Systematic review

Health workers' views on audit in maternal and newborn healthcare in LMICs: a qualitative evidence synthesis

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Abstract

Objectives: To identify and summarise health workers' views on the use of audit as a method to improve the quality of maternal and newborn healthcare in low- and middle-income countries (LMICs).

Methods: We conducted a qualitative evidence synthesis. PubMed, CINAHL, and Global Health databases were searched using keywords, synonyms and MeSH headings for 'audit', 'views' and 'health workers' to find papers that used qualitative methods to explore health workers' views on audit in LMICs. Titles and abstracts were then screened for inclusion. The remaining full-text papers were then screened. The final included papers were quality assessed using the Critical Appraisal Skills Programme tool for qualitative research. Data on audit type and health workers' perceptions were extracted and analysed using thematic synthesis.

Results: 19 papers were included in the review, most from sub-Saharan Africa. Health workers generally held favourable views of audit and expressed dedication to the process. Similarly, they described positive experiences conducting audit. The main barriers to implementing audit were the presence of a blame culture, inadequate training and the lack of time and resources to conduct audit. Health workers' motivation and dedication to the audit process helped to overcome such barriers.

Conclusions: Health workers are dedicated to the process of audit, but must be supported with training, leadership and adequate resources to use it. Decision-makers and technical partners supporting audit should focus on improving audit training and finding ways to conduct audit without requiring too much staff time.

Keywords: Maternal health; Newborn health; quality improvement; Clinical audit; Qualitative research; Qualitative evidence synthesis

Introduction

Access to skilled healthcare is improving in low- and middle-income countries (LMICs) (1), but in many countries the quality of maternal and newborn healthcare (MNH) does not reach required standards (2, 3). Ninety-nine percent of maternal deaths occur in LMICs (4); however up to 80% of these deaths may be avoidable through the provision of good-quality care (5, 6). Studies have consistently uncovered MNH that does not meet evidence-based standards (7-9). Improving the quality of MNH is a key global priority as set out in the Sustainable Development Goals, which include improved health and wellbeing for all (2, 4).

The WHO report 'Beyond the Numbers' (10) prompted many countries to begin quality improvement (QI) through various types of audit. Most audits follow a cyclical process of collecting data to determine where gaps in quality of care exist, using the data to develop actions to address those gaps, and monitoring to determine the extent of improvement. In 2013 WHO introduced Maternal Death Surveillance and Response (MDSR) as a new method of maternal death review (11). MDSR is a continuous cycle that emphasises the importance of timely reporting (surveillance) of deaths and implementation of actions (response) to prevent further deaths. It involves establishing an entire system to link surveillance and review of deaths at community and facility level, aggregate information on avoidable factors and use this to guide action. MDSR builds on existing approaches to audit, many of which are similarly named, and are often used interchangeably. For clarity, we have provided brief definitions of commonly used audit types in table 1; the definitions are summarised from published sources.

Table 1. Definitions of commonly used audit types

Audit type	Definition
Facility-based	
Facility-based maternal and/or perinatal death review (MDR / PDR)	A qualitative, in-depth investigation of the causes of, and circumstances surrounding, maternal (and/or perinatal) deaths which occur in healthcare facilities, conducted by health workers at that facility (10)
Near miss audit (also called critical incident audit)	The identification and assessment of cases where any pregnant or recently delivered woman survived a life-threatening complication, either by chance or because of good hospital care (10)
Standards-based audit (SBA) (also called clinical audit)	A quantitative, systematic review of aspects of care against explicit pre-defined standards/criteria, followed by the implementation of change (10)
Case-note audit	A process where health workers choose a random medical record and qualitatively measure it against the protocols of that facility
Confidential Enquiry into	A systematic, multi-disciplinary anonymous investigation of deaths (all or

Maternal Deaths (CEMD)	a sample of) occurring in a regional or national level (10)
Maternal Death Surveillance and Response (MDSR)	A continuous cycle of notification, review, analysis and response to maternal deaths, involving all stakeholders on a national level. Recommendations are centred on political and policy actions (4)
Community-based	
Community-based maternal and / or perinatal death review (also called verbal autopsy)	A method of finding out the medical causes of maternal/ perinatal deaths that occur outside of a health facility, and ascertaining the factors that may have contributed to these (including personal, family and community factors) (10)
Social autopsy	An adjunct to verbal autopsy, where health workers interview the community about the general social, behavioural and health system factors that may have contributed to a death (12)

There is some evidence that audit is effective in improving processes of care (13), and that it is feasible (14). However, there are known challenges to establishing audit cycles at various levels of the health system (15). For example, audit can be a time burden to already overstretched health workers (16, 17), the quality and availability of data is often poor (18, 19), senior management support for audit is often lacking (20, 21), improvement is hampered by unrealistic recommendations (10, 17) and often fear of blame exists (5, 19).

This systematic review identifies and summarises health workers' views of audit as a method for improving the quality of maternal and newborn healthcare. Health workers are ultimately responsible for conducting audit in their workplace. The process of audit itself requires that they reflect on and improve their clinical practice (10). Given the growing literature on the human factors that affect the process of audit (5, 18-20), it is timely to bring together studies that outline health workers' views of audit, to understand which factors are critical for successful audit implementation.

Methods

Increasingly, it is recognised that those contributing to health policy and practice require a deeper understanding of the perceptions and attitudes of implementers (22). Qualitative evidence synthesis can provide this by drawing on views from a range of contexts (22, 23). Here, a systematic literature review was carried out to synthesize qualitative data around healthcare workers' experiences using audit for MNH.

Inclusion criteria

Studies that used known qualitative data collection (e.g. focus groups or interviews) and analysis (e.g. thematic analysis, framework analyses) methods were included. Studies could be purely qualitative, or employ mixed methods (if they included a recognisable qualitative component). Studies that explored

health workers' views, experiences, or perceived barriers and facilitators to conducting audit were included. Studies could include any cadre of health worker who participated in audit, including non-clinical staff. Studies relating to any type of audit (e.g. MDR, near-miss audit, clinical audit) were included. Studies had to have been conducted in LMICs, as defined by the World Bank (24).

Search strategy

We conducted comprehensive searches of PubMed, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and Global Health databases. Additional File 1 provides the search strategy used in the three databases. The search was conducted during July 2017, and a further search of PubMed was conducted in December 2019. Keywords and synonyms for audit, health workers and the key outcomes of interest were combined with medical subject heading (MeSH) functions in each database. Boolean operators (AND and OR) were used to combine search terms. Search terms were limited to 'Title or Abstract' to increase the relevance of the findings. We included studies published from 1990 onwards; this is when audit to improve MNH was initiated (4). We included papers published in English only.

Study selection

References retrieved from the database searches were managed in Endnote (25), and duplicates were removed. Titles and abstracts of remaining references were screened by CR to identify potentially relevant articles. Following this, two reviewers (CR and VK) independently read the full-text articles and assessed them against the inclusion criteria; reasons for exclusion were recorded and any disagreements were resolved by discussion. The reference lists of included studies were checked for additional relevant papers.

Quality assessment

The Critical Appraisal Skills Programme (CASP) qualitative research checklist was used to appraise the quality of the included studies (26) as it provides a guide to assessing the whole study design and has been widely used in qualitative evidence syntheses (27). No studies were excluded on the basis of poor-quality reporting, though lower-quality studies contributed less to the qualitative synthesis (23, 28).

Data synthesis

We used thematic synthesis to extract and aggregate findings from the included studies (23). One reviewer (CR) read all included studies in detail and used line-by-line coding. In the case of mixed-methods studies, only the qualitative components relating to health workers' views of audit were coded.

Coded data from each paper were extracted into a Microsoft Excel spreadsheet, further examined for core meaning and combined into possible themes. Potential descriptive themes were discussed by two reviewers (CR and HS) and refined into final themes (23, 29). Additional file 2 provides the coding framework used to code findings from each study and shows how coded data were grouped into themes.

Results

Study selection

In total, 2,162 studies were identified by the initial search; after duplicates were removed, the titles and abstracts of 1451 studies were screened and 1422 excluded. The updated search in December 2019 produced no new studies. 29 full-text papers were assessed against the inclusion criteria: 15 were included (17, 30-43) and 14 excluded (20, 44-56). A further six potentially relevant papers were identified from the reference lists of the included studies (12, 57-61), four of which were included (12, 57, 58, 61), resulting in 19 included studies in total (12, 17, 30-37, 39-43, 57, 58, 61, 62) (Figure 1).

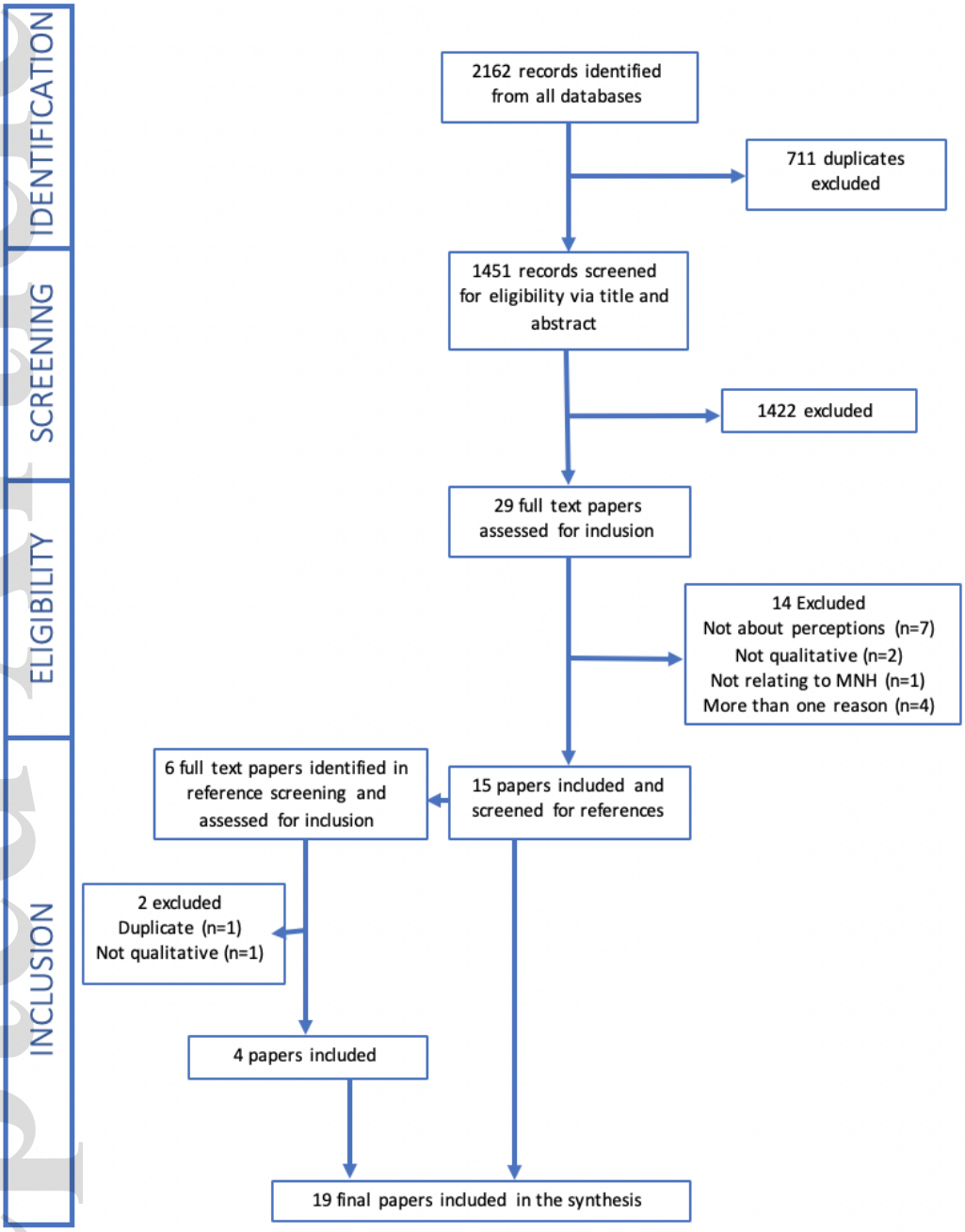

Figure 1. Flowchart showing study screening and selection

Study characteristics

Table 2 provides a summary of study characteristics. The majority of studies were conducted in Sub-Saharan Africa (17, 30-32, 35-37, 40, 41, 43, 57, 61, 62). Eight papers reported standalone qualitative research (12, 32-34, 37, 57, 61, 62) and eleven were mixed-methods studies (17, 30, 31, 35, 36, 39-43, 58). Facility based maternal and perinatal death reviews were the most commonly reported audit type (n = 9) (30, 31, 33, 35, 36, 40-42, 61), the other studies focused on near-miss/critical incidents (n=3) (17, 32, 37), case-note audit (n=2) (43,57), clinical audit (n=1) (39) and MDSR (n=1) (62). Three studies reported on community-based audits (12, 34, 58).

Table 2. Characteristics of included studies

Intervention	Author and year	Country	Study design	Data collection methods	Type of participants	Outcomes
Facility-based audit						
Facility-based maternal and perinatal death review	Agaro et al. 2016 (30)	Uganda	Mixed-methods including qualitative component	Key-informant interviews	District health team members and facility health managers involved in MPDR, and MPDR committee chairpersons	Knowledge, attitudes and barriers towards MPDR
Facility-based maternal and perinatal death review	Armstrong et al. 2014 (31)	Tanzania	Mixed-methods including qualitative component	Key-informant interviews	Midwives, directors, medical officers, laboratory staff, nurses, pharmacists, health coordinators, district officers, secretaries, ministry of health representatives and professional bodies involved in MPDR, and MPDR experts	Perceptions of MPDR function (outcomes were altered depending on the type of participant being interviewed)
Facility-based	Biswas et al.	Bangladesh	Qualitative	In-depth	Doctors, nurses, health	Acceptability of facility death

maternal and perinatal death review	2015 (33)			interviews Focus groups Document review	managers, family planning officers	review, lessons learnt and challenges of implementation
Facility-based maternal and perinatal death review	Nyamtema et al. 2010 (40)	Tanzania	Mixed-methods including qualitative component	In-depth interviews	Members of the maternal and perinatal audit committees (unclear), and hospital administrators	Existence, structure, process and outcome of maternal and perinatal death audits
Facility-based maternal death review	Dumont et al. 2009 (35)	Senegal	Mixed-methods including qualitative component	In-depth interviews Focus groups Observation of sessions Document review	Doctors, midwives, paramedics, and other 'hospital staff members' (unclear), audit data collectors, and heads of the maternity unit	Experiences of participation in audit, barriers and facilitators to audit implementation
Facility-based maternal death review	Hofman et al. 2014 (36)	Nigeria	Mixed-methods including qualitative	Semi-structured interviews	"Members of the MDR teams" (unclear)	Experiences of audit, facilitators and challenges to audit

			component			
Facility-based maternal death review	Owolabi et al. 2014 (41)	Malawi	Mixed-methods including qualitative component	Key-informant interviews	People involved in MDR / MDR stakeholders (unclear)	Perceptions on the process and feasibility of using the ICD-MM MDR form
Facility-based perinatal death review	Belizan et al. 2011 (61)	South Africa	Qualitative (stages of change model)	Group workshops	Doctors, midwives, nurses and regional or provincial coordinators involved in audit	Experiences of implementing and sustaining PDR
Facility-based perinatal death review	Raman et al. 2015 (42)	Fiji	Mixed-methods including qualitative component	Key-informant interviews	"Audit champions and team members" (unclear)	Barriers and facilitators towards perinatal mortality audit
Near-miss audit	Filippi et al. 2004 (17)	Benin, Côte d'Ivoire, Ghana, Morocco	Mixed-methods including qualitative	Interviews (undefined type) Observation	"Audit team members" (unclear)	Feasibility, barriers and enablers to audit

			component	of sessions Document review		
Near-miss audit	Hutchinson et al. 2010 (37)	Benin	Qualitative	Semi-structured interviews	Midwives, doctors, nurses, social worker and ministry of health policy makers that were involved in near-miss reviews	Perceptions of advantages, disadvantages, barriers and facilitators to near-miss audit
Critical incident audit	Bakker et al. 2011 (32)	Malawi	Qualitative	In-depth interviews Key-informant interviews Focus group Observation of sessions	Medical officers, clinical officers, nurse-midwives and medical assistants involved in critical incident audit	Knowledge and experiences of audit
Clinical audit	Muffler et al. 2007 (39)	Morocco	Mixed-methods including qualitative	Semi-structured interviews	Hospital directors and department managers, doctors, nurse/midwives and provincial managers	The use of audit, perceptions of feasibility, advantages and disadvantages

			component		involved in audit	
Case-note audit	Richard et al. 2009 (43)	Burkina Faso	Mixed-methods including qualitative component	Semi-structured interviews	Doctors, midwives, auxiliary midwives, assistant surgeons, assistant anaesthetists.	Perceptions. experiences, barriers and facilitators to audit
Case-note audit	van Hemersveld et al. 2012 (57)	Tanzania	Qualitative	In-depth interviews Observation of sessions	Doctors, medical officers, midwives, nurses, matron, district medical and nursing officers involved in audit.	Perceptions of the conduct, effects and advantages/disadvantages of audit
Maternal death surveillance and response	Abebe at al. 2017 (62)	Ethiopia	Qualitative	Key-informant interviews	Facility health managers, hospital directors and public health professionals involved in MDSR	Perceptions, experiences and barriers and facilitators toward MDSR implementation
Community-based audit						
Community-based maternal and perinatal	Biswas et al. 2014 (58)	Bangladesh	Mixed-methods including qualitative	In-depth interviews Focus groups	Health and family planning assistants, inspectors, technicians and officers, community members, civil	Experiences and perceptions of feasibility in MPDR

death review			component		surgeons and director of family planning	
Community-based maternal and perinatal death review	Biswas et al. 2015 (34)	Bangladesh	Qualitative	In-depth interviews Focus groups Observation of sessions Document review	Health and family planning inspectors, managers and family planning officers involved in audit	Experiences on the conduct of verbal autopsy
Social Autopsy	Biswas et al. 2016 (12)	Bangladesh	Qualitative	In-depth interviews Focus groups Group discussions Observation of sessions Document review	Health and family planning inspectors, family planning officers, and community members involved in social autopsy	Acceptability and effects of social autopsy

Quality appraisal

Additional File 3 provides the full CASP assessment of the included studies. In general, the data from stand-alone qualitative studies were better reported than the qualitative data from mixed-methods studies. All studies had a clear aim. Thirteen papers were judged as having collected data in ways that addressed the research question (12, 31-35, 37, 39-41, 57, 58, 62). Reporting of data analysis varied; ten studies demonstrated rigorous data analysis (12, 30, 31, 33-35, 37, 57, 61, 62).

Description of themes

Findings are presented according to the main objectives of the review. No distinct patterns were found across study locations; however, some findings were specific to audit type and we have highlighted this in the descriptions below. Illustrative quotes for each theme are presented in Box 1.

The purpose of audit

Across all audit types, health workers described various reasons for conducting audit, including to update clinical knowledge (17, 31-33, 36, 37, 39, 43, 57) and to improve quality of care (12, 17, 30-34, 36, 37, 39, 43, 57, 58, 61). In death reviews, audit was perceived as a way of preventing similar occurrences (30, 31, 33, 34, 58, 62). In near-miss audit, health workers named a benefit that staff were able to learn about the patient's perspective (17, 37) (see Box 1 for illustrative quotes).

Conversely, some felt the purpose of audit was to blame (31), or to control staff (39, 43). In MDSR and facility death reviews, others admitted to only doing audit because somebody senior instructed them to (61, 62), for example "[the professor] came and told us, 'you must start audit'"(61).

Box 1. Illustrative quotes for each theme

Theme 1: beliefs about the purpose of conducting audit
"In our country why maternal and neonatal death rate is high... why they die... We are doing this to find out the causes and probable solution to prevent maternal and neonatal deaths" - (34, p. 333), verbal autopsy, Bangladesh
"*[The participants] rated [audit] as the principal promoter of change*" - (43, p. 41), case-note audit, Burkina Faso
"[The professor] came and told us, 'You and Hospital X must start (audit)'. We heard what it was all about and we went with it" - (61, p. 6), PDR, South Africa
Theme 2: Attitudes towards conducting audit
"It's critically important that people don't hide behind a busy schedule to avoid doing audit. It's not an extra; it's as crucial as filling in your clinical notes. If you can get people to run with the idea that it's integral, you don't need to beat them to do it" - (61, p. 7), PDR, South Africa

"We are trying to work together even if we have a shortage of human resources" - (33, p. 6), facility death review, Bangladesh *"People are not motivated to come because they don't know what they are doing there. If you know then you wouldn't want to miss this session"* - (57, p. 654), case-note audit, Tanzania
Theme 3: Learning the process *"What are we [supposed to] do exactly in MDSR and in the committee? We worried about that but through time… we understand it is very simple and needs only supervision and attention"* - (62, p. 5), MDSR, Ethiopia *"Initially at the beginning of doing verbal autopsy it felt a little difficult to ask a number of questions with the deceased family members, however, later on when we frequently carried out verbal autopsy, the instrument came easier to me and now we can comfortably interact with the family members"*- (34, p. 333), verbal autopsy, Bangladesh *"Midwives, doctors, obstetricians, all those who are involved in the provision of care for birthing women should receive training in audit. We must ensure this is included in their curriculum"* - (37, p. 540), near-miss audit, Benin
Theme 4: Perceptions of tangible improvements in health service delivery *"We realised that the pressure of mothers who had died from eclampsia was not monitored because all the pressure machines were old and had broken down, so we decided to procure a pressure machine for the maternity ward. Now mothers do not die from undetected high blood pressures"* – (30, p. 10), Maternal and perinatal death review, Uganda *"Before there was no ambulance at our hospital for referrals, but now we have an ambulance… [MDSR] cannot directly order an ambulance, but pushes the management to solve the problem"* - (62, p. 5), MDSR, Ethiopia *"I write down everything I do in the case-notes, I wouldn't like that the day my case is audited, they accused me of not filling my case notes"* - (43, p. 41), case-note audit, Burkina Faso
Theme 5: Motivation to participate in the audit process *"None implementation of recommendations by those above the health facility levels demotivates MPDR members. You keep discussing the same recommendations and no actions are taken by the district"* - (30, p. 8), Maternal and perinatal death review (MPDR), Uganda *"In Ghana (there was) a plea to an audit meeting by one hospital manager to stop making recommendations that require money"* - (17, p.63), near-miss audit, Ghana *"The documentation is not taking place as supposed to be, and the analysis of this is not taking place, and the feedback is not there to the facilities"* - (31, p. 1092), MPDR, Tanzania

Theme 6: Perceived importance of the organisation and leadership of audit meetings *"Some respondents argued that absence of [support staff such as the transport officer and pharmacist] negatively impacted on the efficiency of audit, as problems were not 'expressed directly to the right persons'"* - (32, p. 1246), critical incident audit, Malawi *"[The audit coordinator] doesn't allow people to be unsustainable. She checks up. Without her, half of the sites will vanish."* - (61, p. 4), PDR, South Africa *"Another problem was that 'people prolong on matters, other than the main points' causing the discussion to be 'not focused to the point'"* - (57, p. 655), case note audit, Tanzania
Theme 7: Reflections on hierarchies and moving away from a culture of blame *"I felt guilty, even threatened by a penalty. The head of department said that the woman was killed when he talks about what happen in the unit when the patient died"* - (35, p. 9), facility death review, Senegal *"What was very important was the buy-in from everyone, to inform everyone what [audit] was about. We informed our regional director... management at each place… management in each sub-district"* - (61, p. 6), PDR, South Africa *"Let me ask you, [say] a patient is brought in critical condition, the doctor has been called but has not come for eight hours and as a result you see a patient dies. Can you say boldly in front of a doctor you know, or you would rather keep your mouth shut?"* - (31, p. 1091), MPDR, Tanzania
Theme 8: Reflections on resources for audit *"We have a deficit of nurses in our district hospital and we are in huge trouble due to patient overload and struggle to ensure optimum care. This has caused significant delays in implementing [facility death review]. We have to depend on the recall of memories to know about death cases"* - (33, p. 9), facility death review, Bangladesh *"The health centre head was one of the trained… so when the head is changed they [other staff] become lenient and who would collect [data] and review [them]? He was the one we trained as a chairman. So they need to share skills."* - (62, p. 6), MDSR, Ethiopia *"We spend our personal money to call the [district health office] or [Ministry of Health] to notify them about the occurrence of maternal death"* - (30, p. 8), MPDR, Uganda

Attitudes to conducting audit

Most papers reported how health workers approached audit as an essential activity (12, 32-34, 37, 57, 61, 62), some suggesting audit was "…as crucial as filling in your clinical notes" (61). Papers indicated that staff were dedicated to conducting audit and wanted to overcome the barriers they faced (17, 31, 33, 34, 36, 43, 58, 61). In community-based audits, some felt that audit was interesting, and spoke about enjoying the

process (12, 34). However, for some health workers across all audit types, audit was not considered important, and this often related to a lack of understanding of the purpose of audit (32, 37, 40, 43, 57).

Learning the process

Commonly discussed in the papers was the perception that with perseverance and dedication, health workers become accustomed to the process of conducting any type of audit (32, 34, 39, 58, 62). In the papers that explored experiences of facility and community death review, participants commonly described how correctly defining the cause of death was the initial challenge they faced (33, 34, 41, 58). Some also described the difficulty in implementing the verbal autopsy tool, for example, "…at the beginning it felt a little difficult to ask a number of questions to the deceased family members" (34) but this got easier with time.

Almost all of the papers highlighted the importance of training in relation to all audit types (30, 33, 35, 37, 39, 41, 43, 57, 58, 61, 62), and the need to include training in audit ''in the curriculum" for all cadres of staff involved in caring for women giving birth (37). In facility death review and near-miss audit, some health workers highlighted the importance of also training staff not involved in audit, in order to ensure that they report cases and implement recommendations (17, 30, 35).

Tangible improvements in health service delivery

Across all audit types, health workers reported that they experienced tangible improvements in health service delivery as a result of audit (17, 33, 34, 39, 62). MDSR and case-note audit was thought to be a useful way of highlighting problems with the structure of care to management level, allowing actions to be taken to improve quality of care, for example by ensuring there is provision of essential equipment (34, 39, 62). In one paper MDSR was described as a process for "pushing the management to solve the problem" (62). Furthermore, in facility death reviews and near-miss audit, some staff highlighted that the audit led to reorganization on the labour ward, for example by keeping emergency medication in an accessible cupboard (17, 36).

Whilst the above examples indicate improvements in organisation and delivery of care, in two papers concerned with MDSR and case-note audit, health workers described having made changes to their practice only due to fear of being reprimanded (43, 62). For example, staff described writing everything down in case notes because "I wouldn't like that the day my case is audited, they accused me of not filling in my case notes" (43). Interestingly, across all papers, negative effects of audit were seldom discussed.

Motivation to participate in the audit process

In some papers health workers reported that conducting audit led to motivation to participate in audit (32, 39, 57), and this was apparent for all audit types. The most common threat to motivation, across all audit types, was the "non-implementation of audit recommendations by those above the health facility levels"

(17, 30, 32, 35, 39, 40, 43, 57). Health workers involved in audits where the recommendations were not implemented often reported that there is no reason to continue the audit. In other situations, managers pleaded with audit committees to "stop making recommendations that require money" because resources were not readily available to implement suggested changes (17).

Many health workers expressed satisfaction with the feedback they are given on the improvement of their clinical practice due to audit (35, 37, 57, 61). Where staff did not receive regular feedback from seniors, this was considered demotivating (31, 57).

Organization and leadership

Studies described how the absence of particular staff, especially those in leadership roles, would stall audit meetings and lead to irrelevant discussion (17, 32, 35-37, 39, 41-43, 57, 61, 62). For example, without a leader to chair audit meetings, "people prolong on matters other than the main points, causing the discussion to not be focused and to the point" (57). Health workers also emphasized the importance of having senior staff lead meetings, as it was easier for them to highlight mistakes compared to juniors (32, 35, 37, 39, 61). Specifically, in relation to MDR and near-miss audit, the process was reportedly easier when health workers who had been involved in the case were present (17, 32, 36), although for all audit types gathering relevant staff was a challenge (17, 30, 32, 36, 37, 39).

Hierarchies and a culture of blame

A major theme across all included studies was recognition that a culture of blame prevented health workers from participating openly in audit. Many studies gave examples of how health workers feared being personally blamed when a woman and baby had not received appropriate care, and this was often influenced by the attitudes of senior staff (17, 30-32, 36, 37, 39, 43, 57, 62). In one case it was highlighted that nursing and midwifery staff felt unable to speak openly about circumstances of deaths when doctors were involved, "…a patient is brought in a critical condition and the doctor has been called and has not come for 8 hours and ... the patient dies. Can you boldly say in front of a doctor …or would you rather keep your mouth shut?" (31). In another case staff described feeling threatened because senior staff referred to maternal deaths as women 'being killed" (35). Where blame did occur, this caused a ripple of fear amongst other health workers, thus discouraging them from participating in audit (35, 37, 39, 62).

Conversely, in settings where there was a culture of improvement, health workers perceived this to be a facilitator to audit. In some reports, health workers described their working environment as a place where staff were honest about their actions and where they could be self-critical (17, 31, 32, 34, 37, 42, 61). With support of dedicated senior leaders, health workers felt motivated as a team to overcome the barriers that they face in doing audit (33, 34, 42, 58, 61, 62).

Resources for audit

The lack of time available to participate in audit processes was mentioned in a number of studies (12, 17, 32, 34, 37, 39, 57, 58, 61, 62), and was commonly linked with the heavy workload faced in under-staffed hospitals (17, 30, 33, 36, 37, 43, 57). Frontline staff taking ownership for the programme seemed to facilitate the establishment of a continuous audit cycle (12, 17, 39, 42, 57, 61). Frequent departures of those who were trained to do audit threatened continuity and sustainability of the audit cycle (17, 36, 37, 39, 62), for example when the head of a health centre who was trained in audit left, "they [other staff] become lenient and who would collect data and review them?" (62). The loss of human resources, specifically when this related to a staff member in a leadership role for the audit, was a main challenge often cited in relation to sustainability and scale-up of audit at facilities (17, 36, 37, 39, 42, 43, 57, 61, 62).

Lack of financial and material resources, for example tape recorders for interviews in near-miss audit, were also cited as a barrier to conducting audit (17, 30, 32, 36, 37, 39, 42, 58, 61, 62). Others described having to use their "personal money" to call the district health office to notify them of maternal deaths (30). External support, such as from non-governmental organizations (NGOs), was said to improve human and financial resources, as well as contributing to the motivation of health workers in conducting audit (17, 34, 37).

Discussion

The aim of this systematic review was to identify and summarise qualitative evidence on health workers' views on the use of audit to improve the quality of MNH in LMICs. Health workers generally held positive views on the use of audit, and commonly indicated dedication to the process. Similarly, health workers' experiences of audit were largely positive. Many barriers and facilitators became evident from the synthesis, but most notably, a blame culture inhibited open and constructive audit sessions, whereas a culture of improvement was key to maintaining health workers' motivation. Box 2 summarises what was already known about audit in MNH in LMICs, and what this review has added.

The positive views held by the majority of health workers suggest that audit has been well-accepted in low-resource settings. Accepting the process of audit as a benefit to healthcare practice could be the first pre-requisite to successfully implementing and sustaining audit in MNH. However, it is possible that response bias was present in the individual studies: participants involved in the research may have been more likely to hold positive views of the process. Here we found that health workers seldom discussed negative effects of audit, though this was prominent in the literature review conducted by Johnston et al. concerning audit in high-income countries (38). Audit implementers should therefore anticipate negative views towards audit and be ready to address these.

Box 2 Summary of existing knowledge and new findings

What is already known about audit:

- Audit is feasible in LMICs
- Audit improves processes of care
- Common barriers to implementing audit are a blame culture and lack of time and resources
- Motivation to do audit is important
- Successful audit requires training in audit principles and methodology
- Effective leadership as a facilitator in audit is linked to the culture of the audit and the implementation of recommendations

What this review adds:

- Health workers mostly hold positive views on audit as a method of QI
- Health workers are mostly dedicated to audit and want to overcome barriers
- The non-implementation of audit recommendations is a significant threat to health workers' motivation to participate in audit
- Successful audit requires the presence of a wide variety of trained team members, including health workers involved in a particular case, team leaders, and non-clinical staff, in order to ensure that realistic recommendations are implemented
- A culture of blame is a main barrier that health workers face toward conducting audit openly and effectively; this in turn influences multiple other aspects of health worker's views including their motivation to participate in audit
- Hierarchical structures and leadership directly influence a culture of blame, but can also play a key role in moving toward a culture of improvement by fostering a team-based approach and encouraging an open and constructive discussion during audit meetings

Motivation to participate in audit was a major theme identified in the review. Health workers who were motivated were more likely to explore solutions to their encountered barriers. The non-implementation of recommendations derived from audit served as a significant threat to motivation, which would in turn act as a barrier to conducting audit, as well as influencing health workers' views of audit. Finding ways to ensure that recommendations are implemented, and that they lead to action planning with the relevant responsible persons, could therefore increase health workers' intrinsic motivation, and encourage them to overcome other barriers.

The difficulty surrounding a blame culture is well-documented in research across various healthcare settings (20, 38, 63, 64). Our review highlights the importance of healthcare teams moving away from a blame culture toward a culture of improvement, which in a healthcare setting entails health workers sharing similar positive understanding, approaches and beliefs towards audit (65). The majority of the themes described in this synthesis have a direct influence on the culture surrounding the audit, including health workers' perceived purpose of audit, their attitude, the type of training they receive, their

motivation and support from team leaders. It is possible that improving the culture surrounding the audit requires improvement in all of these factors.

Across the results, it is clear that the views and experiences held by staff are influenced by the barriers and facilitators they face when conducting audit. For example, the theme of motivation is inherently linked to health workers' view that audit is essential, as well as their ability to overcome the barriers to implementing audit. Importantly, no paper discussed barriers as an absolute block to conducting audit. Instead health workers often spoke about these as challenges to overcome. Such results are promising given the global emphasis on improving quality of care, where audit is a key process (66).

Implications for policy, practice and research

Those working in ministries of health are well-placed to ensure that mentorship to carry out audit processes occurs at district, sub-district, and facility level. Guidance for audit provided by ministries of health could draw on practical recommendations provided in this paper, to allow health workers to anticipate and overcome the challenges they are likely to face.

External support for audit, for example from NGOs can provide training for audit as well as human and financial resources. Numerous global organisations have produced aids for health workers implementing and sustaining audit, for example the WHO's MDSR guidance (11) or the International Federation of Gynaecology and Obstetrics' (FIGO) guidance on conducting MDR (67). However, external support risks undermining national efforts and local empowerment to participate in audit, so organisations must be aware of this and encourage ownership at the local level, for example by advising on members of a national, subnational and local audit team (19).

Most of the evidence for the themes identified came from studies conducted in sub-Saharan Africa; it would be interesting to determine, through further research, whether the themes identified in this review are relevant and applicable to other countries. Most of the included studies were concerned with health worker experiences of facility-based maternal and perinatal death reviews—little is known about implementing other types of audit. It would be worthwhile to conduct more qualitative and implementation research of other types of audit to better understand health worker experiences and implementation challenges.

This review employed a robust search strategy and involved multiple reviewers in analysis to increase rigour. However, only one researcher conducted the initial title and abstract screening (although two reviewers conducted the full text screening). Furthermore, grey literature was not searched as part of this review, and only papers published in English were included. There is a chance, therefore, that some relevant papers were missed. Nevertheless, the aim of a thematic synthesis is to aggregate themes across multiple studies, and this does not necessarily require every paper to be included (23). Only one researcher conducted the CASP quality appraisal, though findings of the quality appraisal were discussed among all reviewers. Similarly, only one researcher conducted the data extraction, although potential themes were

discussed between two reviewers.

Conclusion

Health workers hold positive views toward audit in MNH in LMICs. Audit implementers must focus on building a culture of improvement in order to sustain health workers' motivation to participate in audit, by ensuring a team-based approach, a blame-free discussion, and follow-through on audit recommendations.

References

1. United Nations Development Programme. Human Development Report 2016: Human Development for Everyone. New York http://hdr.undp.org/en/2016-report/: UNDP; 2016.
2. WHO. The Global Strategy for Women's, Children's and Adolescents' Health: 2016-2030. Geneva http://www.who.int/pmnch/activities/advocacy/globalstrategy/2016_2030/en/: World Health Organization 2017.
3. WHO. Standards for improving quality of maternal and newborn care in health facilities Geneva http://www.who.int/maternal_child_adolescent/documents/improving-maternal-newborn-care-quality/en/: World Health Organization 2016.
4. WHO. Time to respond. Geneva http://www.who.int/maternal_child_adolescent/documents/maternal_death_surveillance_implementation/en/: World Health Organization; 2016.
5. Raven JH, Hofman J, Adegoke A, van den Broek N. Methodology and tools for quality improvement in maternal and newborn health care. Int J Gynecol Obstet. 2011;114(1):4-9.
6. Raven JH, Tolhurst RJ, Tang S, van den Broek N. What is quality in maternal and neonatal health care? Midwifery. 2012;28(5):e676-83.
7. Browne JL, van Nievelt SW, Srofenyoh EK, Grobbee DE, Klipstein-Grobusch K. Criteria-based audit of quality of care to women with severe pre-eclampsia and eclampsia in a referral hospital in Accra, Ghana. PLoS One. 2015;10(4):e0125749.
8. Hoque M, Hoque E, Kader SB. Audit of antenatal care in a rural district of KZN, South Africa South African Family Practice 2008;58(3):66-d.
9. Kihara AB, Harries AD, Bissell K, Kizito W, Van Den Berg R, Mueke S, et al. Antenatal care and pregnancy outcomes in a safe motherhood health voucher system in rural Kenya, 2007-2013. Public health action. 2015;5(1):23-9.
10. WHO. Beyond the Numbers: Reviewing maternal deaths and complications to make pregnancy safer. Geneva http://www.who.int/maternal_child_adolescent/documents/9241591838/en/: World Health Organization; 2004.
11. WHO. Maternal Death Surveillance and Response, Technical guidance. https://apps.who.int/iris/bitstream/handle/10665/87340/9789241506083_eng.pdf;jsessionid=C7E1CE

CE9FEAA373101CAA5B633D1D4B?sequence=1: World Health Organization,; 2013.
12. Biswas A, Rahman F, Eriksson C, Halim A, Dalal K. Social Autopsy of maternal, neonatal deaths and stillbirths in rural Bangladesh: qualitative exploration of its effect and community acceptance. BMJ open. 2016;6(8):e010490.
13. Kongnyuy EJ, Uthman OA. Use of criterion-based clinical audit to improve the quality of obstetric care: A systematic review. Acta Obstet Gynecol Scand. 2009;88(8):873-81.
14. Pirkle CM, Dumont A, Zunzunegui MV. Criterion-based clinical audit to assess quality of obstetrical care in low- and middle-income countries: a systematic review. Int J Qual Health Care. 2011;23(4):456-63.
15. Ivers N, Jamtvedt G, Flottorp S, Young JM, Odgaard-Jensen J, French SD, et al. Audit and feedback: effects on professional practice and healthcare outcomes. Cochrane Database Syst Rev 2012(6).
16. Benjamin A. Audit: how to do it in practice. BMJ. 2008;336(7655):1241-5.
17. Filippi V, Brugha R, Browne E, Gohou V, Bacci A, Brouwere Vd, et al. Obstetric audit in resource-poor settings: lessons from a multi-country project auditing 'near miss' obstetrical emergencies. Health Policy Plan. 2004;19(1):57-66.
18. Combs Thorsen V, Sundby J, Meguid T, Malata A. Easier said than done!: methodological challenges with conducting maternal death review research in Malawi. BMC Med Res Methodol. 2014;14:29-44.
19. Smith H, Ameh C, Godia P, Maua J, Bartilol K, Amoth P, et al. Implementing Maternal Death Surveillance and Response in Kenya: Incremental Progress and Lessons Learned. Glob Health Sci Pract. 2017;5:345-54.
20. Kongnyuy EJ, van den Broek N. The difficulties of conducting maternal death reviews in Malawi. BMC Pregnancy Childbirth. 2008;8:42-7.
21. Weeks AD, Alia G, Ononge S, Mutungi A, Otolorin EO, Mirembe FM. Introducing criteria based audit into Ugandan maternity units. Qual Saf Health Care. 2004;13(1):52-5.
22. Tong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. BMC Med Res Methodol. 2012;12:181-8.
23. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC Med Res Methodol. 2008;8:45.
24. World Bank. World Bank Country and Lending Groups https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups2017 [cited 2017 8th Aug].
25. Clarivate Analytics. Endnote X9 https://endnote.com/product-details/2019 [
26. Critical Appraisal Skills Programme. CASP Qualitative Research Checklist http://www.casp-uk.net/casp-tools-checklists2017 [cited 2017 1st Sep].
27. Hannes K, Lockwood C, Pearson A. A comparative analysis of three online appraisal instruments' ability to assess validity in qualitative research. Qual Health Res. 2010;20(12):1736-43.
28. Dixon-Woods M, Sutton A, Shaw R, Miller T, Smith J, Young B, et al. Appraising qualitative research for

inclusion in systematic reviews: A quantitative and qualitative comparison of three method. J Health Serv Res Policy. 2007;12:42-7.
29. Barnett-Page E, Thomas J. Methods for the synthesis of qualitative research: a critical review. BMC Med Res Methodol. 2009;9:59.
30. Agaro C, Beyeza-Kashesya J, Waiswa P, Sekandi JN, Tusiime S, Anguzu R, et al. The conduct of maternal and perinatal death reviews in Oyam District, Uganda: a descriptive cross-sectional study. BMC Womens Health. 2016;16(38).
31. Armstrong CE, Lange IL, Magoma M, Ferla C, Filippi V, Ronsmans C. Strengths and weaknesses in the implementation of maternal and perinatal death reviews in Tanzania: perceptions, processes and practice. Trop Med Int Health 2014;19(9):1087-95.
32. Bakker W, Akker Tvd, Mwagomba B, Khukulu R, Elteren Mv, Roosmalen Jv. Health workers' perceptions of obstetric critical incident audit in Thyolo District, Malawi. Trop Med Int Health 2011;16(10):1243-50.
33. Biswas A, Rahman F, Eriksson C, Halim A, Dalal K. Facility death review of maternal and neonatal deaths in Bangladesh. PLoS One. 2015;10(11):e0141902-e.
34. Biswas A, Rahman F, Halim A, Eriksson C, Dalal K. Experiences of community verbal autopsy in maternal and newborn health of Bangladesh. Healthmed. 2015;9(8):329-38.
35. Dumont A, Tourigny C, Fournier P. Improving obstetric care in low-resource settings: implementation of facility-based maternal death reviews in five pilot hospitals in Senegal. Hum Resour Health. 2009;7:61.
36. Hofman JJ, Mohammed H. Experiences with facility-based maternal death reviews in northern Nigeria. Int J Gynaecol Obstet 2014;126(2):111-4.
37. Hutchinson C, Lange I, Kanhonou L, Filippi V, Borchert M. Exploring the sustainability of obstetric near-miss case reviews: a qualitative study in the South of Benin. Midwifery. 2010;26(5):537-43.
38. Johnston G, Crombie IK, Davies HT, Alder EM, Millard A. Reviewing audit: barriers and facilitating factors for effective clinical audit. Qual Health Care. 2000;9(1):23-36.
39. Muffler N, Trabelssi ME, Brouwere Vd. Scaling up clinical audits of obstetric cases in Morocco. Trop Med Int Health 2007;12(10):1248-57.
40. Nyamtema AS, Urassa DP, Pembe AB, Kisanga F, van Roosmalen J. Factors for change in maternal and perinatal audit systems in Dar es Salaam hospitals, Tanzania. BMC Pregnancy Childbirth. 2010;10:29.
41. Owolabi H, Ameh CA, Bar-Zeev S, Adaji S, Kachale F, Broek Nvd. Establishing cause of maternal death in Malawi via facility-based review and application of the ICD-MM classification. BJOG. 2014;121(s4):95-101.
42. Raman S, Iljadica A, Gyaneshwar R, Taito R, Fong J. Improving maternal and child health systems in Fiji through a perinatal mortality audit. Int J Gynaecol Obstet. 2015;129(2):165-8.
43. Richard F, Ouedraogo C, Zongo V, Ouattara F, Zongo S, Gruenais ME, et al. The difficulty of questioning clinical practice: experience of facility-based case reviews in Ouagadougou, Burkina Faso. BJOG.

2009;116(1):38-44.
44. Aborigo RA, Allotey P, Tindana P, Azongo D, Debpur C. Cultural imperatives and the ethics of verbal autopsies in rural Ghana. Glob Health Action 2013;6:18570.
45. Bhattacharyya S, Srivastava A, Knight M. Developing a framework to review near-miss maternal morbidity in India. BMC Health Serv Res. 2014;14:553.
46. Borchert M, Bacci A, Baltag V, Hodorogea S, Drife J. Improving maternal and perinatal healthcare in the Central Asian republics. Int J Gynaecol Obstet 2010;110:97 - 100.
47. D'Ambruoso L, Achadi E, Adisasmita A, Izati Y, Makowiecka K, Hussein J. Assessing quality of care provided by Indonesian village midwives with a confidential enquiry. Midwifery. 2009;25:528 - 39.
48. De Kok B, Imamura M, Kanguru L, Owolabi O, Okonofua F, Hussein J. Achieving accountability through maternal death reviews in NIgeria: a process analysis. Health Policy Plan. 2017;32(8):1083 - 91.
49. Murray-Davis B, McDonald H, Cross-Sudworth F, Dore S, Marrin M, DeSantis J, et al. Implementation of an interprofessional team review of adverse events in Obstetrics using a standardised computer tool: a mixed methods study. J Obstet Gynaecol Can. 2016;38:168 - 76.
50. Newman K, Pyne T. Quality matters: Junior doctors' perceptions. J Manag Med. 1996;10:12 - 23.
51. Price S. Professionalizing midwifery: exploring medically imagined labor rooms in rural Rajastan. Med Anthropol Q. 2014;28:519 - 36.
52. Rao RK, Alva J, Sudhakar C, Lhamo N, Jose DM, Mathew J, et al. Perception of staff nurses regarding quality audit process in hospitals of Mangalore District, Karnatika Nurs J India. 2012;103:204 - 5.
53. Renshaw M, Ireland A. Specialty audit leads - has this concept been effective in implementing audit in an acute hospital? Int J Health Care Qual Assur Inc Leadersh Health Serv. 2003;16:136 - 42.
54. Singh S, Murthy G, Thippaiah A, Upadhyaya S, Krishna M, Shukla R, et al. Community based maternal death review: Lessons learned from Ten Districts in Andhra Pradesh, India. Matern Child Health J. 2015;19:1447 - 54.
55. Sychareun V, Phommachanh S, Soysouvanh S, Lee C, Kang M, Oh J, et al. Provider perspectives on constraints in providing maternal, neonatal and child health services in the Lao People's democratic republic: a qualitative study. BMC Pregnancy Childbirth. 2013;13:243.
56. Takada S, Oudavong B, Kuroiwa C. The successes and challenges of the IMCI training course in Lao PDR. Southeast Asian J Trop Med Public Health. 2007;38:178 - 87.
57. van Hamersveld KT, den Bakker E, Nyamtema AS, van den Akker T, Mfinanga EH, van Elteren M, et al. Barriers to conducting effective obstetric audit in Ifakara: a qualitative assessment in an under-resourced setting in Tanzania. Trop Med Int Health. 2012;17(5):652-7.
58. Biswas A, Rahman F, Eriksson C, Dalal K. Community Notification of Maternal, Neonatal Deaths and Still Births in Maternal and Neonatal Death Review (MNDR) System: Experiences in Bangladesh. Health. 2014;06(16):2218-26.
59. Dumont A, Chergui M, Gaye AL, Touringny A, Fournier P. Identifying barriers and facilitators towards

implementing facility-based maternal death reviews in Senegal. Ottawa: Society of Obstetricians and Gynaecologists of Canada; 2008.

60. Mathur A, Awin N, Adisasmita A, Jayaratne K, Francis S, Sharma S, et al. Maternal death review in selected countries of South East Asia Region BJOG. 2014;121 Suppl 4:67 - 70.
61. Belizan M, Bergh AM, Cilliers C, Pattinson RC, Voce A. Stages of change: A qualitative study on the implementation of a perinatal audit programme in South Africa. BMC Health Serv Res. 2011;11:243.
62. Abebe B, Busza J, Hadush A, Usmael A, Zeleke AB, Sita S, et al. 'We identify, discuss, act and promise to prevent similar deaths': a qualitative study of Ethiopia's Maternal Death Surveillance and Response system. BMJ Glob Health. 2017;2(2):e000199.
63. Stokes T, Shaw EJ, Camosso-Stefinovic J, Imamura M, Kanguru L, Hussein J. Barriers and enablers to guideline implementation strategies to improve obstetric care practice in low- and middle-income countries: a systematic review of qualitative evidence. Implement Sci. 2016;11(1):144-53
64. Johnston GN, Crombie IK, Davies HTO. What Stops Effective Clinical Audit? Reports from the Front Line. Scott Med J. 2000;45(1):23-7.
65. Davies HTO, Nutley SM, Mannion R. Organisational culture and quality of health care. Qual Health Care. 2000;9:111-9.
66. WHO. Quality, equity, dignity: the network to improve quality of care for maternal, newborn and child health – strategic objectives. https://www.who.int/maternal_child_adolescent/documents/quality-care-network-objectives/en/ WHO; 2018.
67. De Brouwere V., Zinnen V., Delvaux T. How to conduct Maternal Death Reviews (MDR). Guidelines and tools for health professionals. London, International Federation of Gynecologists ad Obstetricians, FIGO LOGIC. 2013. http://www.figo.org/files/figo-corp/Edited%20MDR%20Guidelines%20final%202014.pdf accessed [21.12.2019]

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