciding to seek care, delays in reaching an appropriate health facility, or delays in receiving prompt, adequate care (Thaddeus 1994). The three-delays framework is a useful conceptualisation to understand the different responsibilities and bottlenecks that occur across individual, household, community, and health system levels that can lead to poor maternal health outcomes. We used the TDF and COM-B framework to identify factors influencing the prevention, detection, and management of PPH (Cane 2012). The TDF is an integrative and validated theory-informed framework for understanding implementation of evidence-based practice and factors influencing behaviour change across 14 domains representing individual, sociocultural, and environmental barriers and enablers to behaviour change and implementation (e.g. knowledge, beliefs about capabilities, beliefs about consequences, goals, intentions, social/profession role and identity, environmental context, and resources; Atkins 2017; Cane 2012). Several primary qualitative and survey studies have used the TDF to explore barriers and enablers to a range of clinical practice behaviours (Francis 2012), and more recently to aid evidence synthesis (Graham-Rowe 2018). COM-B recognises how Capability, Opportunity, and Motivation interact to generate Behaviours (Michie 2011). Capability refers to an individual's psychological and physical capacity to engage with an activity, motivation refers to the brain processes that energise and direct behaviour, and opportunity refers to the factors outside the individual that make a behaviour possible (Michie 2011).

Lastly, we mapped the TDF and COM-B influences to the BCW to identify intervention types (i.e. training, modelling, persuasion) most likely to target these influences (Table 1). The BCW is a tool to describe, design, and evaluate behaviour change strategies.

All review authors discussed the draft thematic synthesis and framework mapping when developing and finalising the analytical constructs. These regular meetings of the review team enabled critical discussion and interrogation of the data, which was crucial to ensure the findings were trustworthy, coherent, and relevant.

Assessing our confidence in the review findings

Three review authors (SA, MVC, MAB) used the GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative research) approach to assess our confidence in each finding (Lewin 2018). GRADE-CERQual assesses confidence in the evidence based on the following four key components.

- Methodological limitations of included studies: the extent to which there were concerns about the design or conduct of the primary studies that contributed evidence to an individual review finding (Munthe-Kaas 2018)
- Coherence of the review finding: an assessment of how clear and cogent the fit was between the data from the primary studies and a review finding that synthesised those data. By cogent, we mean well-supported or compelling (Colvin 2018)
- Adequacy of the data contributing to a review finding: an overall determination of the degree of richness and quantity of data supporting a review finding (Glenton 2018)
- Relevance of the included studies to the review question: the extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question (Noyes 2018)

After assessing each of the four components individually, three review authors (SA, MVC, MAB) then made a judgement about the overall confidence in the evidence supporting each review

finding. We judged confidence as high, moderate, low, or very low, and the final assessment was based on consensus. All findings started as high confidence, but many were downgraded for important concerns regarding one or more of the GRADE-CERQual components.

Summary of qualitative findings tables and evidence profiles

We presented summaries of the findings and our assessments of confidence in these findings in the summary of qualitative findings tables (Summary of findings 1; Summary of findings 2; Summary of findings 3; Summary of findings 4; Summary of findings 5). The GRADE-CERQual Evidence Profile presents detailed descriptions of the confidence assessments (Appendix 3).

Integrating the review findings with Cochrane intervention reviews

This QES was conducted as a single, independent review. We explored how to link this QES with related Cochrane intervention reviews that focused on the effectiveness of uterotonics, uterine massage, and active management of the third stage of labour (Abedi 2016; Gallos 2018; Hofmeyr 2013a; Hofmeyr 2013b; Oladapo 2020; Salati 2019; Smith 2020; Soltani 2011; Tunçalp 2012; Yaju 2013). Appendix 4 presents the key findings from these intervention reviews. The findings from this QES may help to explain and contextualise the intervention review findings, identify hypotheses for future subgroup analyses, and facilitate the implementation of the interventions evaluated in these intervention reviews.

Review author reflexivity

We maintained a reflexive stance throughout the stages of the review process, from study selection to data synthesis. The review author team represents diverse, international academic and professional backgrounds (medical anthropology, social and behavioural sciences, public health, midwifery, nursing, and obstetrics) with a range of research focus areas, expertise, and countries of origin and work experience. We were mindful that the perspectives of the review authors might influence our data collection, analyses, and interpretation process. Our differing perspectives could be related to our subject expertise; professional backgrounds; knowledge about PPH prevention, detection, and management; and other associated factors. As a diverse, interdisciplinary team, we challenged and critiqued our preconceived assumptions through reflective dialogues, and we supported each other to understand how these assumptions influenced the analysis or interpretation of findings. We believe that the diversity in our team helped us to critique and challenge our biases, and to develop review findings that were inclusive of and responsive to clinical practice and implementation research. The team regularly discussed the progress of the review and critically explored all decisions, based on our collective and individual experiences (as clinicians, academics, and researchers).

RESULTS

Results of the search

Our searches returned 2452 records. After removing 37 duplicates, we screened the titles/abstracts of the 2415 remaining records. We excluded 2211 records that we considered to be clearly irrelevant, and retrieved the full-text articles of the remaining 204 records. During the full-text review, we excluded 116 articles for different reasons (see Characteristics of excluded studies table). We identified 67 studies that met our inclusion criteria (see the Characteristics of included studies table). Of these 67 studies, we sampled 43 for inclusion in the analysis (see Appendix 5). During the search update conducted in November 2022, we identified an additional 21 studies, which we listed as awaiting classification (see Characteristics of studies awaiting classification table). Figure 1 illustrates the study selection process in a PRISMA flow diagram.

Description of studies

Study settings

Seven of the sampled studies were set in low-income countries: Ethiopia (Bekele 2020), the Gambia (Bij de Vaate 2002), Mozambique (Hobday 2018; Hobday 2020), Sierra Leone (Natarajan 2016a), South Sudan (Nelson 2013), and Uganda (Ononge 2016). One multicountry study was conducted in both low- and lower-middle-income countries: Ethiopia, India, Nigeria, and Zimbabwe (Jordan 2016). Twenty-three of the sampled studies were from lower-middle income countries: Bangladesh (Akhter 2016; Bell 2014; Kalim 2009), Ghana (Koski 2014; Schack 2014), Guatemala (Garcia 2012; Radoff 2013), India (Aruldas 2017; Deepak 2013; Kaur 2018), Indonesia (Rosales 2017; Rosmaria 2019), Kenya (Natarajan 2015), Lao People's Democratic Republic (Lao PDR; Durham 2016; Durham 2018; Hose 2020), Myanmar (Than 2017; Than 2018a), Nigeria (Cannon 2017; Sharma 2017), and Tanzania (Adegoke 2020; Alwy Al-beity 2020; Egenberg 2017a). Two of the sampled studies were conducted in upper-middle-income countries: Kosovo (Moore 2016) and Mexico (Berdichevsky 2010). Ten of the sampled studies were from high-income countries: Australia (Elmir 2012a), Canada (Robertson 2017), Netherlands (Woiski 2015), the UK (Dunning 2016; Snowdon 2012), the USA (de la Cruz 2013; Lyndon 2016a; Seacrist 2018; Vamos 2017), and Ireland and New Zealand (Begley 2012).

Sixteen studies were conducted in Africa (Adegoke 2020; Alwy Al-beity 2020; Bekele 2020; Bij de Vaate 2002; Cannon 2017; Egenberg 2017a; Hobday 2018; Hobday 2020; Jordan 2016; Koski 2014; Natarajan 2015; Natarajan 2016a; Nelson 2013; Ononge 2016; Schack 2014; Sharma 2017), 11 in South-East Asia (Akhter 2016; Aruldas 2017; Bell 2014; Deepak 2013; Jordan 2016; Kalim 2009; Kaur 2018; Rosales 2017; Rosmaria 2019; Than 2017; Than 2018a), five in Europe (Begley 2012; Dunning 2016; Moore 2016; Snowdon 2012; Woiski 2015), five in the Western Pacific (Begley 2012; Durham 2016; Durham 2018; Elmir 2012a; Hose 2020), and nine in the Americas (Berdichevsky 2010; de la Cruz 2013; Garcia 2012; Lyndon 2016a; Moore 2016; Radoff 2013; Robertson 2017; Seacrist 2018; Vamos 2017).

Eleven of the sampled studies were conducted in community settings (Aruldas 2017; Bell 2014; Bij de Vaate 2002; Hobday 2018; Hobday 2020; Hose 2020; Kalim 2009; Ononge 2016; Sharma 2017; Snowdon 2012; Woiski 2015), 23 in health facility settings (Adegoke 2020; Akhter 2016; Alwy Al-beity 2020; Begley 2012; Bekele 2020; Berdichevsky 2010; de la Cruz 2013; Dunning 2016; Durham 2016; Egenberg 2017a; Elmir 2012a; Garcia 2012; Jordan 2016; Lyndon 2016a; Moore 2016; Natarajan 2015; Natarajan 2016a; Radoff 2013; Robertson 2017; Rosmaria 2019; Schack 2014; Seacrist 2018; Vamos 2017), and nine in both community and health facility settings (Cannon 2017; Deepak 2013; Durham 2018; Kaur 2018; Koski 2014; Nelson 2013; Rosales 2017; Than 2017; Than 2018a).

Study participants

The sampled studies included different participant perspectives. Seventeen studies presented the experiences of women who had recently given birth or experienced PPH (Aruldas 2017; Cannon 2017; Deepak 2013; de la Cruz 2013; Dunning 2016; Durham 2018; Elmir 2012a; Hobday 2020; Kalim 2009; Koski 2014; Ononge 2016; Robertson 2017; Rosales 2017; Snowdon 2012; Than 2017; Than 2018a; Woiski 2015). Fifteen studies explored perspectives of family members, partners/husbands, or other community members (Akhter 2016; Aruldas 2017; Cannon 2017; Deepak 2013; Dunning 2016; Durham 2018; Hose 2020; Kalim 2009; Kaur 2018; Koski 2014; Nelson 2013; Rosales 2017; Sharma 2017; Snowdon 2012; Than 2017). Fifteen studies included the perspectives of lay health workers or other community-level traditional carers (Bell 2014; Bij de Vaate 2002; Deepak 2013; Durham 2018; Garcia 2012; Hobday 2018; Hobday 2020; Hose 2020; Kalim 2009; Koski 2014; Nelson 2013; Ononge 2016; Radoff 2013; Sharma 2017; Than 2017). Twenty-seven studies explored the experiences of skilled healthcare providers or health managers from either the community (auxiliary nurse-midwives, community health workers) or health facility settings (midwives, doctors, nurses) who were involved in providing maternity services (Adegoke 2020; Akhter 2016; Alwy Al-beity 2020; Begley 2012; Bekele 2020; Bell 2014; Berdichevsky 2010; Bij de Vaate 2002; Deepak 2013; Durham 2016; Egenberg 2017a; Hobday 2020; Koski 2014; Lyndon 2016a; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Radoff 2013; Rosales 2017; Rosmaria 2019; Schack 2014; Seacrist 2018; Than 2017; Than 2018a; Vamos 2017; Woiski 2015). Four studies explore the perspectives of policy-makers (Durham 2018; Hobday 2020; Moore 2016; Than 2017). Three studies explored the perspectives of licenced or unlicensed pharmacists (Cannon 2017; Deepak 2013; Hobday 2020). Two studies explored the perspectives of licenced or unlicensed blood brokers (Akhter 2016; Vamos 2017). Seven studies explored the perspectives of non-governmental organisation staff or programme managers (Bell 2014; Durham 2018; Jordan 2016; Moore 2016; Seacrist 2018; Than 2017; Than 2018a).

Methodological limitations of sampled studies

Appendix 2 presents the methodological limitations of the sampled studies. All 43 sampled studies were published in peer-reviewed journals, which may have imposed word limits that are not well suited to comprehensive qualitative research. All studies had at least a brief description of the context, research design, participants, sampling, data collection, and analysis. There was generally poor or no reporting of researcher reflexivity, particularly regarding interactions between researchers and participants. For example, some sampled studies used data collectors with clinical backgrounds to interview participants who were community health workers or community members, and did not discuss how the positionality of the researcher may have influenced the participant responses or how potential social desirability bias was accounted for.

Confidence in the review findings

Of 29 review findings, we used the GRADE-CERQual approach to grade seven review findings as high confidence, nine as moderate confidence, eight as low confidence, and five as very low confidence (Summary of findings 1; Summary of findings 2; Summary of findings 3; Summary of findings 4; Summary of findings 5). The Evidence Profile in Appendix 3 provides explanations for each GRADE-CERQual assessment.

Our concerns regarding confidence in the review findings were mainly related to methodological limitations, relevance, and adequacy of the data. We had minor concerns (22 findings) or moderate concerns (1 finding) related to methodological limitations, typically because of poor reporting of participant recruitment procedures, lack of researcher reflexivity, and incomplete reporting of data analysis. Most studies (33/43) focused on PPH prevention and management in LMICs and included the perspectives of women, community members, and health workers. The studies from high-income countries typically focused on healthcare providers' perspectives, with few studies including women's perspectives. This raised some concerns about relevance, due to a somewhat limited range of participants and country contexts. When assessing adequacy of data (richness), we had some concerns due to thin or moderately thin data supporting the review findings.

Review findings

We developed the following five overarching themes.

- Community perspectives on bleeding after birth and PPH: findings related to cultural beliefs about postpartum bleeding
- Decision-making to seek and access care: findings related to how women and families make decisions to seek care and the journey to reach that care
- Perceptions and experiences of PPH prevention, detection, and management: findings across the spectrum of PPH prevention, detection, and management in health facility environments, from the perspectives of healthcare providers, women, and community members
- System-level factors: the broader health system challenges and opportunities that influence PPH prevention and management
- Intervention implementation strategies and lessons learnt: factors (e.g. barriers and facilitators) that may influence implementation of interventions to improve PPH prevention, detection, or management

Table 1 presents each finding with TDF and COM-B model mapping, and potential behaviour change interventions, based on the Behaviour Change Wheel. At the end of the results section, we bring together the descriptive qualitative review findings with the TDF and COM-B models of behaviour change to identify how different factors may influence the implementation of interventions to improve PPH prevention, detection, and management; and we propose potential behaviour change interventions to target these factors.

Community perspectives on bleeding after birth and postpartum haemorrhage

Eleven studies explored women's and community members' perspectives on bleeding after birth and PPH in LMICs (Aruldas 2017; Bij de Vaate 2002; Durham 2018; Hose 2020; Kalim 2009; Kaur 2018; Nelson 2013; Ononge 2016; Rosales 2017; Sharma 2017; Than 2018a). Our first four findings relate to cultural beliefs about postpartum bleeding (postpartum bleeding is "normal"; "bad blood" must clear out from the body to restore "purity"), including cultural norms and practices related to heavy postpartum bleeding, particularly during home birth. Bleeding after birth was often seen as having supernatural causes rather than medical causes. Community misconceptions about severe bleeding after birth and limited ability to detect excess blood loss delayed PPH

detection for women who gave birth outside health facilities. For a summary of qualitative findings 1 to 4, see Summary of findings 1.

Finding 1. Postpartum bleeding may be considered "normal" and important to purify the woman's body by expelling the "bad blood" (moderate confidence). In many communities, bleeding during and after childbirth is considered "normal" and necessary to expel "impurities" and restore and cleanse the woman's body after pregnancy and birth. As a result, community members and women may not identify severe bleeding as dangerous unless it is gushing, or until the woman is unconscious; and women may not always accept medication to limit bleeding after birth (Aruldas 2017; Durham 2018; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Sharma 2017; Than 2018a).

One woman in Uganda explained why bleeding after childbirth was desirable: "*Personally, I can't swallow those tablets that stop bleeding because I want the blood to come out. The blood that flows after childbirth is bad blood because for the whole pregnancy you are not menstruating, and this is a long period*" (Ononge 2016).

In Lao PDR, traditional birth attendants used traditional approaches to help women remove "bad blood" and cleanse the woman's uterus after birth; these approaches included applying boiled banana leaves or warm towels for abdominal compression. In Lao PDR and Uganda, some women and community member considered that not bleeding "enough" after birth or stopping bleeding after birth "too soon" (e.g. by using uterotonics) was harmful owing to the accumulation of "bad blood" (Durham 2018; Hose 2020; Ononge 2016).

Finding 2. Misconceptions and supernatural causes of PPH (high confidence). In some communities, people have misconceptions about causes of PPH, including that PPH is caused by supernatural powers or evil spirits that punish women for ignoring or disobeying social rules or for past mistakes. A woman's death from PPH may be perceived as fate or God's will. As a result, community and family members may lack hope about a woman's survival if she experiences PPH, or may limit their attempts to stop bleeding after birth (Aruldas 2017; Kalim 2009; Nelson 2013; Ononge 2016; Rosales 2017; Sharma 2017).

In these LMIC settings (Bangladesh, India, Indonesia, Lao PDR, Nigeria, South Sudan, Uganda), if a pregnant or postpartum woman started bleeding, and it could not be controlled with medication, or no medications were available or considered useful, community members may have turned to traditional medicine for treatment, while attempting to ascertain where and why the woman crossed an evil spirit (Aruldas 2017; Kalim 2009). Where PPH and deaths from PPH were believed to be due to fate or God's will, there were delays in care-seeking or limited interventions in community settings to stop bleeding after birth (Aruldas 2017; Kalim 2009; Rosales 2017). Other misconceptions about PPH included: that it is caused by contraceptive-induced amenorrhoea (related to beliefs about accumulation of "bad blood"; Ononge 2016), that it is contagious, and that the risk of PPH increases if women give birth in a health facility next to another woman who has PPH (Nelson 2013).

Finding 3. Postpartum bleeding is considered abnormal when it is "pouring" (low confidence). Women and community members reported that PPH can be identified when blood is "pouring" from a woman's vagina during and after childbirth, and the amount of blood loss is greater than the amount typically lost during menstruation (Bij de Vaate 2002; Durham 2018; Hose 2020; Ononge 2016; Sharma 2017; Than 2018a).

Community members and traditional birth attendants reported that they relied on physiological signs such as dizziness and fainting to identify dangerous bleeding after birth (Durham 2018; Hose 2020). While they typically did not have objective measures for the amount of blood loss considered to be dangerous, they viewed bleeding "like an open tap" (woman; Gambia; Bij de Vaate 2002) or like "pipe water falling from a pipe-line" (midwife; Myanmar; Than 2018a) to be warning signs of PPH.

Finding 4. Community beliefs about PPH risk factors (moderate confidence). Women and community members reported that physiological risk factors for PPH include grand multiparity (five or more previous births), retained placenta, prolonged labour, anaemia, contraceptive-induced amenorrhoea (related to beliefs about accumulation of "bad blood"), previous experience of PPH, and giving birth in a health facility where many women experience PPH (Kaur 2018; Nelson 2013; Ononge 2016; Than 2018a).

Women in Myanmar also reportedly feared experiencing PPH if they had experienced heavy bleeding in a previous pregnancy (Than 2018a).

Decision-making to seek and access care

Thirteen studies explored decision-making around when to seek and access care in LMICs (Alwy Al-beity 2020; Aruldas 2017; Bell 2014; Bij de Vaate 2002; Garcia 2012; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Radoff 2013; Rosales 2017; Sharma 2017; Than 2018a). When a woman's bleeding after birth became unmanageable at home, traditional birth attendants and the woman's family (usually male members) might have decided to seek care at a health facility. However, the decision-making process was multifaceted and influenced by cultural and socioeconomic factors such as the presence of a male decision-maker, proximity to a health facility, essential resources to transport the woman with PPH, and perceived quality of care at the facility. Consequently, delays in decision-making and referral were common. For a summary of qualitative findings 5 to 7, see Summary of findings 2.

Finding 5. Female relatives and traditional birth attendants were first to recognise PPH in the community (high confidence). For women who give birth at home or in the community, female family members or traditional birth attendants are the first to recognise excess bleeding after birth, usually by identifying blood clots, the colour of blood ("black colour"), severe bleeding, and other physiological changes such as pale skin, unconsciousness, weakness, or dizziness (Aruldas 2017; Bell 2014; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Radoff 2013; Rosales 2017; Sharma 2017; Than 2018a).

Typically, blood loss measurement tools were unavailable (other than pads), and in some settings, visual prompts were used, such as estimating blood loss equivalent to "two fists" or "two mugs" (traditional birth attendant; Uganda; Ononge 2016). In some contexts, where bleeding after birth was considered a cleansing process, women hid their blood loss from others due to beliefs about it being abnormal or fear of judgement (Aruldas 2017; Bell 2014; Garcia 2012; Radoff 2013). Some traditional birth attendants were trained to identify excess blood loss by assessing how frequently they had to change soaked linens or pads, the speed

of blood flow, or expulsion of blood clots (Bij de Vaate 2002; Ononge 2016). Regardless of whether traditional birth attendants or community members were trained, many were aware that heavy bleeding after birth could be life-threatening, and traditional birth attendants and female family and community members were typically responsible for identifying PPH (Aruldas 2017; Bell 2014; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Radoff 2013; Rosales 2017; Sharma 2017; Than 2018a).

Finding 6. Complex decision-making and delays to seek care when PPH is suspected (high confidence). When women give birth in the community, family members typically take the decision of whether and when to seek care if PPH is suspected. These family members are often influenced by trusted traditional birth attendants or community midwives. Sociocultural factors influence care-seeking decisions, including limited autonomy for women giving birth, negative community perceptions and beliefs about quality of care at health facilities, and structural barriers to accessing care (Alwy Al-beity 2020; Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017; Than 2018a).

In many settings, women did not have the power to decide whether or when they should seek care; rather, female family members (especially their mother, mother-in-law, or grandmother) identified complications and informed male family members about the need for higher-level care (Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017). Male family members then relied on traditional birth attendants' knowledge and expertise about the woman's symptoms to make a recommendation, and balanced this recommendation with logistics around their proximity to a health facility and ability to arrange resources and transportation (Alwy Al-beity 2020; Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017). Birthing in the community was sometimes considered desirable to maintain cultural traditions around womanhood, pregnancy, and birth; to strengthen a woman's self-esteem; and because it was possible to pay traditional birth attendants in instalments or by barter (Aruldas 2017; Garcia 2012; Hose 2020; Kalim 2009; Kaur 2018; Rosales 2017; Sharma 2017). Moreover, community perceptions about whether the cause of bleeding was supernatural or medical influenced decisions to seek care, and often led the people making decisions to opt for traditional medicine first. For example, in India, some communities considered bleeding after birth as "polluting", and women with newborns were not permitted to leave the house until the end of the "polluting period" of nine days after birth (elderly woman; India; Aruldas 2017).

Perceptions about and experiences of poor quality care in health facilities also contributed to delays in seeking care (Aruldas 2017; Bij de Vaate 2002; Hose 2020; Kalim 2009; Rosales 2017). Community members lamented the lack of effective communication from healthcare providers to explain PPH to women and family members (Aruldas 2017). In some settings, communication challenges were further complicated when healthcare providers did not share a common language with women or their families (Garcia 2012). Beliefs about poor quality care were exacerbated in public health facilities, where community members expressed their distrust in the system due to insufficient essential resources (such as blood supplies and medication), unavailability of health workers, and fears of mistreatment (Kalim 2009). Collectively, these factors contributed to delays in attending health facilities.

Finding 7. When PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multifaceted and complex (high confidence). Once the decision to seek care is made, there can be further delays related to organising and paying for transportation, the need for onward referral to another health facility, and unclear referral pathways (Alwy Al-beity 2020; Aruldas 2017; Bell 2014; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017).

Delays in the decision to seek care, coupled with delays in the referral pathways from the community to a health facility and onward referral to another health facility, sometimes resulted in women not receiving care for PPH until more than 24 hours after birth (Aruldas 2017; Kalim 2009; Kaur 2018). Lack of well-functioning referral systems and reliance on families for transporting a woman experiencing PPH also introduced complexity and delays in receiving life-saving care (Alwy Al-beity 2020). Onward referrals were complicated by inconsistent availability of transportation, lack of fuel, and unavailability of drivers (Alwy Al-beity 2020). Inefficiencies in the referral systems, such as poor communication between the health workers in the sending and receiving health facility, introduced further delays in life-saving care and impacted the care journey for women with PPH (Alwy Al-beity 2020). Referrals from communities to health facilities could be improved in settings where traditional birth attendants collaborate with and contact community-based frontline health workers and healthcare providers for support during the referral or assistance in managing PPH in the home (Aruldas 2017; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017).

Perceptions and experiences of postpartum haemorrhage prevention, detection, and management

Thirty-two studies explored PPH prevention, detection, and management in health facilities and included the perspectives of healthcare providers, women, and community members in LMICs and high-income countries (Aruldas 2017; Begley 2012; Bekele 2020; Bell 2014; Berdichevsky 2010; Bij de Vaate 2002; Cannon 2017; Deepak 2013; de la Cruz 2013; Dunning 2016; Durham 2016; Durham 2018; Elmir 2012a; Garcia 2012; Hobday 2018; Hobday 2020; Hose 2020; Jordan 2016; Kalim 2009; Koski 2014; Lyndon 2016a; Natarajan 2015; Natarajan 2016a; Nelson 2013; Ononge 2016; Radoff 2013; Robertson 2017; Rosmaria 2019; Schack 2014; Seacrist 2018; Snowdon 2012; Than 2017). When women birth at home or in the community, first responders to PPH may be traditional birth attendants or community midwives, and first-line treatment may be misoprostol. Within health facilities, limited availability of clinical guidelines for PPH care and the subjective nature of visual estimation of blood loss were identified as barriers to accurately detecting PPH. Lack of skilled workforce and medication, limited electricity, and breaks in the cold chain contributed to delays in PPH prevention and management, especially in LMIC settings. Less experienced healthcare providers reported lacking confidence in implementing existing interventions (such as uterine massage), and senior staff could be reluctant to use new PPH treatments (such as treatment options for refractory PPH). Not involving women and their partners in the treatment decision-making process and not allowing them to make an informed decision about PPH treatment

negatively impacted trust in healthcare providers. For a summary of qualitative findings 8 to 16, see Summary of findings 3.

Finding 8. First responders to PPH are not always skilled or trained healthcare providers (high confidence). For women giving birth at home or in the community in LMICs, first-line treatment for excessive blood loss includes the traditional birth attendant or community midwife performing abdominal massage, giving the woman strong tea to drink, bathing the woman, encouraging vomiting to expel retained placenta, and providing medicines from a local pharmacy (Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Nelson 2013; Ononge 2016; Radoff 2013).

In these LMIC settings (Bangladesh, Gambia, Guatemala, India, South Sudan, Uganda), women would typically only seek care at health facilities after traditional birth attendants had exhausted all possible home-based care. Where traditional birth attendants had received additional training about caring for women during birth, they often reported that this training led them to change their practice to seek care earlier, either from community-based midwives or at health facilities (Bij de Vaate 2002; Ononge 2016). Community midwives and traditional birth attendants with some training may have known to avoid harmful traditional practices (e.g. pulling the placenta out) and may have been more likely to refer women with excessive blood loss to the facility, as they had better working relationships with facility-based health workers.

Finding 9. Community-based misoprostol distribution (moderate confidence). Community members are often unaware that misoprostol can be used for PPH prevention; however, women, community members, and health workers consider misoprostol an acceptable option for PPH management, particularly in settings where women give birth at home or where there are delays in seeking care. Some community members are concerned that community-based distribution of misoprostol for PPH has unintended consequences, such as the use of misoprostol for abortion, labour augmentation, or discouraging women from giving birth in a health facility (Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Hobday 2020; Hose 2020; Koski 2014; Than 2017).

Women described positive experiences of using misoprostol, stating that they felt strong after receiving it (community members in Nigeria described it as a "magic drug"; Cannon 2017) and that it helped them return to work sooner, which was empowering (Cannon 2017; Hobday 2018; Hobday 2020; Hose 2020). Some traditional birth attendants also reported using misoprostol in their practice and believed that it had a positive impact on their work and the community (Hobday 2018; Hobday 2020). Healthcare providers in Lao PDR, Mozambique, Myanmar, and Nigeria were generally supportive of community-based distribution of misoprostol but raised some concerns about appropriate access to the drug (Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Hose 2020; Than 2017). Some healthcare providers viewed community-based distribution of misoprostol as an interim solution to managing PPH where rates of facility-based births remained low (Durham 2018).

There were conflicting opinions among healthcare providers as to whether distributing misoprostol to traditional birth attendants and community-based auxiliary midwives was acceptable, safe, and sustainable for improving outcomes in hard-to-reach areas (Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Than 2017). Some healthcare providers expressed concern that community-based distribution to women or traditional birth attendants may result in using misoprostol for abortion or labour augmentation, or to discourage women from going to a health facility for birth; these healthcare providers believed that distribution should be limited to skilled birth attendants to limit misuse (Cannon 2017; Durham 2016; Hobday 2018; Hobday 2020; Koski 2014; Than 2017).

Finding 10. Visual estimation of blood loss and physiological detection of PPH (very low confidence). In health facilities, midwives may consider it easy to implement visual estimation of blood loss with a kidney dish or under-pad, but difficult to accurately interpret the amount of blood loss, as there is substantial variation in blood loss estimation. Not all facility settings have clinical protocols or guidelines for measuring blood loss; therefore, midwives often detect blood loss by physiological assessment (e.g. blood pressure, pulse, appearance), which they consider easy to implement. Some health workers believe that clinical signs are more important than the amount of blood lost for detecting PPH; however, they do not feel confident diagnosing women with PPH based solely on physiological signs (Begley 2012; Rosmaria 2019).

Midwives in one study in Indonesia reported using the woman's blood pressure and pulse rate along with visual assessment of blood loss to diagnose PPH (Rosmaria 2019). However, they did not feel confident in their diagnostic skills, and typically called doctors to confirm suspected PPH and initiate management (Rosmaria 2019). Midwives in Ireland and New Zealand reported being told during training that monitoring the woman's physiological condition was more important than the quantity of blood lost. One midwife described her approach as follows:

"My biggest focus is not so much the blood loss, while I keep an eye on it, it's more about the woman's condition, is she feeling OK…can she hold the baby easily…" (Begley 2012).

Finding 11. Challenges with introducing quantification of blood loss (low confidence). Quantifying (rather than estimating) blood loss is a complex and contentious change of practice for some health workers. Health workers struggle with changes to the workflow and find it difficult to accurately measure blood loss with under-buttocks drapes or by weighing blood-soaked materials (Lyndon 2016a; Seacrist 2018).

Two quality improvement studies discussed the challenges of implementing measures to quantify blood loss in vaginal births; these measures included using an under-buttocks drape to collect blood and weighing blood-soaked materials (Lyndon 2016a; Seacrist 2018). While healthcare providers in these studies understood that visual estimation was inaccurate, they described the introduction of the quantification of blood loss as the most difficult change to implement for several reasons. Midwives, nurses, and doctors reported that the introduction of blood loss quantification led to confusion about which measures to use for PPH diagnosis (e.g. visual estimation by a doctor or quantification by a midwife) and how to keep records (Lyndon 2016a; Seacrist 2018). Moreover, the introduction of blood loss quantification required changes in the workflow of clinical teams (Seacrist 2018). This complexity and lack of role clarity led to limited engagement with and acceptability of blood loss quantification

among healthcare providers. One nurse stated "none of us [health workers] are paying attention at that point" (Seacrist 2018).

Finding 12. Acceptability and awareness of uterotonics for PPH prevention and management (moderate confidence). Most health workers are aware of the benefits of uterotonics for PPH prevention and management, particularly oxytocin (the "intervention of choice"), which is routinely given to women after birth for PPH prevention. Some health workers are aware that giving ergometrine too early might impede delivery of the placenta (Deepak 2013; Koski 2014; Natarajan 2015; Rosmaria 2019; Schack 2014; Than 2017).

In some settings, midwives reported feeling adequately trained to administer uterotonics for PPH prevention (Koski 2014; Natarajan 2015; Rosmaria 2019; Schack 2014). However, some doctors in these settings expressed concerns that midwives did not have sufficient knowledge about the risks associated with uterotonic administration (Koski 2014). Women and community members in India and Ghana were generally aware that oxytocin can be used for labour augmentation and that it can increase labour pains, but were not necessarily aware of oxytocin use for PPH prevention or management (Deepak 2013; Koski 2014). Women and community members in India reported that oxytocin injections were proof of a healthcare provider's dedication to providing quality of care for women, and were therefore generally accepting of injectable oxytocin (Deepak 2013).

Finding 13. Uterine massage for PPH prevention and management (low confidence). Midwives may be primarily responsible for performing uterine massage for PPH prevention. However, consistent application of uterine massage for PPH prevention is influenced by the midwives' availability and workload, and the practice is prioritised for women with the highest risk factors for uterine atony (Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014).

While the sampled studies discussed uterine massage for both PPH prevention and management, they mostly focused on uterine massage for PPH prevention and as a component of active management of the third stage of labour. In contexts where midwives had heavy workloads (studies from Ghana, Kenya, Sierra Leone, South Sudan), uterine massage for PPH prevention was prioritised for women with risk factors such as multiparity, pre-eclampsia, or twin pregnancy (Schack 2014). In some settings where active management of the third stage of labour had been newly introduced in clinical guidelines and protocols, younger or less experienced midwives faced challenges in implementing uterine massage, as they considered it difficult to communicate with older or more experienced midwives, and feared repercussions if they did not follow the guidance of more experienced midwives (Natarajan 2015; Natarajan 2016a; Schack 2014). As this change in practice to introduce active management of the third stage of labour could be met with resistance, some midwives deprioritised uterine massage when work conditions were demanding or stressful (Schack 2014). In settings with inadequate staffing, midwives who were responsible for caring for multiple women sometimes attempted to show women or family members how to conduct massage of the uterus (Schack 2014).

Finding 14. Acceptability and use of NASG (low confidence). Health workers may consider the NASG an effective and a life-saving solution for PPH management at the community level and during referral. However, not all health workers are aware of how to use or remove NASGs (Bekele 2020; Berdichevsky 2010; Jordan 2016).

In Ethiopia, India, Mexico, Nigeria, and Zimbabwe, health workers and community members who were knowledgeable about the NASG desired community-based distribution of the device and relevant training in rural and lower-resourced settings where timely PPH management was challenging (Bekele 2020; Berdichevsky 2010; Jordan 2016). Following training on correct use of the NASG, community health workers in Mexico reported that they felt confident to use it to manage PPH in the community (Berdichevsky 2010). However, a critical challenge existed when women arrived at a health facility in a NASG if the healthcare providers were unaware that premature removal of the NASG could rapidly destabilise a woman's condition (Berdichevsky 2010). Healthcare providers in a multicountry study conducted in Ethiopia, India, Nigeria, and Zimbabwe argued that in view of the life-saving benefits of the NASG, changes to policy and resources for community-level rollout were urgently needed (Jordan 2016).

Finding 15. Acceptability and availability of UBT (low confidence). Health workers and community members may consider the UBT a low-cost, life-saving device for managing refractory PPH. Health workers and community members view it as acceptable owing to its ease of use and the availability of necessary supplies to make it (condom, catheter, syringes), even in resource-constrained settings (Natarajan 2015; Natarajan 2016a; Nelson 2013).

In some settings (Kenya, Sierra Leone, South Sudan), community members were initially hesitant about the UBT because of stigma around the use of a condom as an improvised device, and fears that it could cause infertility or death for the woman (Nelson 2013). Concerns about UBT use among community members were typically alleviated when they recognised the usefulness of the UBT as a life-saving device (Natarajan 2015; Natarajan 2016a; Nelson 2013), and when the term "condom" was replaced with "balloon" (Nelson 2013). Women also accepted the use of the UBT and reported no concerns about pain or complications during or after insertion (Nelson 2013).

Finding 16. Women's experiences of PPH management at health facilities (moderate confidence). Women who gave birth in health facilities and experienced PPH described it as painful, embarrassing, and traumatic. Partners and other family members also found the experience stressful. While some women were dissatisfied with their level of involvement in decision-making for PPH management, others felt health workers knew more about PPH management so were best placed to make these decisions. However, women who had hysterectomies for severe PPH strongly believed that rich discussion and informed consent was needed before the procedure, in view of the lasting physical and emotional consequences (de la Cruz 2013; Dunning 2016; Elmir 2012a; Robertson 2017; Snowdon 2012).

Women who experienced severe PPH recognised that it was an emergency, felt stressed by the urgency of the responses, and feared for their lives (de la Cruz 2013; Dunning 2016; Elmir 2012a; Robertson 2017; Snowdon 2012). One woman in the UK described her experience as follows:

"*Nurses were just coming in, rushing in from God knows where, I mean I don't know how many there was, and it felt like no one was*

telling me what was going on. I mean I was just lying there thinking 'Oh God, oh God, what's happening?'" (Snowdon 2012).

Some women who experienced PPH reported that they and their partners or families were not fully informed or involved in decision-making, perceiving themselves as "passive participants" (de la Cruz 2013; Dunning 2016; Snowdon 2012). Women had mixed views on their preferred level of involvement in decision-making, recognising that the healthcare providers were the experts in these emergency situations (Dunning 2016; Snowdon 2012). Some felt a sense of relief for surviving, and others felt regret for surgical intervention, particularly hysterectomy (de la Cruz 2013). Women's partners likewise expressed mixed views about their preferred level of information and involvement in decision-making, as they recognised the intensity of the emergency, and some felt that more information may cause distress and confusion (Dunning 2016). By comparison, some women and their partners expressed disappointment at not being involved in the decision-making or not being updated about the woman's condition while she was in the operating theatre, as it made them feel undermined and that their emotional needs were not adequately met (de la Cruz 2013; Snowdon 2012).

System-level factors

Twenty studies explored system-level factors influencing PPH prevention and management (Akhter 2016; Alwy Al-beity 2020; Bell 2014; Cannon 2017; Deepak 2013; Durham 2016; Durham 2018; Egenberg 2017a; Hobday 2018; Koski 2014; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Than 2018a; Vamos 2017; Woiski 2015). Community-based distribution of misoprostol was acceptable for women, community members, and other key stakeholders for PPH prevention and management. However, there were some challenges related to policy and practice reforms to improve the availability and appropriate use of misoprostol in the community. Healthcare providers reported how inconsistent supplies of drugs and resources, stressful working conditions within maternity care (long shifts, short staffing, multiple women giving birth simultaneously), and lack of skilled maternity staff hindered them from providing quality care. For a summary of qualitative findings 17 to 21, see Summary of findings 4.

Finding 17. Limited availability of misoprostol (moderate confidence). There is limited availability of misoprostol in the community owing to stockouts, poor supply systems, and the difficulty of navigating misoprostol procurement for community health workers. Community health workers and traditional birth attendants believe that endorsement from national stakeholders, robust distribution guidelines, and training for community health workers would improve the sustainability of misoprostol supply in the community (Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Than 2017).

Challenges in procuring misoprostol in the community included stockouts and logistics for traditional birth attendants to obtain misoprostol due to far distances to dispensaries (Hobday 2018). In some settings (Laos PDR, Mozambique), women were given misoprostol late in pregnancy for self-administration in the case of complications during birth, but this distribution could be hampered by limited coverage of village health workers (Durham 2018; Hobday 2018). Community-based health workers and policy-makers highlighted the need for policy reform to improve community-based distribution of misoprostol, to co-ordinate national policies with WHO guidance, to integrate misoprostol into essential maternal health drugs lists, and to use local distribution through district hospitals as measures for improving sustainability and scalability of programmes (Bell 2014; Durham 2016; Durham 2018; Hobday 2018).

Finding 18. Cold chain and quality of uterotonics (low confidence). Reliability and availability of cold storage for oxytocin may be a key barrier to consistent and quality use of the drug for PPH prevention and management (Deepak 2013; Koski 2014; Than 2018a).

Some rural health centres in Ghana, India, and Myanmar did not have refrigeration, and in those that did, electricity could be unreliable or shut off at night, lowering the quality of oxytocin (Deepak 2013; Koski 2014; Than 2018a). Some health workers and pharmacists had limited awareness about necessary storage conditions for oxytocin, with some believing that oxytocin was stable at room temperature (Deepak 2013; Koski 2014; Than 2018a).

Finding 19. Availability of drugs and supplies (high confidence). Inconsistent availability of resources (drugs, medical supplies, blood) cause delays in the timely management of PPH. Availability is further exacerbated by procurement challenges, such as poor communication and inefficient technical capacity within facilities to internally allocate supplies (Akhter 2016; Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017).

When working in settings with inconsistent availability of resources, healthcare providers who cared for women with PPH could feel overwhelmed with the workload, which negatively impacted their motivation to continue their caring responsibilities (Seacrist 2018). Healthcare providers in Mozambique and Tanzania reported that inefficient internal allocation of supplies within health facilities contributed to limited availability of resources on the labour ward (Alwy Al-beity 2020; Hobday 2018). This situation was frustrating for healthcare providers, who sometimes had to ask family members to purchase essential resources such as gloves from outside the health facility, leading to further delays as the woman continued to bleed (Alwy Al-beity 2020; Hobday 2018).

Healthcare providers in Bangladesh and Tanzania reported that they could not guarantee a safe blood supply for blood transfusion – which they recognised as an important component of PPH management – owing to poor co-ordination of blood supplies and limited availability of blood banking between health facilities (Akhter 2016; Alwy Al-beity 2020). In these cases, women's families were responsible for sourcing blood, but they could struggle to access licenced blood banks or identify appropriate donors, thus leading them to use unlicensed blood banks and risk receiving contaminated blood (Akhter 2016; Alwy Al-beity 2020).

Finding 20. Stressful working conditions (moderate confidence). Health workers describe working on the maternity ward as stressful and intense due to short staffing, long shifts, and the unpredictability of emergencies. Exhausted and overwhelmed staff may be unable to appropriately monitor all women, particularly when multiple women are giving birth simultaneously or on the floor of the health facility; this could lead to delays in detecting PPH. As a result, health workers feel dissatisfied and unappreciated, and in some settings fear blame when poor

outcomes occur (Alwy Al-beity 2020; Egenberg 2017a; Schack 2014; Seacrist 2018).

Stressful working conditions made healthcare providers feel exhausted and anxious, limited their ability to monitor women during labour and after birth, limited their use of uterine massage for PPH prevention, and prevented them from attending training to improve their skills (Alwy Al-beity 2020; Egenberg 2017a; Schack 2014; Seacrist 2018). Stressful work conditions also contributed to healthcare providers fearing that they had missed opportunities to detect and manage complications like PPH in a timely and appropriate manner (Alwy Al-beity 2020; Schack 2014; Seacrist 2018), and feeling dissatisfied and unappreciated if poor outcomes occurred (Egenberg 2017a; Seacrist 2018).

Finding 21. Health workforce challenges (high confidence). Inadequate staffing, high turnover of skilled health workers, and appointment of lower-level cadres of health workers are key barriers to the provision of quality PPH care, particularly in facilities in rural areas. Health managers reported that many health workers do not have adequate or appropriate skills, even after attending in-service training. Continuous mentoring, coaching, and training is considered necessary to improve this situation (Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017; Woiski 2015).

Health workers described struggling to provide quality PPH care when working with individuals or in teams with low skills, as they lacked confidence in their colleagues' abilities, and this was compounded by high staff turnover (Alwy Al-beity 2020; Woiski 2015). Some healthcare providers in Tanzania reported feeling dissatisfied with their working conditions and unappreciated despite hard work (Alwy Al-beity 2020). This was compounded by their perceptions that their supervisors focused solely on administrative tasks, but blamed healthcare providers if poor outcomes occurred (Alwy Al-beity 2020).

Intervention implementation strategies and lessons learnt

Seven studies evaluated existing interventions or quality improvement initiatives to improve PPH prevention, detection, and management in LMICs and high-income countries (Alwy Al-beity 2020; Egenberg 2017a; Jordan 2016; Lyndon 2016a; Seacrist 2018; Vamos 2017; Woiski 2015). Overall, factors associated with successful implementation ("making a difference") included existing workplace cultures of safety and reflective learning, local PPH champions, and positive attitudes. Factors associated with limited or failed implementation included negative attitudes, lack of PPH champions, and lack of resources and support. Some workers felt "hopeful for the future" while others were "disappointed and discouraged" (Seacrist 2018). Clear communication and expectations about work flow and responsibilities were critical to implementation success. Negative interprofessional relationships could impede implementation, such as doctors criticising midwives about implementation, or midwives feeling intimidated by doctors. For a summary of qualitative findings 22 to 29, see Summary of findings 5.

Finding 22. Teamwork and leadership (very low confidence). Good leaders and supervisors work "hand in hand" with health workers and help inspire good performance and teamwork as they lead by example. In well-functioning teams, when health workers call for help during a PPH, people immediately organise and work together as a team until the woman is safely managed or referred. Working as a team is highly valued and considered necessary for providing appropriate PPH care and for ensuring health workers feel duty bound to see PPH emergencies through (Alwy Al-beity 2020; Woiski 2015).

Healthcare providers felt that health workforce shortcomings could potentially be addressed by continuous mentoring, coaching, team-based training, and clear clinical protocols for PPH management (Alwy Al-beity 2020; Woiski 2015). Examples of good leadership included supervisors assisting with PPH management and healthcare providers calling for help or giving advice to the team even if they were off duty. This type of leadership inspired good performance and teamwork though leading by example (Alwy Al-beity 2020). Health workers may have prolonged their shifts or shared responsibilities to support colleagues during PPH emergencies until the PPH was under control or referral was complete; colleagues highly valued these efforts (Alwy Al-beity 2020; Woiski 2015).

Finding 23. Team-based, multidisciplinary simulation training (moderate confidence). Through team-based simulation training, health workers of different cadres (doctors, midwives, lay health workers) can develop a shared mental model to help them to work quickly, efficiently, and amicably as a team to manage women with PPH. Team-based multidisciplinary training may help to challenge existing hierarchical relationships, improve confidence, clarify roles and task management, reduce stress, improve provision of woman-centred care and communication, and encourage health workers to "rehearse, repeat and reinforce" their knowledge (Egenberg 2017a; Vamos 2017; Woiski 2015).

While team-based care was considered a major shift from the previous PHH management approach, healthcare providers who participated in team-based, multidisciplinary simulation training felt that sharing the burden and responsibility of care and having a shared goal of saving the woman's life was clearly beneficial (Egenberg 2017a; Vamos 2017; Woiski 2015). Multidisciplinary training also involved healthcare providers who may not have previously had a role in PPH management (e.g. medical attendants); healthcare providers reported that this led to improvements in early detection and management of PPH (Egenberg 2017a). Team-based multidisciplinary simulation training played a critical role in challenging clinical hierarchies, as it helped to clarify the roles of each team member working towards a common goal. For example, a nurse-midwife in Tanzania described how this type of training reduced clashes between nurses and doctors by clarifying roles and responsibilities:

"*The doctors used to undermine the nurses: 'they know nothing.' Moreover, the nurses too felt that they were not capable of managing without a doctor. After the training, it was quite evident that nurses have a very clear role to perform, and doctors, as well as attendants. Everyone has a contribution to the teamwork*" (Egenberg 2017a).

Team-based simulation training also made health workers' more confident that when they sounded the alert for a PPH, colleagues would immediately come to their assistance to work "as a family" to manage the emergency (Nurse-Midwife; Tanzania; Egenberg 2017a). Increased feelings of confidence and team support helped healthcare providers to feel less stressed and more adequately equipped to cope during emergencies. Although calling for help for

PPH was often part of national guidelines and clinical protocols, calls for help were typically ignored before the simulation training. The simulation training helped to establish leadership during PPH, enhanced cooperation, and sent a clear message to colleagues that help was urgently needed (Egenberg 2017a). Team-based simulation training enhanced the health workers' intrinsic motivation and perception of competence to manage PPH (Egenberg 2017a; Vamos 2017). Health workers considered the training scenarios were realistic and helped them to "think, act, and change" (Doctor; Tanzania; Egenberg 2017a). Realistic scenarios, along with repetitive practice for changed behaviour and engagement with all health workers within the framework of their job tasks, allowed health workers to "rehearse, repeat, and reinforce" their knowledge and contributed to improved clinical management, as it was directly transferable to clinical work (Nurse-Midwife; Tanzania; Egenberg 2017a).

Team-based simulation training helped healthcare providers to recognise the importance of informing the woman and her family about her condition and care, even during an emergency, and healthcare providers felt relieved to share this information, as it helped relatives to prepare for any outcome (Egenberg 2017a; Vamos 2017; Woiski 2015). Healthcare providers were also motivated when they provided high quality care to a woman and were appreciated by her and her family (Egenberg 2017a; Vamos 2017; Woiski 2015).

Finding 24. Reflective learning and debriefing (low confidence). Debriefing, for example by having a "huddle" after an emergency or at the end of the shift, may help health workers discuss and reflect on what happened, what could be improved, how people are feeling, and the different roles that each person plays and could play in the future when managing a woman with PPH. While debriefing and reflective learning are mostly valued and considered useful by health workers, it can be challenging to consistently implement these strategies after every PPH and sustain them over time, owing to competing demands or staff resistance to the introduction of a new concept (Egenberg 2017a; Lyndon 2016a; Seacrist 2018; Vamos 2017).

Debriefing and reflective learning helped health workers recognise that they each played an important role in preventing maternal death or severe morbidity from PPH, by acting quickly in an emergency (Egenberg 2017a). Most healthcare providers valued debriefing and reflective learning, but there were barriers to consistent implementation. Some healthcare providers considered that debriefing and reflective learning were more challenging to implement and hardwire into practice than the more clinical and patient-focused aspects of care (Lyndon 2016a; Seacrist 2018). Evaluations of two quality improvement studies in the USA found that reflective debriefing was the least likely component of the intervention to be implemented, possibly because of the logistical challenges of bringing the team together after a PPH, and because healthcare providers perceived that debriefing had a low added value (Lyndon 2016a; Seacrist 2018). Some healthcare providers noted that doctors were more likely to miss or skip debriefing and reflective learning sessions due to resistance or competing clinical responsibilities (Vamos 2017).

Finding 25. Factors affecting success of champions (moderate confidence). People who assume the role of champion voluntarily seem more enthusiastic and more likely to achieve successful implementation in their context compared to people assigned the role of champion. Champions who are given protected time for project implementation within their other work responsibilities may be more likely to sustain success than champions who balance implementation and clinical responsibilities without dedicated time (Jordan 2016; Lyndon 2016a; Seacrist 2018; Vamos 2017).

Champions played an important and highly valued role in fostering positive environments for successful implementation, by bringing people together, eliciting support from others, building local ownership, promoting accountability, and facilitating changes in practice (Jordan 2016; Lyndon 2016a; Seacrist 2018; Vamos 2017). Successful champions were enthusiastic, committed, persistent, and found creative solutions and "easy wins" to build momentum (Jordan 2016; Lyndon 2016a). Successful implementation initiatives included champions of different cadres (doctors, midwives, nurses), and administrators acted as champions by providing leadership in financial management, equipment procurement, time rostering for training and additional staffing, and encouraging participation (Jordan 2016; Lyndon 2016a; Seacrist 2018; Vamos 2017).

However, healthcare providers and managers also identified barriers to the implementation of local champions. Not all champions were enthusiastic or charismatic leaders, which some supervisors believed may have been due to the role being assigned rather than voluntary (Seacrist 2018). Success could likewise be hindered when champions had insufficient dedicated time for project implementation, or in health facilities with high staff turnover leading to reduced engagement in leadership activities (Seacrist 2018). Lack of or limited administrative support may have contributed to slow progress in adopting policies, receiving financial support for supplies or services, and cooperation with other departments (Seacrist 2018).

Finding 26. Local organisational culture (low confidence). Local organisational culture in each facility influences implementation, and existing cultures of safety, quality improvement, evidence-based practice, and change management facilitate success, as facilities have high readiness to engage in PPH initiatives. When faced with resistance, successful facilities focus on the anticipated benefits of implementation as a motivator, believing that changes to practice will become easier with time ("then it stuck" mentality) and that perseverance is critical. In contrast, facilities with less experience in quality improvement find it difficult to continually change practice, and facilities with strong interprofessional hierarchies often delay changes to practice or are unable to obtain consensus or foster a positive learning environment (Lyndon 2016a; Seacrist 2018; Vamos 2017).

Health facilities with cultures of openness and collaboration across departments and cadres were more likely to succeed (Lyndon 2016a; Vamos 2017). In contrast, facility cultures with strong interprofessional hierarchies could delay changes to practice as buy-in was needed across disciplines (Lyndon 2016a). Both informal and formal leadership were identified as important for promoting cultures of taking the initiative for improvement, rather than relying on external pressure or priorities (Lyndon 2016a). Facility culture was also a barrier in some settings, particularly in health facilities that were not teaching hospitals, or that had less exposure to quality improvement or rapid changes to practice (Vamos 2017). Some hospitals struggled with implementation, as it was considered too difficult to continually make changes to practice (Seacrist 2018). For example, an evaluation of a quality

improvement study in the USA found that "*hospital leadership and the overall culture of the hospital that values evidence-based practices and quality improvement processes facilitated buy-in at multiple levels for the initiative*" (Vamos 2017).

Finding 27. Multidisciplinary collaboration and buy-in (very low confidence). Implementation of PPH strategies requires multidisciplinary collaboration and buy-in, which could be challenging to co-ordinate but is critical to successful implementation. Collaborating across disciplines (e.g. midwifery, obstetrics) to develop a shared vision of care for women with PPH and streamline processes may require project leaders to appreciate different perspectives and goals of different departments and cadres (Lyndon 2016a; Seacrist 2018; Vamos 2017).

PPH quality improvement studies in the USA described difficulty engaging with some cadres of healthcare providers to co-ordinate a unified approach to managing PPH (Lyndon 2016a; Seacrist 2018; Vamos 2017). For example, Lyndon 2016a found that anaesthesiologists working in maternity care were less supportive of basing PPH treatment on blood loss, and preferred waiting for lab results, which resulted in delayed care and was a critical barrier. When project leaders succeeded in engaging staff across disciplines and cadres, this acted as a catalyst for improving quality outside the scope of PPH management, which in turn acted as a positive reinforcement for PPH project teams (Lyndon 2016a).

Establishing multidisciplinary implementation teams was a highly valued part of planning and acted as a driving force for enhancing uptake of implementation activities (Lyndon 2016a; Seacrist 2018; Vamos 2017). Settings with a lack of buy-in among all cadres of healthcare providers faced challenges with implementation, and the lack of buy-in was believed to be due to competing priorities and segmentation of support to specific departments or cadres (Seacrist 2018; Vamos 2017). Identifying and implementing local champions from different cadres helped to improve buy-in.

Finding 28. Complex data collection and high workloads (very low confidence). The complexity and time-intensiveness of data collection and high workloads may represent persistent barriers to implementation. Data collection on blood loss, health outcomes, and treatment require different data sources, and cross-departmental collaboration may be necessary to identify treatments. Onerous data collection systems coupled with existing high workloads in some cases discourage health workers from participating in PPH initiatives altogether (Lyndon 2016a; Seacrist 2018; Vamos 2017).

In an evaluation of a quality improvement initiative in the USA, healthcare providers had to source 21 individual elements from chart review, perform hand calculations and manual data entry, and ensure cross-departmental collaboration (Lyndon 2016a). While participating in monthly audit and reporting was highly valued for accountability, fostering a learning community, and as a source of encouragement in some settings (Lyndon 2016a), healthcare providers in another quality improvement initiative in the USA felt that the required documentation and data collection processes were too onerous and discouraged them from actively participating in the PPH initiative (Seacrist 2018).

Finding 29. Regular and clear communication (very low confidence). Regular and clear communication and expectations about workflow and responsibilities may be critical to implementation success. Communication styles could be tailored to be responsive to leadership and cultural styles, and include both active communication methods (scheduled meetings, debriefings after PPH, educational meeting, informal discussions) and passive communication methods (flyers, announcements, emails). Less communication and openness may lead to challenges, particularly around problem-solving. (Egenberg 2017a; Lyndon 2016a; Vamos 2017).

Team-based, multidisciplinary simulation training typically emphasised the importance of clear communication during emergencies, which encouraged other cadres of healthcare providers to feel more empowered to lead PPH management (Egenberg 2017a). Similarly, healthcare providers highly valued receiving individualised and direct feedback from supervisors or champions (Vamos 2017).

Mapping to the Theoretical Domains Framework and COM-B model, and potential implementation strategies based on the Behaviour Change Wheel

We mapped the qualitative findings about perceived factors influencing blood loss estimation and PPH prevention, detection, and management to the TDF and COM-B frameworks, then mapped the identified TDF and COM-B influences onto BCW intervention types (Michie 2011). Finally, we provided examples of how to operationalise the intervention strategies (see Table 1). With this type of mapping, we can use theoretical approaches to understand which barriers and enablers to target in intervention development and scale-up when aiming to improve prevention, detection, and management of PPH.

Some qualitative findings (Findings 22 to 26, 28, and 29) included existent implementation strategies such as guidelines, local protocols and posters (BCW intervention type: education) and team-based simulation training, group "huddles", and "local champions" (BCW intervention types: training, modelling). These strategies targeted mostly health workers at facility level. The results of the mapping task showed a broader range of other potential BCW intervention types: environmental restructuring, enablement, and persuasion.

At the community level, proposed implementation strategies could target increasing women's understanding and awareness of "normal" bleeding and preventive drug options (BCW intervention types: education, persuasion) and providing opportunities for women, family members, and traditional birth attendants groups to meet with facility staff to discuss the importance of seeking medical care and reduce distrust of attending facilities (BCW intervention type: enablement).

At a system level, implementation strategies could aim to reduce shortages of health workers, improve referral pathways and procurement processes to reduce stockouts of oxytocin, and introduce PPH detection methods that accurately measure blood loss (BCW intervention types: environmental restructuring, enablement). Other strategies include addressing sociocultural factors such as the influence of male family members on care-seeking decisions, and health workers' reluctance to change ways of working (BCW intervention types: enablement, environmental restructuring, persuasion, education).

DISCUSSION

Summary of the main findings

For a summary of the main findings, see the Plain Language Summary.

Comparison with other reviews and implications for the field

Our QES explores the perceptions and experiences of preventing, identifying, and managing PPH in both community and health facility settings. As such, our QES complements existing intervention effectiveness evidence from 10 Cochrane intervention reviews, of which nine evaluated PPH prevention (Abedi 2016; Gallos 2018; Hofmeyr 2013a; Hofmeyr 2013b; Oladapo 2020; Salati 2019; Soltani 2011; Tunçalp 2012; Yaju 2013), and two evaluated PPH management (Oladapo 2020; Smith 2020). Most of these reviews analysed the effectiveness of different uterotonics (misoprostol, oxytocin, ergometrine, prostaglandins, carbetocin) for PPH prevention or management, and two included network meta-analyses on uterotonics (for PPH prevention in Gallos 2018, and for PPH management in Smith 2020). The existing Cochrane intervention reviews typically evaluate clinical outcomes of blood loss, mortality, and morbidity, with limited focus on women's or families' experiences of PPH.

Our QES shows that when women birth in the community, local beliefs about bleeding after birth and PPH can influence early detection and management of PPH (Summary of findings 1). Moreover, complex decision-making pathways for seeking and accessing care when PPH is suspected during births in the community or at home can lead to delays in receiving life-saving treatment (Summary of findings 2). An existing Cochrane Review evaluated the effect of blood loss estimation methods for reducing adverse consequences of PPH after vaginal birth (Diaz 2018). Our QES expands on the findings of Diaz 2018 to explain how existing approaches to visual estimation and challenges with introducing quantification of blood loss may delay appropriate PPH management. We also explored factors affecting the use of uterotonics, uterine massage, NASG, and UBT (Summary of findings 3). Moreover, our findings suggest that system-level factors, including the availability of drugs and supplies, challenges with maintaining the cold chain, stressful working conditions, and health workforce challenges, can act as barriers to timely and effective PPH prevention and management (Summary of findings 4). It is important to address global and gender inequities that limit funding to maternity services (particularly in LMICs), and to find government-level health system solutions to overcome shortages of staff, life-saving medications, and supplies. However, our QES identified some low-cost improvements to quality of care and organisations (such as reflective learning, multidisciplinary training, local PPH champions, clear communication, and positive organisational culture) that may also reduce PPH-related morbidity and mortality, although these largely come from high-income settings (Summary of findings 5).

While existing Cochrane intervention reviews provide evidence of what works to prevent and manage PPH, our QES extends this knowledge to improve understanding of the factors affecting implementation of effective interventions for PPH prevention, detection, and management. Understanding these factors could help health managers, healthcare providers, policy-makers, and communities to address barriers and reinforce enablers to improve the success and sustainability of programmes addressing PPH. Lastly, our mapping of the QES findings to the TDF, COM-B model, and BCW provides important theory-based evidence about the types of strategies that may help with successful implementation and scale-up of effective interventions for PPH detection, prevention, and management (Table 1).

Overall completeness and applicability of the evidence

Our sampling strategy achieved reasonable completeness of evidence from LMICs, where the burden of PPH morbidity and mortality is greatest: 33 of 43 sampled studies were conducted in LMIC settings. However, we identified no studies from Eastern Mediterranean or Pacific Island countries, which reveals a gap in the existing research evidence. The sampled studies represented a range of participant perspectives from community members (women, families, elders, traditional birth attendants, village doctors), healthcare providers (community health workers, midwives, nurses, doctors), and other key stakeholders (policy-makers, government officials). However, for some review findings, most evidence was from high-income countries. For example, Finding 16 (women's experiences of PPH) is supported by evidence from five studies that were all conducted in high-income countries.

Most of the sampled studies contributed evidence about PPH prevention and management; evidence about PPH detection was comparatively thinner. Given that early and accurate detection of blood loss is crucial for timely implementation of PPH management, more evidence is needed about how to effectively implement new strategies to accurately quantify blood loss (e.g. using an obstetric drape). Such qualitative evidence would improve understanding of factors affecting the accurate quantification of blood loss in practice, and ultimately inform future training and strategies to improve blood loss detection.

While the sampled studies included sufficient evidence about uterotonics for PPH prevention and management, there was limited evidence about other effective and WHO-recommended co-interventions such as IV fluids, tranexamic acid, and examination of the genital tract (WHO 2012; WHO 2018a; WHO 2020b). Detecting and managing PPH is complex and requires teamwork. Most of the evidence from the sampled studies about improving effective teamwork, communication, and training came from high-income settings. Therefore, it may be useful to conduct qualitative research to explore healthcare providers' and women's beliefs (about feasibility and acceptability), values, and preferences in relation to these co-interventions (IV fluids, tranexamic acid, examination of the genital tract) and in relation to introducing implementation strategies to promote teamwork, communication, and effective training on PPH in settings with the greatest needs.

Finally, while Findings 6 and 7 describe factors affecting timely referral from births in the home or community to a health facility, there was limited evidence in the sampled studies about factors affecting timely referral from lower-level facilities (e.g. health centres) to higher-level care (e.g. district hospitals). This is a critical stage for supporting women with refractory PPH, who may need blood transfusion or surgical intervention that cannot be provided at lower-level health facilities.

Limitations of the review

While we did not impose any language limitations during the database search, screening, or sampling, all sampled studies were published in English, and only one included study was published in another language (Spanish; Álvarez-Franco 2013). As we identified many eligible studies, we used a sampling approach, which is aligned with QES methods that prioritise variation in concepts and depth of understanding over exhaustive data collection. It is possible that our sampling approach excluded studies that would have provided variations in concepts included in our QES.

AUTHORS' CONCLUSIONS

Implications for practice

Below is a list of prompts, derived from our qualitative evidence synthesis findings, that may help programme managers, policymakers, researchers, and other key stakeholders to identify and address factors that can affect implementation and scale-up of postpartum haemorrhage (PPH)-related interventions. These prompts may be used in tandem with the Roadmap to Combat Postpartum Haemorrhage.

Community level

- What kind of beliefs and norms around bleeding after birth do people in your community have? Are there harmful cultural practices around bleeding after birth that may need to be addressed? Are there helpful cultural practices around bleeding after birth that can be reinforced or leveraged?
- How can community mobilisation, outreach, and awareness-raising activities be enhanced or optimised for improved PPH prevention, detection, and management?
- Do people in the community (including women, their partners or husbands, families, and traditional birth attendants) understand the causes and dangers of PPH?
- Do traditional birth attendants and other community-based health workers have sufficient **knowledge** about:
  - prevention of PPH?
  - the risk factors and causes of PPH?
  - the early signs and symptoms of PPH?
  - how to plan for prompt referral and access to comprehensive emergency care?
  - how to provide emergency support and refer women with suspected PPH?
- Do traditional birth attendants and other community-based health workers have **access to resources** they need, including:
  - information on how to recognise excessive postpartum blood loss?
  - programmes on advance distribution of misoprostol for PPH prevention?
  - resources to reach facility-based care?
- Are traditional birth attendants, other community-based health workers, and community members able to **refer** women with an obstetric emergency to health facilities?
- Are ambulances or other emergency transportation options **available in the community** and **stocked with equipment, medicines, and supplies for PPH management**, for timely and safe referral of women with PPH?
- Are referral pathways from communities to health facilities clear and easily navigable? Are traditional birth attendants or other community stakeholders able to initiate emergency contact with health facility staff about supporting women with obstetric emergencies?

Health facility level

- In your setting, are there **clear and up-to-date clinical protocols** for:
  - quantifying blood loss after birth and early detection of PPH?
  - preventing PPH?
  - prompt initiation of PPH management and escalation as appropriate?
- In your setting, is there **regular team-based, multidisciplinary, in-service education and training** for midwives, nurses, and doctors on how to:
  - quantify blood loss after birth?
  - recognise risk factors, signs, and symptoms of women with PPH?
  - use interventions for:
    - PPH prevention (e.g. uterotonics, controlled cord traction)?
    - first-line PPH management (e.g. additional uterotonics, intravenous crystalloids, tranexamic acid, uterine massage)?
    - refractory PPH management (e.g. non-pneumatic anti-shock garment, compressive measures, intrauterine balloon tamponade)?
    - surgical interventions (e.g. laparotomy, artery ligation, hysterectomy)?
  - provide respectful care, including during obstetric emergencies?
  - clearly communicate and obtain informed consent, including during obstetric emergencies?
  - debrief and reflect on obstetric emergencies as a team?
- In your setting, are the following aspects of **care for women throughout birth and early postpartum periods** addressed?
  - Is care provided for women in a way that is respectful and that allows them to maintain their dignity, privacy, and confidentiality, including during an obstetric emergency?
  - Do healthcare providers communicate clearly and effectively with women and their families or labour companions?
- In your setting, are the following **health workforce and supportive supervision** issues addressed?
  - Does the health centre or health facility have an appropriate skill mix, given the population of women that they care for?
  - Which health workers have prescription and administration authority for drugs to prevent or manage PPH, and is this reflected in their scope of practice (e.g. if midwives are expected to administer uterotonics, do they have administration authority)?
  - Do health worker to woman staffing ratios allow for all women to be appropriately and adequately monitored after birth for excessive blood loss and associated physiological changes?
  - Is there a positive working environment for health workers, including a 'no blame' culture for obstetric emergencies?

- Are there communication approaches in place for actively discussing obstetric emergencies and sharing lessons learnt (e.g. audit and feedback meetings, group debriefing, informal discussions)?
- Is there a facility-level PPH champion to help drive implementation of best practices for PPH prevention, detection, and management?
- Are midwives, nurses, and doctors able to work together as a team to respond to women with PPH? If a health worker calls for help, can they rely on someone to respond promptly?

- In your setting, are the following **resources available and accessible** at all appropriate health facilities?
  - Sufficient number of beds in the labour, delivery, and postnatal wards.
  - Available recovery areas close to the delivery room and sufficient staffing for more intensive monitoring during the immediate postpartum period.
  - Sufficient medicines, equipment, and supplies for PPH prevention, detection, and first-line and refractory PPH management.
  - Adequate and functional cold-chain storage for temperature-sensitive medicines (e.g. oxytocin).
  - Functioning and well-stocked blood bank.
  - Robust, easily navigable, and reliable data management systems to record information about blood loss, treatments, and health outcomes.

Policy level

- Are national maternal health guidelines and policies in line with the current World Health Organization (WHO) recommendations on PPH prevention, detection, and management, and have they been disseminated and implemented?
- Are cultural preferences and traditional knowledges supported in policies, to reduce cultural barriers to accessing health services and promote equitable and respectful care for all?
- Have policies and strategies for improving referral pathways for women with obstetric emergencies been designed, implemented, and evaluated, including for community to health facility referrals and for lower-level to higher-level facility referrals?
- Are there procurement and distribution systems in place to ensure consistent availability of advance misoprostol for PPH prevention in communities, and other drugs and supplies in health facilities, without the risk of stock-outs?
- Do data management systems at the national, state, and regional level allow for robust data collection and reporting of maternal and perinatal health outcomes, including obstetric emergencies?
- Is the health workforce responsive to the needs of health facilities and populations?

Implications for research

Most sampled studies used qualitative interviews or focus group discussions, which rely on individual self-reporting. Given the complexity of PPH prevention, detection, and management pathways, other methods of data collection may yield important insights about beliefs and bottlenecks. For example, arts-based participatory methods with women and community members may help to improve understanding of cultural beliefs around blood loss and identify areas for change. Arts-based methods such as Photovoice, body-mapping, and i-Poetry have the potential to generate insights that cannot be expressed in semi-structured qualitative interviews or focus groups alone, and can help facilitate knowledge translation (Fraser 2011). Longer-term ethnographic research and observation of labour, childbirth, and postnatal wards within health facilities, or of community-based births with traditional birth attendants, may improve understanding about actual practices (rather than perceptions about practices) and potential changes over time.

Some qualitative studies provided insufficient information about methods and design, which made critical appraisal difficult. Use of reporting standards for qualitative research may help researchers to better report the details of how they conducted the study.

There were few or no data on some new or emerging interventions for PPH-related care (e.g. intrauterine balloon tamponade and tranexamic acid). High-quality qualitative research on these interventions would help to provide a more holistic understanding of factors that may influence implementation.

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Editorial and peer-reviewer contributions

The following people conducted the editorial process for this article:

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- Managing Editors (selected peer reviewers, provided editorial guidance to authors, edited the article): Luisa Fernandez Mauleffinch and Joey Kwong, Cochrane Central Editorial Service
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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Adegoke 2020

Study characteristics	
Notes	Country: Tanzania WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): semi-structured interviews, in-depth interviews, and focus group discussion Number (n) and type of participants: n = 25; nurse midwives, obstetrics-gynaecologists, postgraduate doctors, and general practitioners

Akhter 2016

Study characteristics	
Notes	Country: Bangladesh WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): in-depth interviews and key informant interview Number (n) and type of participants: n = 64; women's family members (husbands, fathers, brothers-in-law, sisters-in-law), professors, assistant and associate professors, nurses, hospital directors, managers, blood bank authorities, and unlicensed blood brokers (ward boys, technologists)

Alwy Al-beity 2020

Study characteristics	
Notes	Country: Tanzania WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): in-depth interviews and focus group discussion

Alwy Al-beity 2020 *(Continued)*

	Number (n) and type of participants: n = 61; clinicians, nurse/midwives, medical attendants, maternal child health aid (MCHA), health managers (including regional and district medical officers and reproductive, maternal, newborn, and child health co-ordinators)

Aruldas 2017

Study characteristics	
Notes	Country: India WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: community Data collection technique(s): in-depth interviews and key informant interviews Number (n) and type of participants: n = 14; women and their family members and neighbours (husbands and male family members refused to participate)

Atukunda 2015

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Uganda WHO region: Africa Income level: low Study design: descriptive qualitative study Study setting: facility Data collection technique(s): key informant interviews and secondary document analysis Number (n) and type of participants: n = 82; government officials, healthcare providers, and civil society organisations

Bakar 2019

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Tanzania WHO region: Africa Income level: low

Bakar 2019 *(Continued)*

	Study design: qualitative study
	Study setting: community
	Data collection technique(s): focus group discussion
	Number (n) and type of participants: n = 108; women of reproductive age (15–49 years)

Bazzano 2014

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness**
	Country: Cambodia
	WHO region: Western Pacific
	Income level: low
	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 21; programme stakeholders (programme managers, staff of international organisations and local non-governmental health organisations, and pharmaceutical industry personnel)

Begley 2012

Study characteristics	
Notes	Country: Ireland and New Zealand
	WHO region: Europe
	Income level: high
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 27; midwives

Bekele 2020

Study characteristics	
Notes	Country: Ethiopia
	WHO region: Africa
	Income level: low

Bekele 2020 *(Continued)*

	Study design: mixed-method study
	Study setting: facility
	Data collection technique(s): key informant interviews (note: mixed-method study with survey and qualitative interviews; qualitative participants were not involved in the survey)
	Number (n) and type of participants: n = 10; midwives, doctors, nurses, and emergency surgeons

Bell 2014

Study characteristics	
Notes	Country: Bangladesh
	WHO region: South-East Asia
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 87; traditional birth attendants, community health workers, family welfare visitors, and NGO managers

Berdichevsky 2010

Study characteristics	
Notes	Country: Mexico
	WHO region: the Americas
	Income level: upper-middle
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured, in-depth interviews
	Number (n) and type of participants: n = 70; nurses/auxiliary nurses, medical students, general practitioners, and administrative staff

Bij de Vaate 2002

Study characteristics	
Notes	Country: the Gambia
	WHO region: Africa
	Income level: low

Bij de Vaate 2002 *(Continued)*

	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 22; traditional birth attendants, community health nurse-midwives

Braddick 2016

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Uganda
	WHO region: Africa
	Income level: low
	Study design: concurrent mixed-methods study (cross-sectional survey and qualitative interviews)
	Study setting: facility
	Data collection technique(s): survey and semi-structured interviews
	Number (n) and type of participants: n = 18 (interviews); medical doctors and midwives

Cannon 2017

Study characteristics	
Notes	Country: Nigeria
	WHO region: Africa
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: facility and community
	Data collection technique(s): focus group discussion and key informant interviews
	Number (n) and type of participants: n = 128; women, women's partners, community members, community-based health volunteers, drug keepers' service providers, and drug keepers

Collins 2016

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Madagascar
	WHO region: Africa

Collins 2016 *(Continued)*

	Income level: low
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 12; health practitioners, matrons, and community agents

de la Cruz 2013

Study characteristics	
Notes	Country: USA
	WHO region: the Americas
	Income level: high
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): qualitative interviews (telephone)
	Number (n) and type of participants: n = 15; women

de Melo 2018

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Brazil
	WHO region: the Americas
	Income level: upper-middle
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 12; obstetrics and gynaecology healthcare practitioners

Deepak 2013

Study characteristics	
Notes	Country: India
	WHO region: South-East Asia
	Income level: lower-middle

Deepak 2013 *(Continued)*

	Study design: qualitative exploratory study
	Study setting: facility and community
	Data collection technique(s): semi-structured, in-depth interviews
	Number (n) and type of participants: n = 140; women, women's mothers-in-law, traditional birth attendants, unlicensed village doctors, chemist in the local pharmacy, physicians, and nurses.

Dunning 2016

Study characteristics	
Notes	Country: UK
	WHO region: Europe
	Income level: high
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured, in-depth interviews
	Number (n) and type of participants: n = 17; women and birth partners

Durham 2016

Study characteristics	
Notes	Country: Lao People's Democratic Republic
	WHO region: Western Pacific
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 35; healthcare managers, healthcare providers working in public and private sectors (obstetricians, gynaecologist, medical doctors, nurses, midwives)

Durham 2018

Study characteristics	
Notes	Country: Lao People's Democratic Republic
	WHO region: Western Pacific
	Income level: lower-middle
	Study design: descriptive qualitative study

Durham 2018 *(Continued)*

	Study setting: facility and community
	Data collection technique(s): focus group discussion and key informant interviews
	Number (n) and type of participants: n = 25; women and their family members (husbands, mothers, and mothers-in-law), village health volunteers, village heads, village health workers, Ministry of Health staff (at central, district, and provincial level), international NGOs, hospital staff, multilateral organisation staff

Egenberg 2017a

Study characteristics	
Notes	Country: Tanzania
	WHO region: Africa
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews and focus group discussions
	Number (n) and type of participants: n = 29; nurse midwives, doctors, and medical attendants

Elmir 2012a

Study characteristics	
Notes	Country: Australia
	WHO region: Western Pacific
	Income level: high
	Study design: naturalistic qualitative study
	Study setting: facility
	Data collection technique(s): qualitative interviews (face-to-face, telephone, and via email)
	Number (n) and type of participants: n = 21; women

Foster 2006

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Dominican Republic
	WHO region: the Americas
	Income level: lower-middle

Foster 2006 *(Continued)*

	Study design: ethnographic qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 24; auxiliary nurses

Garcia 2012

Study characteristics	
Notes	Country: Guatemala
	WHO region: the Americas
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): focus group discussion
	Number (n) and type of participants: n = 13; traditional birth attendants

Hobday 2018

Study characteristics	
Notes	Country: Mozambique
	WHO region: Africa
	Income level: low
	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): semi-structured interviews and focus group discussions
	Number (n) and type of participants: n = 16; traditional birth attendants

Hobday 2019

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Mozambique
	WHO region: Africa
	Income level: low
	Study design: phenomenological qualitative study

Hobday 2019 *(Continued)*

	Study setting: community
	Data collection technique(s): qualitative interviews and focus groups discussions
	Number (n) and type of participants: n = 64; programme stakeholders, health staff, and community health workers

Hobday 2020

Study characteristics	
Notes	Country: Mozambique
	WHO region: Africa
	Income level: low
	Study design: qualitative process evaluation
	Study setting: community
	Data collection technique(s): policy document review, semi-structured interviews, and focus groups discussions
	Number (n) and type of participants: n = 75; women, traditional birth attendants, medical directors, MNCH nurses, midwives, health technicians/auxiliary staff, community health workers, Ministry of Health staff, policy and MNCH stakeholders, and pharmacists

Hose 2020

Study characteristics	
Notes	Country: Lao People's Democratic Republic
	WHO region: Western Pacific
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): focus group discussion
	Number (n) and type of participants: n = 34; village midwives, health workers and health volunteers, and village heads

Jordan 2016

Study characteristics	
Notes	Country: Ethiopia, India, Nigeria, and Zimbabwe
	WHO region: Africa and South-East Asia
	Income level: low and lower-middle

Jordan 2016 *(Continued)*

	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): key informant interviews
	Number (n) and type of participants: n = 13; key informants including NGO staff, academic researchers, and WHO staff

Kalim 2009

Study characteristics	
Notes	Country: Bangladesh
	WHO region: South-East Asia
	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: community
	Data collection technique(s): free-listing, rating exercises, hypothetical case scenarios, and in-depth interviews
	Number (n) and type of participants: n = 80; women and their female caregivers (mother, mother-in-law, sister-in-law, and traditional birth attendant), and elderly women who had at least one childbirth experience

Kaur 2018

Study characteristics	
Notes	Country: India
	WHO region: South-East Asia
	Income level: lower-middle
	Study design: mixed-method study
	Study setting: facility and community setting
	Data collection technique(s): verbal autopsy questionnaire (quantitative) and qualitative interviews
	Number (n) and type of participants: n = 68; husband or parents-in-law (primary caregivers) of deceased women

Koski 2014

Study characteristics	
Notes	Country: Ghana
	WHO region: Africa

Koski 2014 *(Continued)*

	Income level: lower-middle
	Study design: descriptive qualitative study
	Study setting: facility and community
	Data collection technique(s): semi-structured, in-depth interviews
	Number (n) and type of participants: n = 185; women, mothers aged 50 years and older, traditional birth attendants, chemical sellers, physicians, medical assistants, midwives, and nursing staff

Lyndon 2016a

Study characteristics	
Notes	Country: USA
	WHO region: the Americas
	Income level: high
	Study design: descriptive qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured, in-depth interviews
	Number (n) and type of participants: n = 22; nurses and implementation team leaders

Mapp 2005a

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: UK
	WHO region: Europe
	Income level: high
	Study design: phenomenological qualitative study
	Study setting: facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 10; women

Mapp 2005b

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: UK

Mapp 2005b *(Continued)*

	WHO region: Europe
	Income level: high
	Study design: phenomenological qualitative study
	Study setting: facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 10; women

Matsuyama 2008

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Nepal
	WHO region: South-East Asia
	Income level: low
	Study design: qualitative study using grounded theory
	Study setting: community
	Data collection technique(s): key informant interviews, case histories, free-listing, ranking, and pile sorting
	Number (n) and type of participants: n = 28; village wise men, wise women, village health volunteers, mothers-in-law, women with small children, husbands, traditional birth attendants, traditional healers, and pharmacists

Moore 2016

Study characteristics	
Notes	Country: Kosovo
	WHO region: Europe
	Income level: upper-middle
	Study design: qualitative evaluation study
	Study setting: facility
	Data collection technique(s): semi-structured interviews and focus group discussions
	Number (n) and type of participants: n = 39; policymakers, researchers and academics, frontline health-care providers, and representatives from professional associations and NGOs

Nansubuga 2015

Study characteristics	
Notes	Country: Uganda WHO region: Africa Income level: low Study design: mixed-method study (with qualitative research) Study setting: community Data collection technique(s): survey and qualitative interviews Number (n) and type of participants: n = 10; male partners of women who experienced a maternal near-miss

Natarajan 2015

Study characteristics	
Notes	Country: Kenya WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 68; midwives, clinical officers, and medical officers

Natarajan 2016a

Study characteristics	
Notes	Country: Sierra Leone WHO region: Africa Income level: low Study design: descriptive qualitative study Study setting: facility Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 29; midwives; maternal and child health aide, state-enroled child health nurse, clinical health officer and assistants, and medical doctors

Natarajan 2016b

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Kenya WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 61; healthcare providers

Nelson 2013

Study characteristics	
Notes	Country: Sudan WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility and community Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 24; patient relatives and other community members, community-based birth attendants, and facility-based providers

Ngunyulu 2015

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: South Africa WHO region: Africa Income level: upper-middle Study design: descriptive qualitative study Study setting: community Data collection technique(s): qualitative interviews Number (n) and type of participants: n = 15; traditional birth attendants

Oliver 2018

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Ethiopia, India, and Myanmar WHO region: Africa and South-East Asia Income level: low and lower-middle Study design: qualitative study Study setting: community and facility Data collection technique(s): in-depth interviews, focus group discussion, and observations Number (n) and type of participants: n = 198; pharmacists, midwives, nurses, doctors, obstetricians, supply chain experts, programme managers, and policy-makers

Ononge 2016

Study characteristics	
Notes	Country: Uganda WHO region: Africa Income level: low Study design: qualitative phenomenological study Study setting: community Data collection technique(s): qualitative interviews Number (n) and type of participants: n = 15; women and traditional birth attendants

Pendleton 2016

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Kenya and Senegal WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): qualitative interviews Number (n) and type of participants: n = 30; medical doctors, obstetrician/gynaecologists, obstetrician/gynaecologist residents, surgical residents, and general surgeon

Peterson 2014

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: India WHO region: South-East Asia Income level: lower-middle Study design: qualitative study Study setting: community Data collection technique(s): focus group discussion Number (n) and type of participants: n = 18; village health workers and trainers

Radoff 2013

Study characteristics	
Notes	Country: Guatemala WHO region: the Americas Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): focus group survey and discussions Number (n) and type of participants: n = 39; traditional birth attendants and auxiliary nurses

Robertson 2017

Study characteristics	
Notes	Country: Canada WHO region: the Americas Income level: high Study design: mixed-method study Study setting: facility Data collection technique(s): semi-structured focus group discussion and survey Number (n) and type of participants: n = 23; women

Rosales 2017

Study characteristics	
Notes	Country: Indonesia WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: facility and community Data collection technique(s): qualitative interviews Number (n) and type of participants: n = 36; women and their family members (husbands and close relatives), midwives, and community healthcare workers

Rosmaria 2019

Study characteristics	
Notes	Country: Indonesia WHO region: South-East Asia Income level: lower-middle Study design: exploratory mixed-method study Study setting: facility Data collection technique(s): in-depth interviews Number (n) and type of participants: n = 23; midwives

Schack 2014

Study characteristics	
Notes	Country: Ghana WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: facility Data collection technique(s): in-depth interviews Number (n) and type of participants: n = 12; midwives

Seacrist 2018

Study characteristics	
Notes	Country: USA WHO region: the Americas Income level: high Study design: descriptive qualitative study with a grounded theory approach Study setting: facility Data collection technique(s): in-depth interviews and observational notes Number (n) and type of participants: n = 21; project implementation team co-ordinators (nurse and physician champions) and various staff and administrative personnel

Sharma 2017

Study characteristics	
Notes	Country: Nigeria WHO region: Africa Income level: lower-middle Study design: descriptive qualitative study Study setting: community Data collection technique(s): qualitative group interviews Number (n) and type of participants: n = 40; husbands, family members, neighbours, and traditional birth attendants

Sibley 2007

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Bangladesh WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: community Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 60; elderly influential women, traditional birth attendants, and women of reproductive age

Sitti 2016

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Togo
	WHO region: Africa
	Income level: low
	Study design: qualitative study
	Study setting: facility
	Data collection technique(s): observational and case study
	Number (n) and type of participants: n = 6; medical professionals

Snowdon 2012

Study characteristics	
Notes	Country: UK
	WHO region: Europe
	Income level: high
	Study design: interpretive phenomenological
	Study setting: community
	Data collection technique(s): qualitative interviews
	Number (n) and type of participants: n = 15; women and their partners

Spangler 2014a

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.**
	Country: Ethiopia
	WHO region: Africa
	Income level: low
	Study design: qualitative study
	Study setting: community
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 42; government officials

Than 2017

Study characteristics	
Notes	Country: Myanmar WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: facility and community Data collection technique(s): in-depth interviews and focus group discussions Number (n) and type of participants: n = 123; women, community members, midwives and auxiliary midwives, national-level health planners, district and township level health planners and implementers

Than 2018a

Study characteristics	
Notes	Country: Myanmar WHO region: South-East Asia Income level: lower-middle Study design: descriptive qualitative study Study setting: facility and community Data collection technique(s): in-depth interviews and focus group discussions Number (n) and type of participants: n = 116; women, midwives, auxiliary midwives, hospital staff, obstetricians, and key informants from the pharmaceutical industry and agencies working on maternal and child health

Vamos 2016

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: USA WHO region: the Americas Income level: high Study design: descriptive qualitative study Study setting: facility Data collection technique(s): in-depth interviews Number (n) and type of participants: n = 48; nurses, doctors, and other staff

Vamos 2017

Study characteristics	
Notes	Country: USA WHO region: the Americas Income level: high Study design: descriptive qualitative study Study setting: facility Data collection technique(s): in-depth interviews and focus group discussions Number (n) and type of participants: n = 50; physician, nurse, medical leadership, nursing leadership, nurse manager, blood bank

White 2002

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Cambodia WHO region: Western Pacific Income level: low Study design: descriptive qualitative study Study setting: community Data collection technique(s): key informant interviews and focus group discussion Number (n) and type of participants: n = 129; women and traditional birth attendants

Williams 2019

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Uganda WHO region: Africa Income level: low Study design: mixed-methods study (with descriptive qualitative study) Study setting: facility Data collection technique(s): qualitative interviews and focus group discussion Number (n) and type of participants: n = 50; birth attendants and district trainers

Woiski 2015

Study characteristics	
Notes	Country: Netherlands WHO region: Europe Income level: high Study design: mixed-method study Study setting: facility and community Data collection technique(s): qualitative interviews and survey Number (n) and type of participants: n = 53 (& 315 in the survey); women, obstetrician, nurses, and midwives

Álvarez-Franco 2013

Study characteristics	
Notes	**Included but not sampled: did not meet the sampling criteria for data scope and richness.** Country: Colombia WHO region: the Americas Income level: upper-middle Study design: interpretive phenomenological qualitative study Study setting: facility Data collection technique(s): in-depth interviews and focus group discussion Number (n) and type of participants: n = 8; women of reproductive age

MNCH: maternal, neonatal, and child health; NGO: non-governmental organisation; WHO: World Health Organization.

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abdillahi 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Abera 2011	Not qualitative data collection and analysis.
Ajeani 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Akmal 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Aluko 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Amod 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.

Study	Reason for exclusion
Amod 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Asowa-Omorodion 1997	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Baskett 2004	Not qualitative data collection and analysis.
Bazant 2013	Not qualitative data collection and analysis.
Belizan 2007	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Benson 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Biswas 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Biswas 2020	Not qualitative data collection and analysis.
Bolan 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Borchert 2012	Not qualitative data collection and analysis.
Bottcher 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Brauer 2015	Not qualitative data collection and analysis.
Burke 2016	Not qualitative data collection and analysis.
Cameron 2007	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Campbell 1995	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Cano Iglesias 2019	Not primary research (e.g. news, systematic/literature review, clinical case report).
Carnahan 2016	Not qualitative data collection and analysis.
Cherine 2004	Not qualitative data collection and analysis.
Chopel 2014	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Cunningham 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
de Wet 2014	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Ditai 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Egenberg 2017b	Not qualitative data collection and analysis.
Ejembi 2014	Not qualitative data collection and analysis.
Ellard 2014	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Elmir 2012b	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Elmir 2014	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Fioratou 2016	Not qualitative data collection and analysis.

Study	Reason for exclusion
Gao 2010	Not qualitative data collection and analysis.
Ghinea 2015	Not primary research (e.g. news, systematic/literature review, clinical case report).
Goodburn 1994	Not primary research (e.g. news, systematic/literature review, clinical case report).
Goodburn 1995	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Gorantla 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Gray 2017	Not qualitative data collection and analysis.
Hassan-Bitar 2007	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Heine 2012	Conference proceedings.
Hinton 2014	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Hirst 2009	Not qualitative analysis.
Hoogenboom 2015	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Ibrahim 2016	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Indrayani 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Itina 1997	Not qualitative analysis.
James 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Jangsten 2005	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Jonasdottir 2019	Not primary research (e.g. news, systematic/literature review, clinical case report).
Kaingu 2011	Not qualitative data collection and analysis.
Khan 2002	Full text unavailable.
Knight 2016	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Kumar 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Kumari 2019	Not qualitative data collection and analysis.
Lavoie 2022	Not qualitative analysis.
Lyndon 2016b	Duplicate.
Mbaruku 2018	Not qualitative data collection and analysis.
Mesko 2003	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Mirzabagi 2013	Not qualitative analysis.
Moran 2017	Not primary research (e.g. news, systematic/literature review, clinical case report).

Study	Reason for exclusion
Muchene 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Natarajan 2016c	Not qualitative analysis.
Nathan 2018a	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Nathan 2018b	Duplicate.
Ndirangu 2015	Not qualitative data collection and analysis.
Ntlokonkulu 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Nur 2019	Not qualitative data collection and analysis.
Oiyemhonlan 2013	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Okolocha 1998	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Oliver 2020	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Onah 2005	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Oyebola 1980	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Pilli 2020	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Prata 2012	Not qualitative analysis.
Qureshi 2016	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Rajbhandari 2017	Not qualitative data collection and analysis.
Reiss 2017	Not qualitative data collection and analysis.
Riang'a 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Richardson 2022	Not qualitative analysis.
Rogo 2001	Not qualitative analysis.
Rosato 2006	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Rosmiati 2018	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Régo 2011	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Saxton 2016	Not primary research (e.g. news, systematic/literature review, clinical case report).
Seacrist 2019	Not qualitative analysis.
Semasaka 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Sentilhes 2011	Not qualitative data collection and analysis.
Sharma 2016	Not qualitative analysis.

Study	Reason for exclusion
Sharma 2018	Not primary research (e.g. news, systematic/literature review, clinical case report).
Shimkhada 2016	Not qualitative analysis.
Sibley 2009	Not qualitative data collection and analysis.
Simpson 2017	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Sommer 2017	Not qualitative data collection and analysis.
Sorensen 2010	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Spangler 2014b	Duplicate.
Stein 2019	Not qualitative data collection and analysis.
Storeng 2010	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Sweeney 2022	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Than 2018b	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Thatte 2009	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Theron 2021	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Thompson 2010a	Not qualitative data collection and analysis.
Thompson 2010b	Duplicate.
Tsu 2003	Not qualitative data collection and analysis.
VanderMeulen 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Verschueren 2019	Not qualitative analysis.
Vivio 2010	Not qualitative analysis.
Wahed 2010	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Webber 2014a	Not qualitative data collection and analysis.
Webber 2014b	Not qualitative data collection and analysis.
White 1996	Duplicate.
White 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Yanagisawa 2015	Did not evaluate experience of PPH or PPH prevention, detection, or management.
Yasin 2019	Did not evaluate experience of PPH or PPH prevention, detection, or management.

PPH: postpartum haemorrhage.

Characteristics of studies awaiting classification *[ordered by study ID]*

Alwy Al-beity 2022

Notes	**Study identified in search update** Country: Tanzania WHO region: Africa Income level: lower-middle Study design: qualitative process evaluation Study setting: facility Data collection technique(s): focus group discussion Number (n) and type of participants: n = 51; medical doctors, non-physician clinicians, nurse-midwives, auxiliary nurses, and nursing assistants

Bautista-Valarezo 2022

Notes	**Study identified in search update** Country: Ecuador WHO region: the Americas Income level: upper-middle Study design: mixed-methods participant action research Study setting: community Data collection technique(s): focus group discussion and semi-structured interviews Number (n) and type of participants: n = 94; traditional midwives

Bazirete 2020

Notes	**Study identified in search update** Country: Rwanda WHO region: Africa Income level: low Study design: exploratory descriptive qualitative study Study setting: community and facility Data collection technique(s): semi-structured interviews and focus group discussions Number (n) and type of participants: n = 46; women who experienced PPH, women's partners or close relatives, community health workers, healthcare providers (nurses, midwives, medical doctor)

Bento 2021

Notes	**Study identified in search update** Country: Brazil WHO region: the Americas Income level: upper-middle Study design: exploratory descriptive qualitative study Study setting: health facility Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 27; health professionals (nursing technicians, nurses, medical residents in gynaecology and obstetrics, hired medical doctors, and medicine professors)

Bewket 2022

Notes	**Study identified in search update** Country: Ethiopia WHO region: Africa Income level: low Study design: descriptive qualitative study Study setting: health facility Data collection technique(s): interviews, focus group discussions, and self-administered open-ended questionnaires Number (n) and type of participants: n = 41; midwives, midwifery unit managers, and obstetricians

Brazil 2022

Notes	**Study identified in search update** Country: Australia Region: Western Pacific Income level: high Study design: mixed-methods action research Study setting: facility Data collection technique(s): focus groups and relational co-ordination survey Number (n) and type of participants: n = 189; midwives and doctors

Briley 2021

Notes	**Study identified in search update**
	Country: UK
	WHO region: Europe
	Income level: high
	Study design: descriptive qualitative study
	Study setting: facility setting
	Data collection technique(s): interviews
	Number (n) and type of participants: n = 22; women, birth partners, and healthcare professionals

Esan 2023

Notes	**Study identified in search update**
	Country: Nigeria
	WHO region: Africa
	Income level: lower-middle
	Study design: qualitative phenomenological study
	Study setting: facility
	Data collection technique(s): semi-structured interviews
	Number (n) and type of participants: n = 15; midwives

Flanagan 2021

Notes	**Study identified in search update**
	Country: Madagascar
	WHO region: Africa
	Income level: low
	Study design: cross-sectional qualitative study
	Study setting: community and facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 47; women; doctors, midwives, nurses, trainees, medical supervisors, community health volunteers, and traditional birth attendants

Hancock 2021

Notes	**Study identified in search update**

Hancock 2021 *(Continued)*

	Country: UK WHO region: Europe Income level: high Study design: 2-phased, exploratory sequential mixed-methods study Study setting: facility setting Data collection technique(s): semi-structured interviews and focus group discussion Number (n) and type of participants: n = 51; women, birth partners, obstetricians, obstetric anaesthetist, and midwives

Kalu 2022

Notes	**Study identified in search update** Country: Nigeria WHO region: Africa Income level: lower-middle Study design: exploratory qualitative study Study setting: facility Data collection technique(s): semi-structured interviews Number (n) and type of participants: n = 15; midwives

MacGuire 2018

Notes	**Study identified in search update** Country: Guatemala, Indonesia, Kenya, Nigeria WHO region: the Americas, South-East Asia, Africa Income level: lower-middle Study design: mixed-methods study Study setting: facility Data collection technique(s): online quantitative survey and in-person interviews Number (n) and type of participants • Survey respondents: n = 42; doctor, nurse, midwives, traditional birth attendants, and community health workers • Qualitative interviews: n = 18; doctors, nurses, obstetrician-gynaecologists, midwives, clinical officers, and community health extension workers

Marabele 2020

Notes	**Study identified in search update**
	Country: South Africa
	WHO region: Africa
	Income level: upper-middle
	Study design: exploratory descriptive qualitative study
	Study setting: community
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 30; women aged over 40 years

Nishimwe 2022

Notes	**Study identified in search update**
	Country: Rwanda
	WHO region: Africa
	Income level: low
	Study design: exploratory qualitative study
	Study setting: facility
	Data collection technique(s): focus group discussions
	Number (n) and type of participants: n = 26; nurses and midwives

Njolomole 2022

Notes	**Study identified in search update**
	Country: Malawi
	WHO region: Africa
	Income level: low
	Study design: cross-sectional grounded theory qualitative research
	Study setting: facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 47; policy-makers, healthcare providers, and health facility managers

Parameshwar 2022

Notes	**Study identified in search update**

Parameshwar 2022 *(Continued)*

	Country: Guatemala
	WHO region: the Americas
	Income level: upper-middle
	Study design: mixed-methods study
	Study setting: facility
	Data collection technique(s): qualitative interviews and multiple-choice knowledge survey
	Number (n) and type of participants: n = 39; obstetricians/gynaecologists

Posever 2022

Notes	**Study identified in search update**
	Country: India
	WHO region: South-East Asia
	Income level: lower-middle
	Study design: qualitative study
	Study setting: facility
	Data collection technique(s): semi-structured interviews and focus groups
	Number (n) and type of participants: n = 62; obstetric healthcare providers (nurses, obstetrics/gynaecology residents, professors, and programme leads)

Ramavhoya 2021

Notes	**Study identified in search update**
	Country: South Africa
	WHO region: Africa
	Income level: upper-middle
	Study design: descriptive exploratory qualitative study
	Study setting: facility
	Data collection technique(s): in-depth interviews
	Number (n) and type of participants: n = 18; midwives

Singh 2021

Notes	**Study identified in search update**
	Country: India
	WHO region: South-East Asia

Singh 2021 *(Continued)*

	Income level: lower-middle Study design: cross-sectional observational mixed-methods study Study setting: facility settings Data collection technique(s): on-site observation and interviews Number (n) and type of participants: n = 125; doctors, nurses, auxiliary nurse-midwives, and observations of health provider practices during 1479 vaginal births and early postpartum period

Walker 2021

Notes	**Study identified in search update** Country: USA WHO region: the Americas Income level: high Study design: multiple case-study qualitative study Study setting: facility Data collection technique(s): semi-structured 1-on-1 group interviews Number (n) and type of participants: n = 25; project leads (nurses, clinical nurse specialists, and physicians)

Yargawa 2021

Notes	**Study identified in search update** Country: Nigeria WHO region: Africa Income level: lower-middle Study design: mixed-methods study Study setting: community Data collection technique(s): in-depth interviews, family interviews, focus group discussions, and household survey Number (n) and type of participants • Interviews and focus group discussions: n = 65; women • Family interviews: n =10; women's husbands, co-wives and other female family members • Household survey: n = 640; survey respondents

PPH: postpartum haemorrhage; WHO: World Health Organization.

ADDITIONAL TABLES

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel

Findings	COM-B & TDF mapping[a]	Actor	Potential intervention type based on BCW[b]	Examples of how to operationalise implementation strategies/examples of implementation strategies in use (*in italics*)
Finding 1. Postpartum bleeding considered "normal" and important to purify the woman's body by expelling the "bad blood"	**Psychological Capability:** Knowledge; Memory, Attention and Decision Processes **Social Opportunity:** Social Influences of women and community	Women and community members	Education, Persuasion, Modelling	Provide information about why excessive bleeding is not normal and the benefits of accepting PPH treatments. Information could be delivered via a range of modalities, such as campaigns in local communities. Ideally, information to be delivered by credible messengers such as other women with experience of PPH or local respected community members.
Finding 2. Misconceptions and supernatural causes of PPH	**Social Opportunity:** Social Influences (of community)	Women and community members	Education, Persuasion, Modelling, Enablement	In addition to strategies for Finding 1, hold local group meetings with community members facilitated by health workers to discuss and address concerns, common myths, and misconceptions around supernatural causes of PPH. Enable social support, discussion, and knowledge building.
Finding 3. Postpartum bleeding is considered abnormal when it is "pouring"	**Psychological Capability:** Memory, Attention and Decision Processes	Women and community members	Training, Education, Environmental restructuring	Provide local, culturally competent, and tailored training for women and community members on how to identify blood loss appropriately in community settings (i.e. signs, symptoms, when to seek help). Such information can also be displayed in community areas (e.g. posters with advice, prompts, and cues to care seeking).
Finding 4. Community beliefs about PPH risk factors	**Psychological Capability:** Knowledge **Social Opportunity:** Social Influences (of women and community)	Women and community members	Education, Enablement	Provide local education for women and community members about risk factors for PPH (e.g. grand multiparity, prolonged labour, previous PPH).
Finding 5. Female relatives and traditional birth attendants are first to recognise PPH in the community	**Psychological Capability:** Memory, Attention and Decision-process **Reflective Motivation:** Social/Professional Role and Identity	Women and community members	Education, Training	Provide training for traditional birth attendants and women on identifying PPH earlier and recognising excessive bleeding and other signs and symptoms of early onset of PPH (e.g. what is not "normal" bleeding).
Finding 6. Complex decision-making and delays to seek care when PPH is suspected	**Social Opportunity:** Social Influences (of male family members) **Physical Opportunity:** Environmental Context and Resources	Women, community members, health workers and managers	Education, Training, Modelling, Enablement, Persuasion	Target family members and traditional birth attendants, as well as women giving birth, in education and training initiatives. There is potential for targeted campaigns or community group education and training meetings involving traditional birth attendants, midwives, women, and family members to address concerns about seeking care at health facilities, lack of trust in health facilities, and when and how to refer in health facilities. Transparent

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel *(Continued)*

	Automatic Motivation: Emotion (of women) **Psychological Capability:** Memory, Attention and Decision-process **Reflective Motivation:** Social/Professional Role and Identity			communication and wider dissemination of results of any local audits on quality of care to community members can also help build trust.
Finding 7. When PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multifaceted and complex	**Physical Opportunity:** Environmental Context and Resources	Women, community members, health workers and managers	Environmental restructuring, Enablement	Address systemic issues around inconsistent infrastructure (i.e. increase accessibility of services, access to transport, supplies). Introduce a pro forma or other structured templates to document key information about the woman and PPH, to help streamline and standardise sharing of key information during handover and referral process between care teams and settings.
Finding 8. First responders to PPH are not always skilled or trained healthcare providers	**Psychological Capability:** Knowledge; Behaviour Regulation **Physical Capability:** Skills	Women and community members	Education, Training, Persuasion	Provide education and training for traditional birth attendants on the potential risks and harms associated with traditional treatments (e.g. drinking strong tea, encouraging vomiting) and their efficacy in preventing and managing PPH. Provide education and training on alternatives and when to seek additional care.
Finding 9. Community-based misoprostol distribution	**Psychological Capability:** Knowledge **Reflective Motivation:** Beliefs about Consequences	Women, community members, health workers and managers	Education, Training	In areas where there is community-based access and distribution of misoprostol, ensure there is accompanying education and training of community-based healthcare providers about how and when to appropriately use misoprostol.
Finding 10. Visual estimation of blood loss and physiological detection of PPH	**Psychological Capability:** Memory, Attention and Decision-process **Physical Opportunity:** Environmental Context and Resources **Reflective Motivation:** Beliefs about Capabilities	Health workers and managers	Education, Training, Enablement, Environmental restructuring	Introduce guidelines or protocols (or both) on PPH detection. Also consider providing tools for objective measurement and quantification of blood loss that can act as a prompt or trigger for initiating PPH management. Provide education and training on how to use these tools to measure blood loss objectively, as well as how to assess changes in vital signs (e.g. blood pressure and pulse).
Finding 11. Challenges with introducing	**Physical Opportunity:** Environmental Context and Resources	Health workers and managers	Education, Training, Environmental restructuring,	Linked to Finding 10. Provide education and training on PPH detection to encourage objective measurement of blood loss from a credible messenger (e.g. midwife) and discourage use

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel *(Continued)*

quantification of blood loss	**Reflective Motivation:** Beliefs about Capabilities		Modelling, Persuasion	of clinical signs only. Provide audit and feedback on improvement in detection rates following the introduction of quantification tools (persuasion).
Finding 12. Acceptability and awareness of uterotonics for PPH prevention and management	**Psychological Capability:** Knowledge **Reflective Motivation:** Beliefs about Consequences	Women and health workers	Education, Training	Provide information and training on using uterotonics (e.g. oxytocin). As above (Finding 11), provide audit and feedback on any improvements in PPH-associated outcomes as a persuasive strategy.
Finding 13. Uterine massage for PPH prevention and management	**Psychological Capability:** Memory, Attention and Decision-process **Social Opportunity:** Social Influences **Physical Opportunity:** Environmental Context and Resources **Reflective Motivation:** Social/Professional Role and Identity	Women and health workers	Education, Training, Environmental restructuring Enablement, Modelling	Provide education and training for healthcare providers on uterine massage and address issues related to midwife shortages and workloads. Education and training should be simulation- and team-based and include demonstrations and opportunities for practice and rehearsal to build confidence and competence.
Finding 14. Acceptability and use of NASG	**Physical Capability:** Skills **Reflective Motivation:** Beliefs about Consequences	Women and health workers	Education, Training, Environmental restructuring, Modelling	Provide education and training for healthcare providers on how to use the NASG. Education and training should be simulation- and team-based and include demonstrations and opportunities for practice and rehearsal to build confidence and competence.
Finding 15. Acceptability and availability of UBT	**Physical Opportunity:** Environmental Context and Resources **Reflective Motivation:** Beliefs about Consequences; Beliefs about Capabilities	Women and health workers	Education, Training, Enablement	Provide education and training for healthcare providers on UBT use and address inconsistent supplies necessary to use the UBT. Education and training should be simulation- and team-based and include demonstrations and opportunities for practice and rehearsal to build confidence and competence.
Finding 16. Women's experiences of PPH management at health facilities	**Psychological Capability:** Memory, Attention and Decision-making (of health worker) **Social Opportunity:** Social Influence (of woman and health workers)	Women and health workers	Education, Training, Enablement, Persuasion	Provide education and training for health workers on how to involve women and family members in care decisions and how to take consent for women with severe PPH requiring surgery. Training could include example scripts of how to conduct these discussions as well as opportunities for behavioural practice, rehearsal, and feedback. Also consider use of patient testimonials and case studies to raise awareness among healthcare providers of how women experience PPH (i.e. psychological and emotional consequences).

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel *(Continued)*

	Reflective Motivation: Beliefs about Consequences; Emotion (of woman)			
Finding 17. Limited availability of misoprostol	**Psychological Capability:** Knowledge **Physical Capability:** Skills **Social Opportunity:** Social Influences **Physical Opportunity:** Environmental Context and Resources	Community members, health workers and managers, and key stakeholders	Environmental restructuring, Modelling, Enablement	Engage with local stakeholders to develop and introduce a procurement management system (in digital format and in standardised forms) to limit stock-out issues with misoprostol.
Finding 18. Cold chain and quality of uteroton-ics	**Physical Opportunity**: Environmental Context and Resources	Health workers and managers, and key stakeholders	Environmental restructuring, Enablement	Provide refrigeration for cold chain storage, increase availability of quality oxytocin, and ensure rapid access to oxytocin by having storage close to labour/delivery rooms.
Finding 19. Availability of drugs and supplies	**Physical Opportunity:** Environmental Resources and Context	Health workers and managers, and key stakeholders	Environmental restructuring, Enablement	Address inconsistent supplies of drugs, medical equipment, and blood and develop a new procurement audit tool to identify low stock or stock-outs. Introduce PPH trolleys/kits/boxes to ensure supplies are readily available at the bedside to rapidly manage a PPH and deliver treatments in fast succession where appropriate (except fridge-based items).
Finding 20. Stressful working conditions	**Physical Opportunity:** Environmental Context and Resources **Automatic Motivation**: Emotion; Reinforcement	Health workers and managers	Enablement	Address the low morale of health workers due to stressful working condition (e.g. dealing with emergencies, long hours, feeling under-valued). Provide opportunities for health providers to reflect and debrief on PPH (i.e. as part of multidisciplinary team meetings). Recognise good practice through audit and feedback. Help workers to do their job more efficiently by providing focused training and job aids, and encouraging team work, communication, and social support.
Finding 21. Health workforce challenges	**Physical Capability:** Skills **Physical Opportunity:** Environmental Context and Resources	Health workers and managers, and key stakeholders	Training, Enablement	Address shortages in skilled staff by training lower-level cadres.
Finding 22. Teamwork and leadership	**Social Opportunity:** Social Influences **Reflective Motivation:** Social/Professional Role and Identity	Health workers and managers	Education, Persuasion, Modelling, Enablement	Introduce team-based education and training that emphasises teamwork and communication as part of PPH detection and management.

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel *(Continued)*

				Introduction of "local champion" who takes on a leadership and supervision role to promote team work among health workers.
Finding 23. Team-based, multidisciplinary simulation training.	**Physical Capability:** Skills **Reflective Motivation:** Social/Professional Role and Identity	Health workers and managers	Education, Training, Modelling, Enablement	Introduce team-based education and training. *Provision of team-based simulation training for all cadres of health workers.*
Finding 24. Reflective learning and debriefing	**Psychological Capability**: Behaviour Regulation **Social Opportunity:** Social Influences **Reflective Motivation:** Goals	Health workers and managers	Education, Training, Modelling, Enablement,	Introduce audit and feedback on PPH practice with concrete recommendations and focused actions/areas for improvement and suggestions on how to work towards addressing changes in ways of working. *Introduction of "huddle" for health workers to meet as a group to reflect on care provision together and to discuss any potential changes to ways of working.*
Finding 25. Factors affecting success of champions	**Reflective Motivation:** Social/Professional Role and Identity	Health workers and managers	Education, Modelling, Enablement, Persuasion	*Introduction of volunteer "local champion" who has protected time to carry out the role.*
Finding 26. Local organisational culture	**Social Opportunity:** Social Influences	Health workers and managers	Enablement	Introduce audit and feedback on PPH practice to identify areas for improvement. *Introduction of improvement initiatives culture at facilities by addressing barriers such as reluctance to change ways of working.*
Finding 27. Multidisciplinary collaboration and buy-in	**Reflective Motivation:** Social/Professional Role and Identity; Goals	Health workers and managers	Education, Modelling, Enablement, Persuasion	Provide opportunities for multidisciplinary team discussion and encourage contributions of different perspectives, including team-based training and learning. *Collaboration across disciplines to increase common goals and reduce different thinking between disciplines.*
Finding 28. Complex data collection and high workloads	**Physical Opportunity:** Environmental Context and Resources **Reflective Motivation:** Intention	Health workers and managers	Enablement	Increase availability of health workers and cross-department collaborations. Consider reviewing and modifying data collection systems to reduce impact on workload, introducing digital data collection tools and standardised pro formas to streamline and standardise data collection.
Finding 29. Regular and clear communication	**Social Opportunity:** Social Influences **Physical Opportunity:** Environmental Context and Resources	Health workers and managers	Education, Environmental restructuring, Enablement	Introduce standardised documentation tools and handover procedures (e.g. templates to document key information about the woman and PPH), to help streamline and standardise sharing of key information during handover. *Improvement in workforce communication through regular meetings, debrief sessions, and*

Table 1. Mapping qualitative findings to the TDF and COM-B frameworks, and Behaviour Change Wheel *(Continued)*

	Reflective Motivation: Social/Professional Role and Identity	*provision or sharing of information directly with health workers.*

[a] The COM-B model proposes that Capability, Opportunity, and Motivation are necessary to change Behaviour).
[b] Other Behaviour Change Wheel (BCW) intervention types considered unacceptable were incentivisation, coercion, and restriction.
NASG: non-pneumatic anti-shock garment; PPH: postpartum haemorrhage; UBT: uterine balloon tamponade.

APPENDICES

Appendix 1. Search strategies

Epistemonikos, Epistemonikos Foundation (searched 13 Nov 2022)

Advanced search in Title/Abstract

"postpartum hemorrhage" OR "postpartum haemorrhage" OR "postpartum hemorrhages" OR "postpartum haemorrhages" OR "post partum hemorrhage" OR "post partum haemorrhage" OR "post partum hemorrhages" OR "post partum haemorrhages" OR "post-partum hemorrhage" OR "post-partum haemorrhage" OR "post-partum hemorrhages" OR "post-partum haemorrhages" OR "postnatal hemorrhage" OR "postnatal haemorrhage" OR "postnatal hemorrhages" OR "postnatal haemorrhages" OR "post natal hemorrhage" OR "post natal haemorrhage" OR "post natal hemorrhages" OR "post natal haemorrhages" OR "post-natal hemorrhage" OR "post-natal haemorrhage" OR "post-natal hemorrhages" OR "post-natal haemorrhages"

AND

qualitative OR interview* OR "focus group" OR "focus groups" OR focus-group OR focus-groups OR ethnograph* OR fieldwork OR "field work" OR field-work OR "key informant"

Ovid MEDLINE(R) ALL <1946 to November 11, 2022> (searched 13 Nov 2022)

1	Postpartum Hemorrhage/	8157
2	Delivery, Obstetric/	32541
3	exp Parturition/	20886
4	Postpartum Period/	29822
5	Postnatal Care/	6334
6	or/2-5	81927
7	Hemorrhage/	80120
8	Uterine Hemorrhage/	10026
9	Blood Loss, Surgical/	19914
10	Postoperative Hemorrhage/	10954
11	or/7-10	117813
12	6 and 11	1133

(Continued)

13	(postpartum h?emorrhage? or post partum h?emorrhage? or postnatal h?emorrhage? or post natal h?emorrhage?).ti,ab,kf.	8430
14	((h?emorrhage? or PPH) and (birth? or childbirth? or labor or labour or delivery or deliveries or obstetric* or puerperium or maternal or maternity or woman or women)).ti,kf.	4913
15	((h?emorrhage? or PPH) adj3 (birth? or childbirth? or labor or labour or delivery or deliveries or obstetric* or puerperium or maternal or maternity or woman or women)).ab.	4363
16	(PPH and (complicat* or identif* or detect* or manage* or monitor* or care or treat* or prevent*)).ti,kf.	103
17	(PPH adj3 (complicat* or identif* or detect* or manage* or monitor* or care or treat* or prevent*)).ab.	1131
18	((blood loss or bleeding) and (birth? or childbirth? or labor or labour or delivery or deliveries or obstetric* or puerperium or postpartum or post partum or postnatal or post natal)).ti,kf.	1298
19	((blood loss or bleeding) adj3 (birth? or childbirth? or labor or labour or delivery or deliveries or obstetric* or puerperium or postpartum or post partum or postnatal or post natal)).ab.	2162
20	or/13-19	15905
21	1 or 12 or 20	18700
22	limit 21 to "qualitative (best balance of sensitivity and specificity)"	1930
23	qualitative research/	77527
24	21 and 23	74
25	22 or 24	1933

CINAHL 1980 to present, EbscoHost (searched 13 Nov 2022)

S14	S13 [Exclude MEDLINE records]	99
S13	S10 OR S12	241
S12	S9 AND S11	134
S11	(MH "Qualitative Studies+")	175,043
S10	S9 Limiters - Clinical Queries: Qualitative - Best Balance	189
S9	S1 OR S4 OR S5 OR S6 OR S7 OR S8	14,979
S8	TI ((blood-loss or bleeding) and (birth* or childbirth* or labor or labour or delivery or deliveries or obstetric* or postpartum or post-partum or postnatal or post-natal or puerperium)) OR AB ((blood-loss or bleeding) and (birth* or	4,531

(Continued)

	childbirth* or labor or labour or delivery or deliveries or obstetric* or postpartum or post-partum or postnatal or post-natal or puerperium))	
S7	TI (PPH and (complicat* or identif* or detect* or manage* or monitor* or care or treat* or prevent*)) OR AB (PPH and (complicat* or identif* or detect* or manage* or monitor* or care or treat* or prevent*))	1,029
S6	TI ((h#emorrhage* or PPH) and (birth* or childbirth* or labor or labour or delivery or deliveries or obstetric* or puerperium or maternal or maternity or woman or women)) OR AB ((h#emorrhage* or PPH) and (birth* or childbirth* or labor or labour or delivery or deliveries or obstetric* or puerperium or maternal or maternity or woman or women))	9,719
S5	TI (postpartum-h#emorrhage or postpartum- h#emorrhages or post-partum-h#emorrhage or post- partum-h#emorrhages or postnatal-h#emorrhage or postnatal-h#emorrhages or post-natal-h#emorrhage or post-natal-h#emorrhages) OR AB (postpartum-h#emorrhage or postpartum- h#emorrhages or post-partum-h#emorrhage or post- partum-h#emorrhages or postnatal-h#emorrhage or postnatal-h#emorrhages or post-natal-h#emorrhage or post-natal-h#emorrhages)	3,703
S4	S2 AND S3	407
S3	(MH "Uterine Hemorrhage") OR (MH "Blood Loss, Surgical") OR (MH "Hemorrhage") OR (MH "Postoperative Hemorrhage")	29,996
S2	(MH "Postnatal Period") OR (MH "Labor") OR (MH Childbirth+) OR (MH "Delivery, Obstetric") OR (MH "Puerperium")	59,282
S1	(MH "Postpartum Hemorrhage")	4,067

Scopus, Elsevier (searched 13 Nov 2022)

((KEY("postpartum hemorrhage")) OR (TITLE-ABS("postpartum hemorrhage" OR "postpartum haemorrhage" OR "postpartum hemorrhages" OR "postpartum haemorrhages" OR "post partum hemorrhage" OR "post partum haemorrhage" OR "post partum hemorrhages" OR "post partum haemorrhages" OR "postnatal hemorrhage" OR "postnatal haemorrhage" OR "postnatal hemorrhages" OR "postnatal haemorrhages" OR "post natal hemorrhage" OR "post natal haemorrhage" OR "post natal hemorrhages" OR "post natal haemorrhages")) OR (TITLE-ABS((hemorrhage* OR haemorrhage* OR PPH) W/3 (birth* OR childbirth* OR labor OR labour OR delivery OR deliveries OR obstetric* OR puerperium OR maternal OR maternity OR woman OR women))) OR (TITLE-ABS((PPH) W/3 (complicat* OR identif* OR detect* OR manage* OR monitor* OR care OR treat* OR prevent*))) OR (TITLE-ABS(("blood loss" OR bleeding) W/3 (birth* OR childbirth* OR labor OR labour OR delivery OR deliveries OR obstetric* OR puerperium OR postpartum OR "post partum" OR postnatal OR "post natal")))) AND ((KEY("qualitative research" OR interview OR "semi structured interview" OR "thematic analysis" OR "qualitative analysis")) OR (TITLE-ABS(qualitative OR interview* OR "thematic analysis" OR themes OR "mixed method" OR "mixed methods"))) AND NOT INDEX(medline)

Gray literature:

- **OpenGrey** (www.opengrey.eu/)

"postpartum hemorrhage" OR "postpartum haemorrhage" OR "postpartum hemorrhages" OR "postpartum haemorrhages" OR "post partum hemorrhage" OR "post partum haemorrhage" OR "post partum hemorrhages" OR "post partum haemorrhages" OR "postnatal hemorrhage" OR "postnatal haemorrhage" OR "postnatal hemorrhages" OR "postnatal haemorrhages" OR "post natal hemorrhage" OR "post natal haemorrhage" OR "post natal hemorrhages" OR "post natal haemorrhages"

- **The Grey Literature Report** (www.greylit.org/)

Eight individual search strings

1. "postpartum hemorrhage"

2. "postpartum haemorrhage"
3. "post partum hemorrhage"
4. "post partum haemorrhage"
5. "postnatal hemorrhage"
6. "postnatal haemorrhage"
7. "post natal hemorrhage"
8. "post natal haemorrhage"

- **BASE** (www.base-search.net/Search/Advanced)

Advanced search – in **Entire Document** – limited to **Document type**: *Report*, and **Document type**: *Doctoral and postdoctoral thesis*

(post-partum "post partum" postpartum post-natal "post natal" postnatal) AND (hemorrhage haemorrhage hemorrhages haemorrhages) AND (qualitative interview interviews themes "mixed method" "mixed methods")

- **Eldis** (www.eldis.org/)

Advanced search – four individual search strings (word variations will be searched for using the below strings)

1. postpartum hemorrhage
2. postpartum haemorrhage
3. postnatal hemorrhage
4. postnatal haemorrhage

Forward citation search of included/relevant records:

Google Scholar

Appendix 2. Methodological limitations of the 43 sampled studies

Author and year	Was there a statement of the aims of the research?	Given the aim, was a qualitative methodology appropriate?	Was the research design appropriate to address the aim?	Was the recruitment strategy appropriate to the aims of the research?	Was the data collected in a way that addressed the research issue?	Was the relationship between the researcher and participants adequately considered?	Have ethical issues been taken into consideration?	Was the data analysis sufficiently rigorous?	Is there a clear statement of findings?
Adegoke 2020	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Akhter 2016	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Alwy Albeity 2020	Yes	Yes	Yes	Yes	Yes	Partial (partial reporting of researcher's role and no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Aruldas 2017	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Begley 2012	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Bekele 2020	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Bell 2014	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes

(Continued)

						(reflexivity not reported)			
Berdichevsky 2010	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Bij de Vaate 2002	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Partial (insufficient description of the data analysis process)	Yes
Cannon 2017	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	No (no mention of data analysis)	Yes
de la Cruz 2013	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Deepak 2013	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Dunning 2016	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Durham 2018	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Durham 2016	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Egenberg 2017a	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Elmir 2012a	Yes	Yes	Yes	Yes	Yes	Partial	Yes	Yes	Yes

(Continued)

						(no mention of potential biases affecting topic guide design and data collection process)			
Garcia 2012	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Hobday 2018	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Hobday 2020	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Partial (insufficient description of the data analysis process)	Yes
Hose 2020	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Jordan 2016	Yes	Yes	Yes	Yes	Yes	Partial (considered bias, but no reflexivity statement)	Yes	Yes	Yes
Kalim 2009	Yes	Yes	Yes	Partial	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Kaur 2018	Yes	Partial	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Koski 2014	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial	Yes

(Continued)

								(insufficient description of the data analysis process)	
Lyndon 2016a	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Exempt	Partial (insufficient description of the data analysis process)	Yes
Moore 2016	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Yes	Yes
Natarajan 2015	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Natarajan 2016a	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Nelson 2013	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Ononge 2016	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Radoff 2013	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Robertson 2017	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial	Yes

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								(insufficient description of the data analysis process)	
Rosales 2017	Yes	Yes	Yes	Partial	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Partial (insufficient description of the data analysis process)	Yes
Rosmaria 2019	Yes	Yes	Yes	Yes	Partial	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes
Schack 2014	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Seacrist 2018	Yes	Yes	Yes	Yes	Yes	Yes	Partial	Yes	Yes
Sharma 2017	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential influences during data collection process)	Yes	Yes	Yes
Snowdon 2012	Yes	Yes	Yes	Yes	Yes	Partial (insufficient detail on potential influences during data collection)	Yes	Partial (insufficient description of the data analysis process)	Yes
Than 2017	Yes	Yes	Yes	Yes	Yes	Partial (no mention of potential biases affecting topic guide design and data collection process)	Yes	Yes	Yes
Than 2018a	Yes	Yes	Yes	Yes	Yes	Partial	Yes	Yes	Yes

(Continued)

						(no mention of potential biases affecting topic guide design and data collection process)			
Vamos 2017	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Exempt	Yes	Yes
Woiski 2015	Yes	Yes	Yes	Yes	Yes	No (reflexivity not reported)	Yes	Partial (insufficient description of the data analysis process)	Yes

Appendix 3. GRADE-CERQual Evidence Profile

#	Summary of review finding	Studies contributing to the review finding	Methodological limitations	Coherence	Relevance	Adequacy	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
Community perspectives about bleeding after birth and PPH								
1	**Postpartum bleeding may be considered "normal" and important to purify the woman's body by expelling the "bad blood".** In many communities, bleeding during and after childbirth is considered "normal" and necessary to expel "impurities" and restore and cleanse the woman's body after pregnancy and birth. As a result, community members and women may not identify severe bleeding as dangerous unless it is gushing, or until the woman is unconscious; and women may not always accept medication to limit bleeding after birth	Aruldas 2017; Durham 2018; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Sharma 2017; Than 2018a	Minor concerns: 5 studies with no or very minor concerns, 3 studies with minor concerns (methodology, recruitment, reflexivity, and data analysis)	No or very minor concerns	Minor concerns: 5 lower MICs (Bangladesh, India, Lao PDR, Myanmar, and Nigeria) and 1 LIC (Uganda); community perspectives	Moderate concerns: 8 studies; 3 with moderate to thick data, 5 with thin data	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), minor concerns about relevance (6 lower-MICs and 1 LIC; mostly community perspectives), and moderate concerns about adequacy (8 studies; 3 with moderate to thick data richness and 5 with thin data richness).
2	**Misconceptions and supernatural causes of PPH.** In some communities, people have misconceptions about causes of PPH, including that PPH is caused by supernatural powers or evil spirits that punish women for ignoring or disobeying social rules or for past mistakes. A woman's death from PPH may be perceived as fate or God's will. As a result, community and family members may lack hope about a woman's survival if she experi-	Aruldas 2017; Kalim 2009; Nelson 2013; Ononge 2016; Rosales 2017; Sharma 2017	Minor concerns: 3 studies with no or very minor concerns, 1 study with minor concerns (recruitment, reflexivity, and data analysis), 2 studies	No or very minor concerns	Minor concerns: 4 lower-MICs (Bangladesh, India, Indonesia, and Nigeria) and 2 LICs (Uganda and Sudan); community perspectives	Minor concerns: 6 studies; 3 with moderate to thick data richness, 3 with thin data richness	High confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (recruitment, reflexivity, and data analysis), minor concerns about relevance (4 lower-MICs and 2 LICs; mostly community perspectives), and minor concerns about adequacy (6 studies; 3

(Continued)

	ences PPH, or may limit their attempts to stop bleeding after birth.		with moderate concerns (recruitment, reflexivity, and data analysis)					with moderate to thick data richness and 3 with thin data richness).
3	**Postpartum bleeding considered abnormal when it is "pouring".** Women and community members reported that PPH can be identified when blood is "pouring" from a woman's vagina during and after childbirth, and the amount of blood loss is greater than the amount typically lost during menstruation.	Bij de Vaate 2002; Durham 2018; Hose 2020; Ononge 2016; Sharma 2017; Than 2018a	No or very minor concerns: 5 studies with no or very minor concerns, 1 study with minor concerns (reflexivity and data analysis)	No or very minor concerns	Moderate concerns: 3 lower-MICs (Myanmar, Nigeria, and Lao PDR) and 2 LICs (Uganda and Gambia); community perspectives	Serious concerns: 6 studies; 4 with moderate to thick data, 2 with thin data richness	Low confidence	We had no or very minor concerns about coherence and methodological limitations (reflexivity and data analysis), moderate concerns about relevance (3 lower-MICs and 2 LICs; mostly community perspectives), and serious concerns about adequacy (6 studies; 4 with moderate to thick data richness and 2 with thin data richness).
4	**Community beliefs about PPH risk factors.** Women and community members reported that physiological risk factors for PPH include grand multiparity (five or more previous births), retained placenta, prolonged labour, anaemia, contraceptive-induced amenorrhoea (related to beliefs about accumulation of "bad blood"), previous experience of PPH, and giving birth in a health facility where many women experience PPH.	Kaur 2018; Nelson 2013; Ononge 2016; Than 2018a	Minor concerns: 2 studies with no or very minor concerns, 2 studies with minor concerns (methodology, reflexivity, and data analysis)	No or very minor concerns	Moderate concerns: 3 lower-MICs (India, Sudan, and Myanmar) and 1 LIC (Uganda); community perspectives	Moderate concerns: 4 studies; 1 with thick data richness, 3 with thin data richness	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (methodology, reflexivity, and data analysis), moderate concerns about relevance (3 lower-MICs and 1 LIC; mostly community perspectives), and moderate concerns about adequacy (4 studies; 3 with thin data richness and 1 with thick data richness).
Decision-making to seek and access care								

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5	**Female relatives and traditional birth attendants were first to recognise PPH in the community.** For women who give birth at home or in the community, female family members or traditional birth attendants are the first to recognise excess bleeding after birth, usually by identifying blood clots, the colour of blood ("black colour"), severe bleeding, and other physiological changes such as pale skin, unconsciousness, weakness, or dizziness.	Aruldas 2017; Bell 2014; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Radoff 2013; Rosales 2017; Sharma 2017; Than 2018a	Minor concerns: 7 studies with no or very minor concerns, 3 studies with minor concerns (methodology, recruitment, reflexivity, and data analysis), 1 study with moderate concerns (recruitment, reflexivity and, data analysis)	No or very minor concerns	No or very minor concerns: 6 lower-MICs (Bangladesh, India, Indonesia, Nigeria, Guatemala, and Myanmar) and 2 LICs (Gambia, and Uganda); community perspectives	Minor concerns: 11 studies; 5 with moderate to thick data, 6 with thin data richness	High confidence	We had minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), no or very minor concerns about coherence and relevance (6 lower-MICs and 2 LICs; mostly community perspectives), and minor concerns about adequacy (11 studies; 5 with moderate to thick data richness, 6 with thin data richness).
6	**Complex decision-making and delays to seek care when PPH is suspected.** When women give birth in the community, family members typically take the decision of whether and when to seek care if PPH is suspected. These family members are often influenced by trusted traditional birth attendants or community midwives. Sociocultural factors influence care-seeking decisions, including limited autonomy for women giving birth, negative community perceptions and beliefs about quality of care at health facilities, and structural barriers to accessing care.	Alwy Al-beity 2020; Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Hose 2020; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017; Than 2018a	Minor concerns: 6 studies with no or very minor concerns, 4 studies with minor concerns (methodology, recruitment, reflexivity, and data analysis), 1 study with moderate concerns (recruitment, reflexivity,	No or very minor concerns	No or very minor concerns: 8 lower-MICs (Bangladesh, Guatemala, India, Indonesia, Myanmar, Nigeria, Lao PDR and Tanzania) and 2 LICs (Gambia and Uganda); mostly community perspectives	No or very minor concerns: 11 studies; 9 with moderate to thick data richness, 2 with thin data richness	High confidence	We had no or very minor concerns about coherence and relevance (8 lower-MICs and 2 LICs; mostly community perspectives), minor concerns about methodological limitations (methodology, recruitment, reflexivity, and data analysis), and no or very minor concerns about adequacy (11 studies; 9 with moderate to thick data richness, 2 with thin data richness).

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			and data analysis)					
7	**When PPH is identified for women birthing at home or in the community, decision-making about the subsequent referral and care pathway can be multifaceted and complex.** Once the decision to seek care is made, there can be further delays related to organising and paying for transportation, the need for onward referral to another health facility, and unclear referral pathways.	Alwy Al-beity 2020; Aruldas 2017; Bell 2014; Garcia 2012; Kalim 2009; Kaur 2018; Ononge 2016; Rosales 2017; Sharma 2017	Minor concerns: 6 studies with no or very minor concerns, 2 studies with minor concerns (appropriateness of qualitative methodology, reflexivity, and data analysis), 1 study with moderate concerns (recruitment, reflexivity, and data analysis)	No or very minor concerns	Minor concerns: 1 LIC (Uganda) 6 lower-MICs (India, Bangladesh, Indonesia, Nigeria, Tanzania, and Guatemala); mostly community perspectives	No or very minor concerns: 9 studies; 7 with thick data richness, 2 with thin data richness	High confidence	We had no or very minor concerns about coherence and adequacy, and minor concerns about methodological limitations (appropriateness of qualitative methodology, recruitment, reflexivity, and data analysis) and relevance (1 LIC, 6 lower-MICs; mostly community perspectives).
Perceptions and experiences of postpartum haemorrhage prevention, detection, and treatment								
8	**First responders to PPH are not always skilled or trained healthcare providers.** For women giving birth at home or in the community in LMICs, first-line treatment for excessive blood loss includes the traditional birth attendant or community midwife performing abdominal massage, giving the woman strong tea to drink, bathing the woman, encouraging vomiting to expel retained placenta, and providing medicines from a local pharmacy.	Aruldas 2017; Bij de Vaate 2002; Garcia 2012; Kalim 2009; Nelson 2013; Ononge 2016; Radoff 2013	Minor concerns: 4 studies with no or very minor concerns, 3 studies with minor concerns (recruitment, reflexivity, and data analysis)	No or very minor concerns	No or very minor concerns: 3 lower-MICs (India, Guatemala, and Bangladesh) and 3 LICs (Sudan, Gambia, and Uganda); community perspectives	No or very minor concerns: 7 studies; 6 with thick data richness, 1 with thin data richness	High confidence	We had no or very minor concerns about coherence, relevance and adequacy, and minor concerns about methodological limitations (recruitment, reflexivity, and data analysis).

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9	**Community-based misoprostol distribution.** Community members are often unaware that misoprostol can be used for PPH prevention; however, women, community members, and health workers consider misoprostol an acceptable option for PPH management, particularly in settings where women give birth at home or where there are delays in seeking care. Some community members are concerned that community-based distribution of misoprostol for PPH has unintended consequences, such as the use of misoprostol for abortion, labour augmentation, or discouraging women from giving birth in a health facility.	Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Hobday 2020; Hose 2020; Koski 2014; Than 2017	Minor concerns: 4 studies with no or very minor concerns, 4 studies with minor concerns (reflexivity and data analysis), 1 study with moderate concerns (reflexivity and data analysis	No or very minor concerns	Moderate concerns: 1 LIC (Mozambique) and 5 lower-MICs (Bangladesh, Myanmar, Nigeria, Ghana, and Lao PDR); healthcare provider and community perspectives	Minor concerns: 9 studies with thick data richness	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis) and adequacy (9 studies with thick data richness), and moderate concerns about relevance (1 LIC and 5 lower-MICs; healthcare provider and community perspectives).
10	**Visual estimation of blood loss and physiological detection of PPH.** In health facilities, midwives may consider it easy to implement visual estimation of blood loss with a kidney dish or under-pad, but difficult to accurately interpret the amount of blood loss, as there is substantial variation in blood loss estimation. Not all facility settings have clinical protocols or guidelines for measuring blood loss; therefore, midwives often detect blood loss by physiological assessment (e.g. blood pressure, pulse, appearance), which they consider easy to implement. Some health workers believe that clinical signs are more important than the amount of blood lost for detecting PPH; however, they do not feel confident diagnosing women with	Begley 2012; Rosmaria 2019	Moderate concerns: 1 study with minor concerns (reflexivity and data analysis), 1 study with moderate concerns (data collection, reflexivity, and data analysis)	No or very minor concerns	Moderate concerns: 2 HICs (Ireland, New Zealand) and 1 lower-MIC (Indonesia); midwives' perspective	Serious concerns: 2 studies with moderate to thick richness	Very low confidence	We had no or very minor concerns about coherence, moderate concerns about methodological limitations (data collection, reflexivity, and data analysis), moderate concerns about relevance (2 HICs and 1 lower-MICs; mostly midwives' perspectives), and serious concerns adequacy (2 studies with moderate to thick data richness).

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	PPH based solely on physiological signs.							
11	**Challenges with introducing quantification of blood loss.** Quantifying (rather than estimating) blood loss is a complex and contentious change of practice for some health workers. Health workers struggle with changes to the workflow and find it difficult to accurately measure blood loss with under-buttocks drapes or by weighing blood-soaked materials.	Lyndon 2016a; Seacrist 2018	Minor concerns: 1 study with no or very minor concerns, 1 study with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 HIC (USA); health workers' perspectives	Serious concerns: 2 studies with moderate to thick data richness	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC; healthcare providers' perspectives) and adequacy (2 studies with moderate to thick data richness).
12	**Acceptability and awareness of uterotonics for PPH prevention and management.** Most health workers are aware of the benefits of uterotonics for PPH prevention and management, particularly oxytocin (the "intervention of choice"), which is routinely given to women after birth for PPH prevention. Some health workers are aware that giving ergometrine too early might impede delivery of the placenta.	Deepak 2013; Koski 2014; Natarajan 2015; Rosmaria 2019; Schack 2014; Than 2017	Minor concerns: 2 studies with no or very minor concerns, 3 studies with minor concerns (reflexivity and data analysis), 1 study with moderate concerns (reflexivity and data analysis)	No or very minor concerns	Moderate concerns: 5 lower-MICs (India, Kenya, Ghana, Myanmar, and Indonesia); both community and healthcare providers' perspectives	Moderate concerns: 6 studies; 2 with thick data richness, 4 with thin data richness	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and moderate concerns about relevance (5 lower-MICs; both community and healthcare providers' perspectives) and adequacy (6 studies; 2 with thick data richness and 4 with thin data richness).
13	**Uterine massage for PPH prevention and management.** Midwives may be primarily responsible for performing uterine massage for PPH prevention. However, consistent application of uterine massage for PPH prevention is influenced by the midwives' avail-	Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014	Minor concerns: 1 study with no or very minor concerns, 3 studies with minor con-	No or very minor concerns	Serious concerns: 1 LIC (Sierra Leone) and 3 lower-MICs (Kenya, Ghana and	Serious concerns: 4 studies; 1 with moderate to thick data richness,	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about rele-

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	ability and workload, and the practice is prioritised for women with the highest risk factors for uterine atony.		cerns (reflexivity and data analysis)		Sudan); healthcare providers' perspectives	3 with thin data richness		vance (3 lower-MICs and 1 LIC; healthcare providers' perspectives) and serious concerns about adequacy (4 studies; 1 with moderate to thick data richness and 3 with thin data richness).
14	**Acceptability and use of NASG.** Health workers may consider the NASG an effective and a life-saving solution for PPH management at the community level and during referral. However, not all health workers are aware of how to use or remove NASGs.	Bekele 2020; Berdichevsky 2010; Jordan 2016	Minor concerns: 1 study with no or very minor concerns, 2 studies with minor concerns (reflexivity)	No or very minor concerns	Minor concerns: 1 upper-MIC (Mexico), 3 lower-MICs (Ethiopia, India, and Nigeria), and 1 LIC (Zimbabwe); healthcare providers' perspectives	Serious concerns: 3 studies with thick data richness	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity) and relevance (1 upper-MIC, 3 lower-MICs, and 1 LIC; healthcare providers' perspectives), and serious concerns about adequacy (3 studies with thick data richness).
15	**Acceptability and availability of UBT.** Health workers and community members may consider the UBT a low-cost, life-saving device for managing refractory PPH. Health workers and community members view it as acceptable owing to its ease of use and the availability of necessary supplies to make it (condom, catheter, syringes), even in resource-constrained settings.	Natarajan 2015; Natarajan 2016a Nelson 2013	Minor concerns: 3 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Moderate concerns: 2 lower-MICs (Sudan and Kenya) and 1 LIC (Sierra Leone); healthcare providers' perspectives	Moderate concerns: 3 studies; 1 with thick data richness, 2 with thin data richness	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and moderate concerns about relevance (2 lower-MICs and 1 LIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness, 1 with thin data richness).
16	**Women's experiences of PPH management at health facilities.** Women who gave birth in health	de la Cruz 2013; Dunning 2016;	Minor concerns: 3 studies with	No or very minor concerns	Serious concerns: 4 HICs (Aus-	Minor concerns: 5 studies; 4	Moderate confidence	We had no or very minor concerns about coherence, minor con-

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	facilities and experienced PPH described it as painful, embarrassing, and traumatic. Partners and other family members also found the experience stressful. While some women were dissatisfied with their level of involvement in decision-making for PPH management, others felt health workers knew more about PPH management so were best placed to make these decisions. However, women who had hysterectomies for severe PPH strongly believed that rich discussion and informed consent was needed before the procedure, in view of the lasting physical and emotional consequences.	Elmir 2012a; Robertson 2017; Snowdon 2012	no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)		tralia, Canada, USA and UK); women's and partners' perspectives	with moderate to thick data richness, 1 with thin data richness		cerns about methodological limitations (reflexivity and data analysis) and adequacy (5 studies; 4 with moderate to thick data richness and 1 with thin data richness), and serious concerns about relevance (4 HICs; women's and partners' perspectives).
System-level factors								
17	**Limited availability of misoprostol.** There is limited availability of misoprostol in the community owing to stockouts, poor supply systems, and the difficulty of navigating misoprostol procurement for community health workers. Community health workers and traditional birth attendants believe that endorsement from national stakeholders, robust distribution guidelines, and training for community health workers would improve the sustainability of misoprostol supply in the community.	Bell 2014; Cannon 2017; Durham 2016; Durham 2018; Hobday 2018; Than 2017	Minor concerns: 4 studies with no or very minor concerns, 1 study with minor concerns (reflexivity and data analysis), 1 study with moderate concerns (reflexivity and data analysis)	No or very minor concerns	Moderate concerns: 1 LIC (Mozambique) and 4 lower-MICs (Bangladesh, Myanmar, Nigeria, and Lao PDR); both community and healthcare providers' perspectives	Minor concerns: 6 studies with moderate to thick data richness	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis) and adequacy (6 studies with moderate to thick data richness), and moderate concerns about relevance (1 LIC and 4 lower-MICs; community and healthcare providers' perspectives).
18	**Cold chain and quality of uterotonics.** Reliability and availability of cold storage for oxytocin may be a key barrier to consistent and	Deepak 2013; Koski 2014; Than 2018a	Minor concerns: 1 study with no or very minor con-	No or very minor concerns	Serious concerns: 3 lower-MICs (Myanmar, India, and	Moderate concerns: 3 studies with moderate to	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations

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	quality use of the drug for PPH prevention and management.		cerns, 2 studies with minor concerns (reflexivity and data analysis).		Ghana); mostly healthcare providers' perspectives	thick data richness		(reflexivity and data analysis), serious concerns about relevance (3 lower-MICs; healthcare providers' perspectives), and moderate concerns about adequacy (3 studies with moderate to thick data richness).
19	**Availability of drugs and supplies.** Inconsistent availability of resources (drugs, medical supplies, blood) cause delays in the timely management of PPH. Availability is further exacerbated by procurement challenges, such as poor communication and inefficient technical capacity within facilities to internally allocate supplies.	Akhter 2016; Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017	No or very minor concerns: 5 studies with no or very minor concerns, 6 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Minor concerns:1 HIC (USA), 1 upper-MIC (Kosovo), 5 lower-MICs (Bangladesh, Tanzania, Kenya, Ghana, Myanmar), and 3 LICs (Mozambique, Sudan, Sierra Leone)	Minor concerns: 11 studies; 7 with thick data richness, 4 with thin data richness	High confidence	We had no or very minor concerns about coherence and methodological limitations, and minor concerns about relevance (10 countries: 1 HIC, 1 upper-MIC, 5 lower-MICs, 3 LICs) and adequacy (11 studies; 7 with thick data richness, 4 with thin data richness).
20	**Stressful working conditions.** Health workers describe working on the maternity ward as stressful and intense due to short staffing, long shifts, and the unpredictability of emergencies. Exhausted and overwhelmed staff may be unable to appropriately monitor all women, particularly when multiple women are giving birth simultaneously or on the floor of the health facility; this could lead to delays in detecting PPH. As a result, health workers feel dissatisfied and unappreciated, and in some settings	Alwy Al-beity 2020; Egenberg 2017a; Schack 2014; Seacrist 2018	No or very minor concerns.	No or very minor concerns.	Serious concerns: 2 LMICs (Ghana and Tanzania), 1 HIC (USA); healthcare providers' perspectives	Minor concerns: 4 studies with moderate to thick data richness	Moderate confidence	We had no or very minor concerns about coherence and methodological limitations, serious concerns about relevance (2 lower-MICs and 1 HIC; healthcare providers' perspectives) and minor concerns about adequacy (4 studies with moderate to thick data richness).

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	fear blame when poor outcomes occur.							
21	**Health workforce challenges.** Inadequate staffing, high turnover of skilled health workers, and appointment of lower-level cadres of health workers are key barriers to the provision of quality PPH care, particularly in facilities in rural areas. Health managers reported that many health workers do not have adequate or appropriate skills, even after attending in-service training. Continuous mentoring, coaching, and training is considered necessary to improve this situation.	Alwy Al-beity 2020; Hobday 2018; Moore 2016; Natarajan 2015; Natarajan 2016a; Nelson 2013; Schack 2014; Seacrist 2018; Than 2017; Vamos 2017; Woiski 2015	Minor concerns: 5 studies with no or very minor concerns, 6 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Minor concerns: 3 LICs (Mozambique, Sierra Leone, and Sudan), 4 lower-MICs (Tanzania, Kenya, Ghana, and Myanmar), 1 upper-MIC (Kosovo), 2 HICs (Netherlands and USA); health providers' perspectives	Minor concerns: 11 studies; 7 with thick data richness, 4 studies with thin data richness	High confidence	We had no or very minor concerns about coherence, and minor concerns about methodological limitations (reflexivity and data analysis), relevance (3 LICs, 4 lower-MICs, 1 upper-MIC, and 2 HICs; healthcare providers' perspectives), and adequacy (11 studies; 7 with thick data richness and 4 with thin data richness).
Intervention implementation strategies and lessons learnt								
22	**Teamwork and leadership.** Good leaders and supervisors work "hand in hand" with health workers and help inspire good performance and teamwork as they lead by example. In well-functioning teams, when health workers call for help during a PPH, people immediately organise and work together as a team until the woman is safely managed or referred. Working as a team is highly valued and considered necessary for providing appropriate PPH care and for ensuring health workers feel duty bound to see PPH emergencies through.	Alwy Al-beity 2020; Woiski 2015	Minor concerns: 1 study with no or very minor concerns, 1 study with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 lower-MIC (Tanzania) and 1 HIC (Netherlands); healthcare providers' perspectives	Serious concerns: 2 studies; 1 with thick data richness, 1 with thin data richness	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 lower-MIC and 1 HIC; healthcare providers' perspectives) and adequacy (2 studies; 1 with thick data richness and 1 with thin data richness).

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23	**Team-based, multidisciplinary simulation training.** Through team-based simulation training, health workers of different cadres (doctors, midwives, lay health workers) can develop a shared mental model to help them to work quickly, efficiently, and amicably as a team to manage women with PPH. Team-based multidisciplinary training may help to challenge existing hierarchical relationships, improve confidence, clarify roles and task management, reduce stress, improve provision of woman-centred care and communication, and encourage health workers to "rehearse, repeat and reinforce" their knowledge.	Egenberg 2017a; Vamos 2017; Woiski 2015	Minor concerns: 1 study with no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Moderate concerns: 1 lower-MIC (Tanzania) and 2 HICs (USA, Netherlands); healthcare providers' perspectives	Serious concerns: 3 studies; 1 with thick data richness, 2 with thin data richness	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about relevance (1 lower-MIC and 2 HICs; healthcare providers' perspectives), and serious concerns about adequacy (3 studies; 1 with thick data richness and 2 with thin data richness).
24	**Reflective learning and debriefing.** Debriefing, for example by having a "huddle" after an emergency or at the end of the shift, may help health workers discuss and reflect on what happened, what could be improved, how people are feeling, and the different roles that each person plays and could play in the future when managing a woman with PPH. While debriefing and reflective learning are mostly valued and considered useful by health workers, it can be challenging to consistently implement these strategies after every PPH and sustain them over time, owing to competing demands or staff resistance to the introduction of a new concept.	Egenberg 2017a; Lyndon 2016a; Seacrist 2018; Vamos 2017	Minor concerns: 2 studies with no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 lower-MIC (Tanzania) and 1 HIC (USA); healthcare providers' perspective	Moderate concerns: 4 studies; 1 with thick data richness and 3 with thin data richness	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), serious concerns about relevance (1 lower-MIC and 1 HIC; healthcare providers' perspectives), and moderate concerns about adequacy (4 studies; 1 with thick data richness and 3 with thin data richness).
25	**Factors affecting success of champions.** People who assume the role of champion voluntarily seem more enthusiastic and more	Jordan 2016; Lyndon 2016a; Seacrist	Minor concerns: 2 studies with no or very	No or very minor concerns	Moderate concerns: 1 LIC (Ethiopia), 3	Moderate concerns: 4 studies with thick data	Moderate confidence	We had no or very minor concerns about coherence, minor concerns about method-

(Continued)

	likely to achieve successful implementation in their context compared to people assigned the role of champion. Champions who are given protected time for project implementation within their other work responsibilities may be more likely to sustain success than champions who balance implementation and clinical responsibilities without dedicated time.	2018; Vamos 2017	minor concerns, 2 studies with minor concerns (reflexivity and data analysis)		lower-MICs (Zimbabwe, India, and Nigeria), and 1 HIC (USA); healthcare providers' perspectives			ological limitations (reflexivity and data analysis), and moderate concerns about relevance (1 LIC, 3 lower-MICs, and 1 HIC; healthcare providers' perspectives) and adequacy (4 studies with thick data richness).
26	**Local organisational culture.** Local organisational culture in each facility influences implementation, and existing cultures of safety, quality improvement, evidence-based practice, and change management facilitate success, as facilities have high readiness to engage in PPH initiatives. When faced with resistance, successful facilities focus on the anticipated benefits of implementation as a motivator, believing that changes to practice will become easier with time ("then it stuck" mentality) and that perseverance is critical. In contrast, facilities with less experience in quality improvement find it difficult to continually change practice, and facilities with strong interprofessional hierarchies often delay changes to practice or are unable to obtain consensus or foster a positive learning environment.	Lyndon 2016a; Seacrist 2018; Vamos 2017	Minor concerns: 1 study with no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 HIC (USA); healthcare providers' perspectives	Moderate concerns: 3 studies with moderate to thick data	Low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), moderate concerns about adequacy (3 studies with moderate to thick data richness), and serious concerns about relevance (1 HIC; healthcare providers' perspectives).
27	**Multidisciplinary collaboration and buy-in.** Implementation of PPH strategies requires multidisciplinary collaboration and buy-in, which could be challenging to coordinate but is critical to successful implementation. Collaborating across disciplines (e.g. midwifery,	Lyndon 2016a; Seacrist 2018; Vamos 2017	Minor concerns 1 study with no or very minor concerns, 2 studies with minor con-	No or very minor concerns.	Serious concerns 1 HIC PAHO country (United States of America); healthcare	Serious concerns 3 studies: 2 with thick data richness, 1 with thin data richness	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about rele-

(Continued)

	obstetrics) to develop a shared vision of care for women with PPH and streamline processes may require project leaders to appreciate different perspectives and goals of different departments and cadres.		cerns (reflexivity, data analysis).		providers' perspectives			vance (1 HIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness and 1 with thin data richness).
28	**Complex data collection and high workloads.** The complexity and time-intensiveness of data collection and high workloads may represent persistent barriers to implementation. Data collection on blood loss, health outcomes, and treatment require different data sources, and cross-departmental collaboration may be necessary to identify treatments. Onerous data collection systems coupled with existing high workloads in some cases discourage health workers from participating in PPH initiatives altogether.	Lyndon 2016a; Seacrist 2018; Vamos 2017	Minor concerns: 1 study with no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 HIC (USA); healthcare providers' perspectives	Serious concerns: 3 studies; 2 with thick data richness, 1 with thin data richness	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC; healthcare providers' perspectives) and adequacy (3 studies; 2 with thick data richness and 1 with thin data richness).
29	**Regular and clear communication.** Regular and clear communication and expectations about workflow and responsibilities may be critical to implementation success. Communication styles could be tailored to be responsive to leadership and cultural styles, and include both active communication methods (scheduled meetings, debriefings after PPH, educational meeting, informal discussions) and passive communication methods (flyers, announcements, emails). Less communication and openness may lead to challenges, particularly around problem-solving.	Egenberg 2017a; Lyndon 2016a; Vamos 2017	Minor concerns: 1 study with no or very minor concerns, 2 studies with minor concerns (reflexivity and data analysis)	No or very minor concerns	Serious concerns: 1 HIC (USA) and 1 lower-MIC (Tanzania); healthcare providers' perspectives	Serious concerns: 3 studies; 1 with moderately thick data richness, 2 with thin data richness	Very low confidence	We had no or very minor concerns about coherence, minor concerns about methodological limitations (reflexivity and data analysis), and serious concerns about relevance (1 HIC and 1 lower-MIC; healthcare providers' perspectives) and adequacy (3 studies; 1 with moderately thick data richness and 2 with thin data richness).

HIC: high-income country (per World Bank classification); LIC: low-income country (per World Bank classification); Lao PDR: Lao People's Democratic Republic; lower- MIC: lower middle-income country (per World Bank classification); NASG: non-pneumatic anti-shock garment; PPH: postpartum haemorrhage; UBT: uterine balloon tamponade; upper-MIC: upper middle-income country (per World Bank Classification).

Appendix 4. Relevant Cochrane Reviews of interventions

Review	Title	PICO Question	Methodology	Key results
Abedi 2016	Breastfeeding or nipple stimulation for reducing postpartum haemorrhage in the third stage of labour	**Patient or population:** women who had a vaginal birth in third stage of labour **Intervention:** nipple stimulation with breast pump. Early suckling was encouraged as soon as the cord was cut on women who gave birth by traditional birth attendants. **Comparison:** no treatment or treatment with oxytocin **Outcome:** severe PPH (measured or estimated blood loss of ≥ 1000 mL, or as defined by the trial authors); maternal death or severe morbidity	Quantitative (RCTs and quasi-RCTs)	There were no group differences regarding blood loss between nipple stimulation and no treatment, or treatment with oxytocin. The results were of low quality due to concerns related to the studies' methodology, analysis, and sample size.
Gallos 2018	Uterotonic agents for preventing postpartum haemorrhage: a network meta-analysis	**Patient or population:** women in the third stage of labour **Intervention:** carbetocin, misoprostol, injectable prostaglandins, ergometrine, ergometrine plus oxytocin (Syntometrine), misoprostol plus oxytocin **Comparison:** oxytocin **Outcome:** PPH ≥ 500 mL; PPH ≥ 1000 mL	Quantitative (RCTs or cluster-RCTs)	All agents were generally effective for preventing PPH when compared with placebo or no treatment. Ergometrine plus oxytocin combination, carbetocin, and misoprostol plus oxytocin combination may have some additional desirable effects compared with the current standard oxytocin. However, the 2 combination regimens were associated with significant side effects. Carbetocin may be more effective than oxytocin for some outcomes without an increase in side effects.
Hofmeyr 2013a	Uterine massage for preventing postpartum haemorrhage	**Patient or population:** women who gave birth vaginally or by caesarean section **Intervention:** uterine massage commencing after birth of the baby, before or after delivery of the placenta, or both **Comparison:** no intervention or a "dummy" procedure to mask allocation, or alternative methods or alternative forms of uterine massage, with or without other third-stage co-interventions	Quantitative (RCTs)	There was substantial heterogeneity in the outcome of ≥ 500 mL of blood loss after trial entry. The average effect, based on a random-effects model, showed no statistically significant differences between groups. The results of this review are inconclusive and should not be interpreted as a reason to change current practice. Due to the limitations of the included trials, more trials with sufficient numbers of women are needed to estimate the effects of sustained uterine massage.

(Continued)

		Outcome: ≥ 500 mL of blood loss after trial entry; placenta delivered > 30 minutes after birth		
Hofmeyr 2013b	Postpartum misoprostol for preventing maternal mortality and morbidity	**Patient or population:** pregnant women ≥ 24 weeks' gestation who received misoprostol during the third stage of labour or in the postpartum period **Intervention:** different doses and different routes (sublingual, oral, vaginal, rectal) of misoprostol used for prevention or treatment of PPH **Comparison:** placebo/no treatment or other uterotonics for prevention or treatment of PPH **Outcome:** maternal death	Quantitative (RCTs)	Misoprostol does not appear to increase or reduce severe morbidity when used to prevent or treat PPH. Misoprostol did not increase or decrease maternal mortality.
Oladapo 2020	Advance misoprostol distribution for preventing and treating postpartum haemorrhage	**Patient or population:** women in the third stage of labour in non-facility birth settings **Intervention:** advance misoprostol distribution/provision to pregnant women for postpartum self-administration **Comparison:** usual (or standard) care **Outcome:** severe PPH	Quantitative (RCTs, cluster-RCTS, and quasi-RCTs)	Evidence from 2 trials reveals that advance misoprostol distribution to pregnant women for self-administration during non-facility birth does not increase the risk of severe maternal morbidity or death compared to usual (or standard) care. There were no reliable data on quantifiable blood loss. Compared to usual care, the available evidence suggests there may be no increase in the risks of blood transfusion or maternal transfer or referral to a health facility. While a strategy of advance misoprostol distribution appears to reduce the proportion of women not using misoprostol (or any uterotonic) during non-facility childbirth, it remains uncertain whether misoprostol is correctly or appropriately used during non-facility birth.
Salati 2019	Prophylactic oxytocin for the third stage of labour to prevent postpartum haemorrhage	**Patient or population:** women in the third stage of labour in hospital labour wards and home births in France, Germany, the Netherlands, Sweden, South Africa, Tunisia, and the UK **Intervention:** oxytocin **Comparison:** no uterotonics or placebo **Outcome:** ≥ 500 mL of blood loss after delivery; need for additional uterotonics; maternal all-cause mortality	Quantitative (RCTs, cluster-RCTS, and quasi-RCTs)	Prophylactic oxytocin compared with no uterotonics may reduce blood loss and the need for additional uterotonics. The effect of oxytocin compared to ergot alkaloids is uncertain with regard to blood loss, need for additional uterotonics, and blood transfusion. Oxytocin may increase the risk of a prolonged third stage compared to ergot alkaloids, although it is unclear whether this translates into an increased risk of manual placental removal.

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Soltani 2011	Placental cord drainage after vaginal delivery as part of the management of the third stage of labour	**Patient or population:** all women who had a vaginal delivery **Intervention:** unclamping the previously clamped and divided umbilical cord and allowing the blood from the placenta to drain freely **Comparison:** no cord drainage **Outcome:** incidence of retained placenta; incidence of postpartum haemorrhage; postpartum blood loss; use of blood transfusion; length of third stage of labour	Quantitative (RCTs)	The results of this study show small positive effects of cord drainage in reducing the length of the third stage of labour by a few minutes and in reducing the amount of blood loss when compared with no cord drainage. The observed changes may be of little clinical significance, particularly in light of the limited availability of high-quality studies.
Smith 2020	Uterotonic agents for first-line treatment of postpartum haemorrhage: a network meta-analysis	**Patient or population:** women in the third stage of labour with PPH in hospital **Intervention:** multiple uterotonic agents (misoprostol, misoprostol plus oxytocin) **Comparison:** multiple uterotonic agents (oxytocin, Syntometrine plus oxytocin) **Outcome:** additional blood loss of ≥ 500 mL between recruitment and cessation of active bleeding; composite outcome of maternal death or severe morbidity	Quantitative (RCTs or cluster-RCTs)	The available evidence suggests that oxytocin used as first-line treatment of PPH is probably more effective than misoprostol, with fewer side effects. Adding misoprostol to the conventional treatment of oxytocin probably makes little or no difference to effectiveness outcomes and is also associated with more side effects. The evidence for most uterotonic agents used as first-line treatment of PPH is limited, with no evidence found for commonly used agents, such as injectable prostaglandins, ergometrine, and Syntometrine.
Tunçalp 2012	Prostaglandins for preventing postpartum haemorrhage	**Patient or population:** women after the birth of their baby **Intervention:** use of prostaglandins as part of active management of the third stage of labour **Comparison:** no uterotonics/placebo **Outcome:** severe PPH (blood loss ≥ 1000 mL); use of additional uterotonics in the third stage of labour	Quantitative (randomised trials)	Oral or sublingual misoprostol shows promising results when compared with placebo in reducing blood loss after delivery. The margin of benefit may be affected by whether other components of the management of the third stage of labour are used or not. As side effects are dose-related, research should be directed towards establishing the lowest effective dose for routine use, and the optimal route of administration.
Yaju 2013	Prophylactic interventions after delivery of placenta for reducing bleeding during the postnatal period	**Patient or population:** women who had a spontaneous vaginal delivery **Intervention:** ergometrine, methylergometrine, or other agents (herbal therapies, and homoeopathic remedies) ad-	Quantitative (RCTs or quasi-RCTs)	There was insufficient evidence to support the use of prophylactic oral methylergometrine given after delivery of the placenta for the prevention of PPH. Additionally, there is no clear evidence to support the prophylactic use of herbal medicine or homoeopathic remedies for PPH.

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	ministered by any route or timing of administration for the prevention of PPH after delivery of the placenta **Comparison:** placebo/no treatment **Outcome:** severe PPH (blood loss ≥ 1000 mL); maternal death or severe morbidity

PPH: postpartum haemorrhage; RCT: randomised controlled trial.

Appendix 5. List of sampled studies

Adegoke 2020
Akhter 2016
Alwy Al-beity 2020
Aruldas 2017
Begley 2012
Bekele 2020
Bell 2014
Berdichevsky 2010
Bij de Vaate 2002
Cannon 2017
de la Cruz 2013
Deepak 2013
Dunning 2016
Durham 2018
Durham 2016
Egenberg 2017a
Elmir 2012a
Garcia 2012
Hobday 2018

(Continued)

Hobday 2020
Hose 2020
Jordan 2016
Kalim 2009
Kaur 2018
Koski 2014
Lyndon 2016a
Moore 2016
Natarajan 2015
Natarajan 2016a
Nelson 2013
Ononge 2016
Radoff 2013
Robertson 2017
Rosales 2017
Rosmaria 2019
Schack 2014
Seacrist 2018
Sharma 2017
Snowdon 2012
Than 2017
Than 2018a
Vamos 2017
Woiski 2015

HISTORY

Protocol first published: Issue 12, 2020

CONTRIBUTIONS OF AUTHORS

SA and MAB drafted the protocol with input from all review authors.
SA, GF, MVC, SM, and MAB conducted study screening.

SA and MAB conducted data extraction, assessed methodological limitations, and conducted the synthesis.
SA, MVC, and MAB conducted GRADE-CERQual assessments.
SA, GF, FL, and MAB mapped findings to the frameworks.
SA and MAB drafted the manuscript.
All review authors provided feedback and read and approved the final review. The manuscript represents the view of the named review authors and does not necessarily represent the official views of HRP, the World Health Organization, or the review author institutions.

DECLARATIONS OF INTEREST

- SA has no conflicts of interest.
- GF has no conflicts of interest.
- MVC has no conflicts of interest.
- SM was a co-author on two studies included in this qualitative evidence synthesis (Jordan 2016; Berdichevsky 2010), but was not involved in the critical appraisal of these studies or GRADE-CERQual assessments of review findings where these studies contributed evidence.
- FA has no conflicts of interest.
- AC is the Chief Investigator for "Early detection of Postpartum Haemorrhage and treatment using the WHO MOTIVE 'first response' bundle: a cluster randomised trial with health economic analysis and mixed methods evaluation" (E-MOTIVE trial). This work is supported by a research grant from the Bill and Melinda Gates Foundation [Grant Number: INV-001393].
- IG was involved in conducting a study eligible for inclusion in this review.
- OTO has no conflicts of interest.
- JPV has an editorial role with Cochrane but was not involved in the editorial process for this review. JPV has worked as a health professional.
- FL has no conflicts of interest.
- MAB has an editorial role with Cochrane but was not involved in the editorial process of this review. MAB was involved in conducting a study eligible for inclusion in this review.

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  MAB's time.
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  FA, IG, OTO's time.

External sources

- Bill and Melinda Gates Foundation, via a Grant INV-001393 awarded to University of Birmingham, USA

  Early Detection of Postpartum Haemorrhage and Treatment Using the World Health Organization MOTIVE 'First Response' Bundle: a Cluster Randomised Trial With Health Economic Analysis and Mixed-methods Evaluation (E-MOTIVE Trial)
- Australian Research Council Discovery Early Career Researcher Award (DE200100264), Australia

  MAB's time

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We updated the title of the review from 'Perceptions and experiences of the prevention, identification and management of postpartum haemorrhage: a qualitative evidence synthesis' to better reflect the phenomenon of interest (Akter 2020).

INDEX TERMS

Medical Subject Headings (MeSH)

Family; Health Personnel; *Midwifery; *Misoprostol; *Postpartum Hemorrhage [diagnosis] [prevention & control]

MeSH check words

Female; Humans; Pregnancy