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REVIEW ARTICLE

Obstetrics

# Determinants of behaviors influencing implementation of maternal and perinatal death surveillance and response in low- and middle-income countries: A systematic review of qualitative studies

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## Abstract

**Background:** Maternal and Perinatal Death Surveillance and Review (MPDSR) can reduce mortality but its implementation is often suboptimal, especially in low- and middle-income countries (LMICs).

**Objectives:** To understand the determinants of behaviors influencing implementation of MPDSR in LMICs (through a systematic review of qualitative studies), in order to plan an intervention to improve its implementation.

**Search Strategy:** Terms for maternal or perinatal death reviews and qualitative studies.

**Selection Criteria:** Qualitative studies regarding implementation of MPDSR in LMICs.

**Data Collection and Analysis:** We coded the included studies using the Theoretical Domains Framework and COM-B model of behavior change (Capability, Opportunity, Motivation). We developed guiding principles for interventions to improve implementation of MPDSR.

**Main Results:** Fifty-nine studies met our inclusion criteria. Capabilities required to conduct MPDSR (knowledge and technical/leadership skills) increase cumulatively from community to health facility and leadership levels. Physical and social opportunities depend on adequate data, human and financial resources, and a blame-free environment. All stakeholders were motivated to avoid negative consequences (blame, litigation, disciplinary action).

**Conclusions:** Implementation of MPDSR could be improved by (1) introducing structural changes to reduce negative consequences, (2) strengthening data collection tools and information systems, (3) mobilizing adequate resources, and (4) building capabilities of all stakeholders.

**KEYWORDS**
behavioral factors, implementation, intervention planning, low- and middle-income countries, maternal and perinatal death surveillance and review (MPDSR), qualitative, systematic review

## 1 | INTRODUCTION

Maternal and Perinatal Death Surveillance and Response (MPDSR) is regarded as an important intervention to reduce maternal and perinatal mortality and is thought to have contributed to achieving this aim in several countries including India and Sri Lanka.[1] Therefore, widespread implementation of MPDSR is recommended by the World Health Organization (WHO).[2,3] Although 85% of low- and middle-income countries (LMICs) have a national policy to review all maternal deaths, fewer than half are implementing MPDSR as per WHO guidelines.[4]

If implemented properly, maternal and perinatal death reviews can reduce maternal mortality by up to 35%,[5] and perinatal mortality by 30%.[6] However, MPDSR often fails to achieve these improvements. In a survey of health facilities in four African countries, fewer than half could provide evidence of any changes resulting from MPDSR.[7] MPDSR sometimes even led to unintended harmful outcomes such as worsening staff shortages or inappropriate referrals of severely ill patients, in order to avoid responsibility.[7] Studies on barriers and enablers in several contexts have been emerging since the inception of MPDSR, but there is clearly a need to improve implementation of MPDSR to achieve its potential impact beyond outlining such factors.

Although behavioral science is crucial in this endeavor, there has been little research on behavioral determinants influencing the implementation of MPDSR, for example what motivates health staff, and how to improve leadership skills.[8,9] To date, only one intervention to improve the implementation of MPDSR (including training, supervision, and provision of resources) has been rigorously evaluated in a cluster-randomized controlled trial.[5] The only component currently being scaled up globally is "training of trainers".

We conducted a systematic review of qualitative studies that documented stakeholders' experiences of implementing MPDSR in LMICs. Our first paper used a realist lens to analyze the contexts and mechanisms underlying both the functional action cycle of successful MPDSR and the dysfunctional vicious cycle of ineffective MPDSR.[10] This second article aims to understand and map the key behavioral determinants of MPDSR implementation, and from these, develop program theory for an intervention to improve its implementation in LMICs.

## 2 | MATERIALS AND METHODS

We conducted a systematic review of qualitative studies regarding the implementation of MPDSR in LMICs, which we report following ENTREQ guidance.[11] The protocol was registered on PROSPERO (https://www.crd.york.ac.uk/prospero/display_record.php?RecordID=271527).

### 2.1 | Search strategy

We searched seven databases from inception to June 2022: CINAHL, MEDLINE, EMBASE, ProQuest Dissertations and Theses, Global Index Medicus, Web of Science, and Google Scholar using key terms for maternal or perinatal death reviews and qualitative studies (Table S1).

### 2.2 | Eligibility criteria

We included qualitative studies regarding implementation of MPDSR or any form of maternal/perinatal death review in LMICs. We excluded studies in high-income countries, those solely about "near-miss" reviews, and studies with insufficient or poorly reported qualitative data.

### 2.3 | Study selection

Two reviewers independently screened titles, abstracts, and selected full texts against the inclusion criteria. Disagreements were resolved by discussion with a third reviewer.

### 2.4 | Data extraction and analysis

Studies were imported into Nvivo.[12] Data on findings (themes, quotes, and other author observations) were identified by repeated reading of text especially in the results and discussion sections. Two reviewers used a framework approach to identify and code behavioral determinants of implementation of MPDSR using the Theoretical Domains Framework (TDF) and the COM-B (Capability, Opportunity, Motivation) behavior change wheel.[13,14,15] "Capabilities" were defined as knowledge and skills needed by individuals to implement MPDSR, while "opportunities" refer to all factors (physical and social) outside the individual needed to implement MPDSR. "Motivation" includes factors that energize individuals to implement MPDSR, both automatic (habitual processes and emotional responses) and reflective (conscious, analytical decision making).[15] These key capabilities, opportunities, and motivational factors were used to determine the guiding principles for a complex intervention to improve the implementation of MPDSR. Guiding principles, a key part of the Person-based approach to developing complex interventions, highlight how the intervention will address issues crucial to engagement.[16] Components of such an intervention were planned based on key examples of good practice and suggestions for improving implementation, extracted from the primary papers.

### 2.5 | Quality assessment

We used the Critical Appraisal Skills Program (CASP) tool for qualitative studies to appraise the quality of full-text articles.[17]

## 3 | RESULTS

### 3.1 | Study selection

We identified a total of 5137 studies after de-duplication (Figure 1). Of these, 134 were assessed in full text, of which 76 were excluded. The commonest reasons for exclusion were focus on other phenomena (for example, near-miss reviews) or lack of qualitative methods or qualitative data.

### 3.2 | Study characteristics

After screening, we included 59 studies, reported in 58 papers from 30 LMICs,[1,7,9,18–72] which included over 1891 participants, most of whom were health workers in hospitals and health facilities, although nine studies included national-level leaders of MPDSR and seven included community members (Table S2). Almost all the studies collected data using individual interviews and/or focus group discussions. Ten observed death review meetings and six also reviewed reports and other relevant documents. Most studies used thematic analysis although two used framework analysis, one used conversational analysis and 12 did not specify their analytical method. The majority (34) focused on maternal deaths, 19 included both maternal and perinatal deaths, and six covered solely perinatal or neonatal deaths. Several of the papers in the review reported improved outcomes although only one was nested in a randomized controlled trial which clearly demonstrated an improved outcome.[38]

### 3.3 | Methodologic quality

All studies were of sufficient quality (Table S3). The qualitative methodology, research design, recruitment strategy and data collection were adequately described in almost all studies. However, the data analysis was unclear (not adequately described)

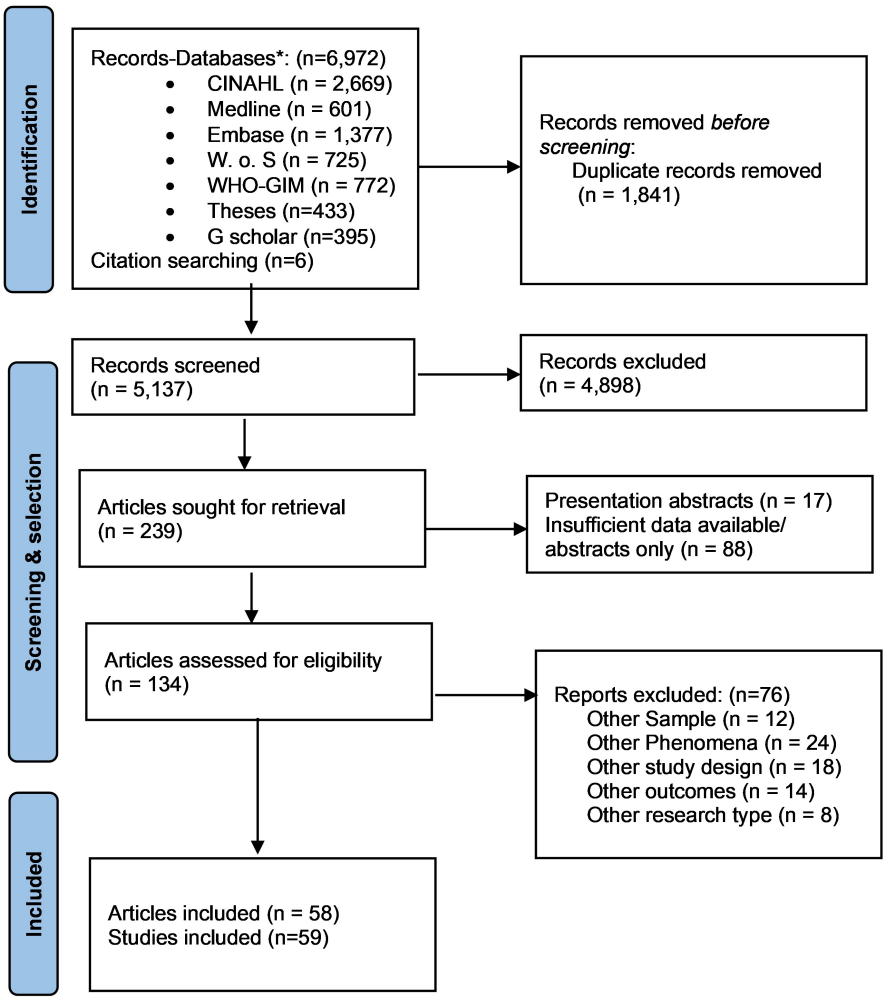


FIGURE 1 Study selection.

in seven studies and inadequate in two, and most did not adequately consider the relationship between the researcher and the participants.

### 3.4 | Synthesis: Behavioral determinants of impactful MPDSR

Implementation of MPDSR is complex because it involves stakeholders at every level. Some behavioral determinants affect several different groups of stakeholders, while others may only affect one group (Figure 2, Tables 1 and 2; Tables S4–S7).

### 3.5 | Capability

The capabilities required increase cumulatively from community to health facility and leadership level (Figure 2). All stakeholders require a basic understanding of the purpose of MPDSR. Some leaders may misinterpret it as a tool for disciplining staff,[71] resulting in a well-justified fear of blame.[52] All health workers need knowledge of clinical protocols and good record-keeping skills so that committees can access the information needed to identify cause of death and avoidable factors.[38,45,48,52] Data collectors need specific skills on completing relevant forms, and interviewing/verbal autopsy where relevant.[1,39] MPDSR committee members need additional knowledge on cause of death classification,[50,53,62,71] and skills in teamwork, audit,[41] communication (expressing disagreement without causing acrimony),[37,57,70] and making SMART recommendations.[47,48] Chairpersons and leaders also need skills in leadership,[21,38,39] chairing,[37] maintaining confidentiality,[48] coaching,[42] and budgeting.[33] Mentors/supervisors of the leaders need additional mentorship skills.[38] In several contexts, teams only had experience of reviewing maternal deaths and expressed a need for specific training on reviewing perinatal/neonatal deaths.[71,72]

### 3.6 | Opportunity

Opportunities that enable implementation of MPDSR are summarized in Table 1. Social opportunity for an open and honest discussion of deaths and avoidable factors is of paramount importance at all levels. This requires strict maintenance of a "no-name, no-blame" policy and confidentiality.[1] This can be difficult to achieve in health facilities with low staff numbers, where health workers can easily recognize who was involved in management of a case.[61] A safe learning environment can foster constructive dialogue, overcome barriers of hierarchy, and encourage all staff to identify errors and gaps in care,[9,32,48,51,52] even if anonymization is not possible. Conversely, a "blame culture" and hierarchical relationships stifle open discussion and result in blame-shifting rather than identifying avoidable factors and accepting responsibility.[23,33,37,40,46,48]

In the community, the social opportunity to collect information depended on respect of cultural norms and traditions.[20] Patients and bereaved families need the opportunity to make complaints about care,[68] and their perspective could help the MPDSR process. Paradoxically the absence of a complaints procedure pushes families to seek legal action as they see no other avenue.[68] Community review meetings provide a unique opportunity to openly discuss issues which otherwise would not be discussed.[32]

Surprisingly, key stakeholders are often unaware of recommendations addressed to them,[18,21,24,39–41] so they cannot implement them. When key stakeholders responsible for implementation are not present at review meetings, they need to be informed about the recommendations. For leaders, the social opportunities to implement MPDSR were enhanced by integration with other public health programs at all stages of the process.[19,28]

Physical opportunity for implementing MPDSR depends on availability of reporting systems, medical records, and resources. Although comprehensive reporting of deaths is the foundation for MPDSR, few LMICs have a robust vital registration system.[1] Various systems have been created to improve the reporting of maternal

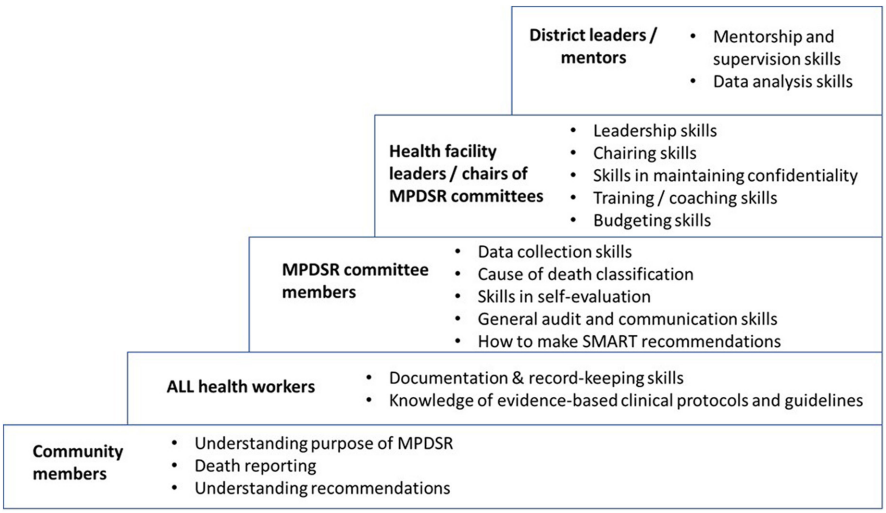


FIGURE 2 Capabilities required for stakeholders to implement the Maternal and Perinatal Death Surveillance and Review (MPDSR).

**TABLE 1** Opportunities to enable stakeholders to implement MPDSR.[a]

| Stage of MPDSR cycle: | All | Reporting deaths | Data collection | Review | Formulating recommendations | Implementing recommendations | | Evaluate and refine |
|---|---|---|---|---|---|---|---|---|
| Community | Opportunity to participate without fear of blame, litigation or disciplinary action | Notification system | Respecting traditions, timing of interviews | Forum to discuss deaths | Opportunity to make recommendations | Financial resources | Awareness of recommendations | |
| All health workers | | | Documentation, availability of medical records | Workload | Opportunity to be involved in meetings | | | |
| MPDSR committee members | | | | Resources, MPDSR forms, scheduling meetings | | | | |
| | | | | Working relationships, hierarchy, Confidential environment, structured discussion | | | | |
| Leaders | | | | | | | | Monitoring system |
| | | Support from all levels of the health system | | | | | | |

Abbreviation: MPDSR, Maternal and Perinatal Death Surveillance and Review.

[a]Blue = physical opportunities; pink = social opportunities.

**TABLE 2** Motivation to implement MPDSR.[a]

| Type of motivation | TDF domain | Community | All health workers | Committee members | Leaders |
|---|---|---|---|---|---|
| Reflective | Beliefs about capabilities | Review of positive care boosts morale | MPDSR empowers health workers | | MPDSR can help to solve problems |
| | Beliefs about consequences | "no-name, no-blame", improving services | Separation of MPDSR from litigation/disciplinary procedures | | MPDSR process generates useful data |
| | | Useful learning | | Professional development | |
| | Incentives | Incentives to report deaths | Results-based financing | Recognition and appreciation of contributions to reviews | |
| | Goals | Commitment to reduce deaths | | | |
| Automatic | Social/professional role, identity and responsibility | Commitment to reduce deaths | Professional responsibility; Institutionalization of MPDSR; support from district health team; ownership; MPDSR provides professional satisfaction | | MPDSR leadership is part of professional training |
| | | | Assigned responsibility for MPDSR process and actions | | |
| | Reinforcement | | | System for following up recommendations | |
| | | | Supportive supervision | | |
| | Emotion | Use less threatening terms | Rebranding | Guilt motivates change | |

Abbreviations: MPDSR, Maternal and Perinatal Death Surveillance and Review; TDF, Theoretical Domains Framework.

[a]Classified according to the Theoretical Domains Framework[14] for each stakeholder group.

and perinatal deaths, but under-reporting can result from complicated or non-integrated systems requiring multiple reports or where there is no system for reporting deaths outside of government health facilities.[42,48,53,66,72] Good medical record systems are essential for finding information on quality of care. Inadequate filing systems and missing records prevent further analysis of cases,[21,34,48] whereas lack of secure storage enables falsification of records when a death is being investigated.[48,52] The review itself should be recorded on a form, which can facilitate the process if well-designed,[38] this form often being the main focus of review meetings.[52] However, the requirement to complete it can hamper the review if forms are unavailable,[1,33] not anonymous,[40] too long,[1] or miss out information (such as social factors, quality of care, and recommendations).[48,50]

Availability of resources affects implementation of MPDSR at all levels. Health facilities require staff time to investigate cases and attend meetings,[7] as well as funding for training and implementing recommendations.[17,33] Where staff are expected to work or meet outside normal working hours, some expect extra pay.[35,70] Effective supervision requires the time of senior experts and their travel to relevant health facilities.[38] Involvement of communities requires additional staff time and transport to conduct interviews and meetings and respect for traditions such as paying condolences.[1,18,20,66]

## 3.7 | Motivation

The factors influencing motivation to implement MPDSR are summarized in Table 2. The most important is to uncouple MPDSR from fear of blame and negative consequences (such as disciplinary action and litigation), which motivate stakeholders at all levels to disengage from MPDSR. Both community members and health workers feared that they could be jailed or convicted by the police if they were found responsible for a death.[19,30,68,73] Health workers also feared that they could be subject to disciplinary procedures,[56,69,71] punishments,[18,46] or litigation,[1,48,65,68] or required to pay compensation to family members.[40] Leaders feared missing targets and put pressure on clinicians not to report maternal deaths.[46] Some terms such as "negligence" and "audit" also elicited negative emotions.[18,48]

Reflective motivation came from stakeholders believing that there would be positive consequences such as a useful learning experience,[9,25,41] and that they were capable of making positive changes,[27] which would improve quality of care and reduce mortality.[22,48] The desire for incentives was frequently mentioned, especially for members of MPDSR committees to attend meetings. Staff often expected refreshments[9,39] or financial incentives,[56,61,70] but these were usually dependent on time-limited external donor funding. Withdrawal of incentives was a strong demotivator and resulted in meetings ceasing.[56] Inclusion of MPDSR as an indicator for performance-based financing may be a more sustainable incentive but was only reported in one study.[66] Members became demotivated when no positive changes were observed,[9,49,52] the same recommendations were often repeated,[21,22,41] there was no support,[48] no feedback of recommendations,[18] and no incentives.[22,52]

Automatic motivation to engage in MPDSR resulted from institutionalization of the process, such that it became part of the professional role and routine activities of health workers.[19,28] Involving stakeholders in formulating recommendations motivated them to take ownership and responsibility for implementation.[9,48] This was reinforced by providing feedback about implemented changes and supportive supervision.[23,27,28,42,52] Health workers were automatically motivated to improve their quality of care when they knew that this would be audited as part of MPDSR.[41,47,48] MPDSR commonly elicited negative emotions such as fear and guilt and "rebranding" was used to avoid this (e.g. from "audit" to "review").[18,48] The feeling of guilt sometimes led to defensiveness,[48] but sometimes motivated improvements in care.[62,70]

## 3.8 | Guiding principles for an intervention to improve implementation of MPDSR

These principles follow logically from the behavioral determinants identified in Table 3.

Capability to implement the various components can be built through training, addressing specific needs in each stakeholder group. The training should be available on an ongoing basis for new staff, especially in contexts where there is frequent turnover.[19] Ongoing mentorship and supervision are also necessary to continually improve capabilities.[2,19,27,28,32,38,42,43,48]

Social opportunities for meaningful and productive discussions can be increased at the local level by asking committee members to sign a charter,[35,70] committing themselves to observing the principles of MPDSR such as confidentiality and "no-name, no-blame", and ensuring a safe learning environment. In addition, its principles need to be enforced by the chair of meetings, which can be particularly challenging in small health facilities where staff can easily recognize themselves in case discussions.[61] Good communication of recommendations is essential to ensure that those responsible have the opportunity to implement them.

Physical opportunities to implement MPDSR can be improved by ensuring data quality, such as integrated and user-friendly death reporting systems,[52] structured medical records,[39] secure and organized filing of medical records,[48] optimized MPDSR forms, and structured supervision forms.[38] It is equally important to ensure that resources are sufficient, by embedding MPDSR into routine health services and ensuring that funds are available for necessary expenses such as stationery and transport, as well as implementing recommendations.

Fear of blame, disciplinary action, and litigation, as the critical issue affecting motivation, needs to be addressed at all levels, through structural changes such as preventing the use of MPDSR documents for litigation,[74] and separating responsibility for MPDSR from disciplinary procedures.[48] The focus must be on recommending health system improvements rather than identifying

**TABLE 3** Guiding principles for an intervention to improve implementation of MPDSR in the community (organized by behavioral determinants).

| COM-B Category | Key behavioral determinants | Design objectives that address each behavioral determinant | Key intervention features relevant to each design objective |
|---|---|---|---|
| Capability | Understanding purpose of MPDSR | To ensure all stakeholders (involved in MPDSR—as per Figure 1) understand the purpose of MPDSR and its core principles (including "no name, no blame" and identifying areas for collective action rather than identifying individuals) | • Community meetings to explain MPDSR and address any concerns<br>• Pre-service training: incorporation of basic training in curricula for all health workers, especially doctors and midwives<br>• In-service training for all health workers<br>• Refresher training: Regular updates for all health workers and to ensure that new health workers are also trained<br>• Provide opportunities for all staff to be involved in regular MPDSR meetings |
| | Documentation and record-keeping skills | To improve clinical record-keeping | • Persuade and train health workers on importance of comprehensive record-keeping<br>• Improve vigilance through auditing of records |
| | Data collection skills | To improve data collection | • Training on completing relevant forms<br>• Training on verbal autopsy/interview techniques (for data collectors) |
| | Knowledge of death and cause of death classification | To improve accuracy of death and cause of death classification | • Training on basic classification of maternal and perinatal death types (what counts as a maternal death, stillbirth vs neonatal death)<br>• Training on ICD-MM (maternal mortality) and ICD-PM (perinatal mortality) |
| | Knowledge of clinical guidelines and standards | To improve identification of areas where care can be improved | • Provision and training on relevant evidence-based guidelines and standards for both maternal and perinatal care<br>• Use of structured approach to discussion; training on use of fishbone diagrams.<br>• Ensure that meeting is confidential and anonymous<br>• Skillful chairing of meetings to ensure blame-free process and to facilitate all members to be appropriately self-critical<br>• Input from external reviewers<br>• Regular supervision by experienced mentors |
| | General audit and communication skills | To ensure that death review meetings are constructive and productive | • To improve teamwork skills<br>• To equip health workers to deal constructively with criticism<br>• To empower committee members to express disagreement without causing acrimony |
| | Data analysis skills | To improve data analysis skills | • Training on relevant data analysis skills (for those responsible for analyzing aggregate data at facility/district/regional levels) |
| | Skills in making recommendations | To improve formulation of SMART recommendations | • Training on how to formulate and document SMART recommendations<br>• Ensure recommendations can be implemented within available resources<br>• Supervision by experienced mentors |
| | Leadership skills | To improve relevant leadership skills | • Training chairs and leaders on implementing and maintaining confidentiality and "no-name, no-blame"<br>• Training on supervision/coaching skills<br>• Supervision/mentorship by experienced mentors |
| | Chairing skills | To optimize chairing of meetings | • Training on communication and chairing skills, participation-enhancing strategies<br>• Regular supervision by external mentor |
| | Budgeting skills | To optimize use of resources | • Training on budgeting skills (specifically regarding the MPDSR budget) |
| | Coaching/training skills | To improve supervision and mentoring of staff conducting MPDSR at all levels | • Training on coaching/training/mentorship skills, tailored to each level of leadership as appropriate |

(Continues)

TABLE 3 (Continued)

| COM-B Category | Key behavioral determinants | Design objectives that address each behavioral determinant | Key intervention features relevant to each design objective |
|---|---|---|---|
| Opportunity | Social opportunity for an open and honest discussion of deaths and avoidable factors | To enable all relevant stakeholders to identify issues with quality of care and to contribute to the discussion | • Committing to confidentiality and "no-name, no blame", by signing an MPDSR "charter"<br>• Providing a safe learning environment<br>• Providing a feedback/complaints procedure for patients and bereaved families to provide direct feedback and make complaints<br>• Holding community meetings to enable community members to discuss relevant cases |
| | Social opportunity for implementation of recommendations | To ensure that all relevant stakeholders are aware of recommendations | • Where possible, assign responsibility for implementation of each recommendation to a specific person<br>• For broader recommendations, identify key stakeholders according to their influence and interest in the topic<br>• Establish a communication and dissemination plan for communicating recommendations to all who have the possibility to implement them (especially if they are not present at the meetings) |
| | Social opportunity to interview bereaved relatives | To respect cultural traditions around bereavement, burials, and mourning | • Respect of local customs and traditions should be prioritized over other considerations (e.g. completing interview within a certain timeframe)<br>• Appropriate condolence gifts should be provided where this is a cultural expectation |
| | Death notification system | To streamline and facilitate death reporting | • Integrated and simplified death notification system, so that community members and health workers can easily and quickly report all maternal and perinatal deaths.<br>• Use of cheap and widely used communication channels (e.g. mobile phones) |
| | Clinical records | To improve quality and accessibility of clinical records | • Facilitate completion of clinical records using standardized structured forms where appropriate<br>• Ensure correct forms are available<br>• Secure filing and storage of medical records |
| | MPDSR forms | To optimize death review forms and ensure their availability | • Forms are anonymized<br>• Forms contain all important information but are not overly long or complicated<br>• Structure of form encourages focus on making SMART recommendations and their follow up |
| | Supervision | To ensure that supervision visits are supportive and effective | • Use of structured supervision forms[38] to guide supervision/mentoring visits. |
| | Resources | To ensure there are sufficient resources to implement MPDSR | • Embedding MPDSR within normal working pattern<br>• Sufficient budget for implementing MPDSR including training, meetings, implementing recommendations, and supervision/mentoring |
| Motivation | Fear of blame | To address and remove underlying reasons for fear of blame | • Legal protection so that MPDSR documents cannot be used for litigation or disciplinary proceedings<br>• Ensure confidentiality, anonymity and "blame-free" principles are understood and adhered to by all<br>• Leaders of MPDSR should be different people from those responsible for disciplinary procedures<br>• "Rebranding" to avoid use of terms perceived to be threatening, such as "negligence" |
| | Automatic motivation to engage | To "institutionalize" MPDSR | • Integrate MPDSR into regular work patterns<br>• Integrate MPDSR into professional roles and responsibilities<br>• Involve all relevant stakeholders in review meetings so that they participate in formulating recommendations and take ownership and responsibility for implementing them<br>• Regular follow up of recommendations to monitor implementation |

TABLE 3 (Continued)

| COM-B Category | Key behavioral determinants | Design objectives that address each behavioral determinant | Key intervention features relevant to each design objective |
|---|---|---|---|
| | Reflective motivation to engage | To provide a useful learning experience | • Ensure that MPDSR meetings provide valuable learning opportunities for all staff. |
| | | To build self-efficacy | • Empower members to make positive changes<br>• Positive feedback of changes implemented and resulting improvements in quality of care/mortality<br>• Supportive supervision and mentoring of MPDSR committee members and chairs |
| | | To reward achievement | • Recognition of staff contributions through incentives (provision of equipment, refreshments, remuneration, celebration)<br>• Results-based financing<br>• Incentives for community members to report deaths |

Abbreviations: COM-B, Capability, Opportunity, Motivation; ICD, International Classification of Diseases; MPDSR, Maternal and Perinatal Death Surveillance and Review; SMART, Specific, Measurable, Achievable, Realistic and Time-bound.

individuals at fault. Rebranding may be needed in contexts where terms like "audit" and "negligence" have become associated with blame.[18,48] Reviews can be used as a positive mechanism for prioritizing modifiable factors and exonerating staff from unfair blame.[65]

In parallel, motivation of health workers will be automatically increased if implementation becomes part of their professional role and becomes embedded in their working schedules. Involving relevant stakeholders in review meetings and formulating recommendations will enable them to take ownership and responsibility for implementing them.[9,25,27,28,38,39,48,49] It is also crucial to have a system to follow-up and monitor the implementation of recommendations.[23,27,48,53]

Reflective motivation to engage in MPDSR should be increased by maximizing learning opportunities, building self-efficacy of members, and providing incentives. Most health workers are keen to keep learning and many value MPDSR meetings for this reason.[9,25,27,41] Their self-efficacy can be built by experiencing improvements due to MPDSR and receiving positive feedback about recommendations implemented.[27,53] Although financial compensation for participation in meetings has been offered by some projects, this often depended on donor funding and so was unsustainable,[52] causing demotivation and even collapse of the process when incentives were withdrawn.[72] Other more sustainable incentives include performance-based financing,[66] providing refreshments during meetings,[39] and celebration of achievements.[9]

## 4 | DISCUSSION

The principal behavioral determinants of MPDSR include capability to perform the tasks required by different stakeholders, the physical and social opportunity to conduct reviews and implement their recommendations, and the automatic and reflective motivation to engage in the process. Based on this empirical evidence, guiding principles for an intervention to improve implementation of MPDSR include building capabilities at all levels, improving opportunities for successful MPDSR (by improving data quality and availability, mobilizing resources and creating a learning environment), and motivating all stakeholders to engage in the process. Motivation requires removing fear of blame and can be increased automatically by embedding MPDSR into institutions and professional roles, involving all important stakeholders, and establishing systems for monitoring implementation. Motivation can be enhanced by providing valued learning opportunities, building self-efficacy of committee members, and providing context-specific incentives.

We conducted a comprehensive literature search and included articles from a wide range of LMICs with over 1891 participants, which provides solid empirical evidence on which to base the analysis. Although the relative importance of determinants varies in different contexts, the main factors were remarkably consistent in all the studies. We did not conduct a formal assessment of confidence in the review findings. The search was limited to qualitative studies; quantitative studies may also provide useful complementary evidence and could be reviewed subsequently.

### 4.1 | Implications for policy and practice: proposed components of a complex intervention to improve implementation of MPDSR

Based on our findings, a complex intervention to improve MPDSR implementation could consist of six major components (Table 4). Simply implementing training in the context of a "blame culture", inadequate data quality, and lack of resources are unlikely to achieve the desired impacts. For this reason, the first four components lay the foundations on which subsequent training and supervision can be built.

#### Stakeholder engagement and implementation research

Engagement at all levels is key to ensure ownership of the intervention, and that results of MPDSR are transformed into concrete actions by relevant stakeholders. An implementation research

**TABLE 4** Components of the proposed intervention.

| Major components | Category | Specific sub-components |
|---|---|---|
| Stakeholder engagement in implementation research | Stakeholder engagement | Engaging all relevant stakeholders in developing the strategy/intervention<br>Development of communication plan |
| | Implementation research | Review of relevant policies<br>Assessment of health facilities' readiness to implement MPDSR<br>Interviews and focus group discussions with key stakeholders |
| Removing fear of blame | Legal protection | Enactment of legal instruments to prevent use of MPDSR data in litigation |
| | Separation from disciplinary procedures | Ensure that the person responsible for MPDSR is not the same person who is responsible for disciplinary procedures.<br>Ensure that police is not involved |
| | Enforcing confidentiality | Model charter, which members of MPDSR committee are required to approve and sign, committing themselves to maintaining confidentiality |
| | Re-branding | Where a previous MPDSR system has been associated with fear of blame, re-brand the system to make it clear that it has changed |
| Tools for improving data quality | Death notification system | Integrated system for reporting deaths from communities and health facilities |
| | Data collection tools | Optimized structured data collection forms/software |
| | Medical record structure | Optimized structured medical records to facilitate completion |
| | Medical record archiving | Optimized system for secure archiving of medical records |
| | MPDSR recording | Optimized structured forms and software for recording key elements of MPDSR discussion |
| | Documentation of recommendations | Optimized system (forms / software) for recording and following-up recommendations |
| | Documentation of supervision | Optimized structured form for recording supervisions and recommendations |
| Mobilizing resources for implementation | Training costs | Travel/refreshments and materials for training (or computer and internet for online training) |
| | Data collection tools | Resources to provide sufficient tools (paper forms or computer software, hardware and internet) |
| | Staff time | Ensure that staff have protected time to attend training and fulfill their roles in MPDSR |
| | MPDSR death review meeting costs | Refreshments for members (and financial allowance where members are asked to attend outside of normal working hours) |
| | Implementation of recommendations | Sufficient financial resources to implement appropriate recommendations (e.g. buying equipment, organizing CPD, community feedback meetings) |
| | MPDSR feedback meeting costs | Regular meetings at community, facility, district, regional and national levels to feedback main results and discuss recommendations (financing for travel and refreshments, venue hire if needed—or for internet connection for online meetings) |
| | Supervision and mentoring costs | Travel costs and remuneration for supervisors/mentors |
| | Community involvement costs | Remuneration for community death reporters<br>Travel costs for facilitators to community meetings and for mobilization of community members to attend<br>Remuneration and travel costs for data collectors in the community<br>Condolence money for bereaved families (where this is a cultural expectation)<br>Travel costs for community representatives to attend higher-level meetings |
| | Communication and dissemination costs | Remuneration for communication manager<br>Costs for communication materials: flyers, booklet, photos, videos<br>Costs for mass media: radio, TV, social media<br>Travel costs for mobilization of health district leaders, policy makers at central level |

TABLE 4 (Continued)

| Major components | Category | Specific sub-components |
|---|---|---|
| Training and institutionalization: Modular "Whole institution" approach | Level 1: training for all staff in health facilities | Pre-service: relevant module in training curricula for medical, nursing, and midwifery students |
| | | In-service: Baseline training for all staff on<br>• Understanding principles of MPDSR<br>• Death notification and classification<br>• Record-keeping and documentation |
| | Level 2: training for MPDSR committee members | Module 1: Principles of MPDSR and audit |
| | | Module 2: Data collection (optional—for data collectors) |
| | | Module 3: Identification of care that can be improved; self-evaluation |
| | | Module 4: Formulation of SMART recommendations |
| | | Module 5: Data analysis (optional—for those involved in data analysis) |
| | Level 3: Training for MPDSR facility leaders/chairs of committees | Module 1: Basic leadership skills |
| | | Module 2: Communication skills for chairing MPDSR meetings |
| | | Module 3: Basic training and coaching skills |
| | Level 4: Training of mentors/supervisors | Module 1: Advanced leadership skills |
| | | Module 2: Advanced training/coaching/mentorship skills |
| Community involvement | Community awareness raising | Raising understanding of MPDSR and principles of no blame |
| | Remuneration for death reporting | Specific community members tasked with reporting deaths and remunerated for this |
| | Respect of cultural traditions around death | Timing interviews of family members at appropriate time<br>Paying condolences |
| | Complaints procedure | Development of a procedure for families to make complaints about health care (without involving litigation) |
| | Sensitive feedback to bereaved families | Feeding back results of review to bereaved families |
| | Community death review and feedback meetings | Facilitating communities to discuss deaths, identify avoidable factors, formulate recommendations which they can implement, and follow up on implementation |
| | Community participation in higher-level MPDSR meetings | Community representatives invited to participate in, and empowered to take their recommendations to MPDSR meetings at district, regional and national levels |

Abbreviations: CPD, continuing professional development; MPDSR, Maternal and Perinatal Death Surveillance and Review.

approach will improve understanding of the most important factors influencing MPDSR in each context and will ensure that the intervention is grounded in, and adapted to, the local context. Stakeholders should also be involved in the development of a communication and dissemination plan (CDP).[75]

## Structural changes to reduce fear of blame

National level legal protection for MPDSR, to prevent it from being used in litigation, has already been enacted in South Africa.[74] If the system has already acquired a negative reputation inciting fear of blame, "re-branding" may be needed—for example in the Democratic Republic of Congo "audit" was replaced by "review".[48] A model charter for MPDSR could also be agreed at national level, which can be signed by participants in health facilities to indicate their commitment to observing the principles. At district and facility levels, local leaders can separate MPDSR from disciplinary procedures by assigning these roles to different people.

## Tools to improve data quality

Tools for death notification, medical record keeping and storage, and documentation of the MPDSR process (meetings, recommendations, and supervisions) need to be optimized and customized based on user feedback. Where feasible, introducing electronic medical records can reduce challenges in documentation.

## Mobilizing resources for implementation

Based on the findings of the implementation research, implementers will define funding priorities and plan the budget for MPDSR activities, taking into account available resources at local, sub-national, and national levels. A process should be developed for considering recommendations from reviews as part of the prioritization of health spending. This would help to avoid the situation where recommendations are not implemented because they require huge investments.[56] Committees should also be encouraged to make recommendations

that are actionable within available budgets or to identify resources for implementing them.[1,19,27,43] It would be most sustainable to identify funds from national and/or district budgets, rather than relying on external donors.[43]

### A modular "whole institution" approach to training and institutionalization

A modular approach would be most efficient and would ensure that specific stakeholders are empowered with specific skills relevant to their level, develop a positive attitude to MPDSR, and feel responsible for the results (Figure 2 and Table 4). This "whole institution" approach has been successfully piloted to improve provision of family planning services.[76] Lower levels are provided as in-service training, on-site, to minimize disruption to service delivery. Higher levels, involving smaller numbers from each facility, may be most efficient if conducted off-site. Supervisors would benefit from specific mentoring training to maximize their effectiveness, such as a package successfully used in Sierra Leone.[77]

### Community engagement

Involving community members in reporting, investigating, and reviewing deaths will maximize the potential impact of MPDSR, but will also require more resources.[18] Therefore, this final component may be best added after the MPDSR process is already running effectively in health facilities, and when sufficient resources have been identified. Developing an effective complaints procedure for patients and bereaved families should be a priority and may help to reduce litigation, if families feel that their feedback is acknowledged and acted upon.[68]

## 4.2 | Priorities for future research

Detailed procedures for each of these components need to be co-created with relevant stakeholder groups. A global "toolkit" of intervention components and resources, which could be adapted to different contexts in different countries, would save time and effort, rather than starting from scratch in each setting. These should be piloted on a small scale to refine and optimize each component, based on feedback from the target population.[16] Where good internet is available, some components could efficiently be delivered online (such as the WHO virtual training course),[78] whereas more face-to-face training will be required in areas with poor connectivity. Process and effectiveness evaluations of the intervention will help to improve it iteratively.

It is very important to evaluate the cost-effectiveness of the intervention package and of MPDSR itself. Although many countries have no budget allocation for MPDSR,[7,16,26,48] adequate resources (staff and materials) are essential to achieve good results.[1] This has an opportunity cost as well as a financial cost, and it has been argued that resources would be better spent implementing interventions with proven effectiveness.[79] However, an effective MPDSR process is itself a tool to improve implementation and uptake of "proven interventions",[27,32,48] by changing behavior and prioritizing use of scarce resources.[1]

Further qualitative research is needed to understand the views of health workers and communities on how to achieve the optimal balance between "no blame" and "accountability". There is an ethical imperative to safeguard vulnerable patients from deliberate harm and negligence, so absolute confidentiality can never be guaranteed. Further research is needed to find the optimal ways of separating disciplinary procedures from MPDSR, especially when the same leaders are in charge of both. Research is also needed to optimize involvement of communities and bereaved families in MPDSR, so that this process helps to address their concerns and empower them to take appropriate actions to avoid future deaths, without engendering fear of blame in either the families themselves or health workers.

## 5 | CONCLUSIONS

Implementation and impact of MPDSR could be improved by (1) engaging key stakeholders in an "implementation research" approach, (2) introducing structural changes to reduce fear of blame, (3) improving data collection tools and information systems, (4) mobilizing adequate resources, (5) building the capabilities of all stakeholders, and (6) community involvement. These strategies would address the major behavioral determinants which influence implementation of MPDSR in many LMICs.

### AUTHOR CONTRIBUTIONS

Merlin L. Willcox contributed to study conception, planning, study selection, data analysis, and wrote the first draft of the manuscript; Immaculate A. Okello contributed to study conception, planning, literature searching and screening, study selection, data analysis, and revised the manuscript; Alice Maidwell-Smith contributed to literature screening, study selection, data analysis, and revised the manuscript; and Abera Kenay Tura, Thomas van den Akker, Marian Knight, Alexandre Dumont, and Ingrid Muller contributed to study conception and planning, and to manuscript revision. All authors read and approved the final manuscript and agree to be accountable for the work.

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### CONFLICT OF INTEREST STATEMENT

MW and AKT are members of the WHO technical working group on maternal and perinatal death surveillance and response. All other authors have no conflicts of interests.

## DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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