

BMJ Open Facilitators and barriers to the effective implementation of the individual maternal near-miss case reviews in low/middle-income countries: a systematic review of qualitative studies

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ABSTRACT

Background The maternal near-miss cases review (NMCR), a type of clinical audit, proved to be effective in improving quality of care and decreasing maternal mortality in low/middle-income countries (LMICs). However, challenges in its implementation have been described.

Objectives Synthesising the evidence on facilitators and barriers to the effective implementation of NMCR in LMICs.

Design Systematic review of qualitative studies.

Data sources MEDLINE, LILACS, Global Health Library, SCI-EXPANDED, SSCI, Cochrane library and Embase were searched in December 2017.

Eligibility criteria for selecting studies Qualitative studies exploring facilitators and/or barriers of implementing NMCR in LMIC were included.

Data extraction and synthesis Two independent reviewers extracted data, performed thematic analysis and assessed risk of bias.

Results Out of 25 361 papers retrieved, 9 studies from Benin, Brazil, Burkina Faso, Cote D'Ivoire, Ghana, Malawi, Morocco, Tanzania, Uganda could be included in the review. The most frequently reported barriers to NMCR implementation were the following: absence of national guidelines and local protocols; insufficient training on how to perform the audit; lack of leadership, coordination, monitoring and supervision; lack of resources and work overload; fear of blame and punishment; poor knowledge of evidenced-based medicine; hierarchical differences among staff and poor understating of the benefits of the NMCR. Major facilitators to NMCR implementation included: good leadership and coordination; training of all key staff; a good cultural environment; clear staff's perception on the benefits of conducting audit; patient empowerment and the availability of external support.

Conclusions In planning the NMCR implementation in LMICs, policy-makers should consider actions to prevent and mitigate common challenges to successful NMCR implementation. Future studies should aim at documenting facilitators and barriers to NMCR outside the African Region.

Strengths and limitations of this study

- This review fills a gap in evidence synthesis by systematically reporting scientific literature on facilitators and barriers to effective implementation of near-miss cases review (NMCR) in low/middle-income countries (LMICs).
- Findings of this review are limited by the paucity of existing scientific reports: although the NMCR approach has been used in many countries (such as in Europe, Central Asia, South East Asia, Latin America and the Caribbean), there has been relatively few formal studies exploring facilitators and barriers to effective NMCR implementation.
- Despite the above-described limitation, this review retrieved an appreciable number of good-quality studies from the African Region and provides a list of recommendations relevant for both researchers and policy-makers for facilitating effective NMCR implementation in LMICs.

BACKGROUND

Ensuring adequate quality of healthcare is a primary objective of the WHO Global Strategy for Women's, Children's and Adolescent's Health 2016–2030.¹ Quality in healthcare is recognised as essential for the health and well-being of the population and as a basic aspect of human rights.^{2 3}

Among different approaches aiming at improving quality of care in maternity services, the maternal near-miss cases review (NMCR) approach was promoted by WHO and partners since 2004 within the strategy Beyond the Numbers.⁴ A maternal near-miss case is defined as a woman who nearly died but survived a complication that occurred during pregnancy, childbirth or within 6 weeks after pregnancy.⁵ The facility-based individual NMCR cycle is defined as a type of criterion-based audit seeking to improve maternal and perinatal healthcare and

outcomes by conducting a review, at hospital level, of the care provided to maternal near-miss cases.⁵ Based on the findings of the case review, actions for improving quality of care are proposed and agreed by hospital staff.⁵ Beside reviewing clinical management, the NMCR can cover other domains involved with care delivery, including availability of essential equipment, staffing, training, policies and organisation of services.⁵ The bottom-up approach of the NMCR aims at ensuring local ownership and at facilitating team-building dynamics.⁵

The NMCR have been promoted in the last 20 years as a way to audit case management more acceptable for health workers than mortality audits.^{4,6} In most facilities, the number of maternal deaths is usually insufficient or not representative enough to allow reliable policy guidance.⁴ Near-miss cases occur more frequently than maternal deaths and their review can inform on both strengths and weaknesses in the process of care. Moreover, discussing cases of deaths may have legal implication and may be perceived as challenging by hospital staff,⁴ while the review of near-miss cases has showed an overall higher acceptability.⁴⁻⁶

A systematic review highlighted that the implementation of the NMCR cycle may significantly decrease maternal mortality (OR 0.77, 95% CI 0.61 to 0.98) in high burden countries and can improve quality of care when measured against predefined standards.⁷ However, a number of challenges hampering successful implementation of the NMCR were also reported.⁷ Knowledge on factors affecting the successful NMCR implementation can help policy-makers and development partners in better planning the intervention. Given the lack of other reviews exploring this question, the objective of this paper was to systematically synthesise the evidence on facilitators and barriers to effective NMCR implementation in low/middle-income countries (LMICs).

METHODS

Search strategy and eligibility criteria

In conducting this review, we followed the guidelines reported in the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)⁸ and ENTREQ statement to enhance transparency in reporting of qualitative evidence synthesis⁹ (see online supplementary appendices 1 and 2). A protocol including detailed methods of the review was developed before starting the review.

We searched up to December 2017 the following databases, with no language restrictions: MEDLINE through PubMed (from 1956); LILACS through the Virtual Health Library (no date restrictions); Global Health Library (WHO website, no date restrictions); Science Citation Index Expanded (SCI-EXPANDED) and Social Sciences Citation Index (SSCI) through Web of Science (no date restrictions); Cochrane library (no date restrictions) and Embase through OVID (from 1996). The search strategy

Box 1 Search strategy

PubMed, Date: 1 December 2017, Total retrieved: 5661

"near miss" OR (audit AND (obstetric* OR matern* OR pregnan* OR woman OR women))

Lilacs, Date: 1 December 2017, Total retrieved: 231

(TW:near miss OR MH:near miss) OR ((TW:audit OR MH:audit OR TW:auditoria OR MH:auditoria OR auditoria) AND (gravid\$ OR pregnan\$ OR enceint\$ OR embarazad\$ OR obstetr\$ OR mulher\$ OR mujer\$ OR femme\$ OR woman OR women OR matern\$))

Global Index Medicus Date: 1 December 2017, Total retrieved: 7876

(TW:near miss OR MH:near miss) OR ((TW:audit OR MH:audit OR TW:auditoria OR MH:auditoria OR auditoria) AND (gravid\$ OR pregnan\$ OR enceint\$ OR embarazad\$ OR obstetr\$ OR mulher\$ OR mujer\$ OR femme\$ OR woman OR women OR matern\$))

Web of Science Date: 1 December 2017, Total retrieved: 5322

TS= "near miss" OR (TS=audit AND TS=(gravid* OR pregnan* OR obstetr* OR woman OR women OR matern*))

Cochrane Library Date: 1 December 2017, Total retrieved: 344

"near miss" OR (audit AND (gravid* or pregnan* or obstetr* or woman or women or matern*))

EMBASE Date: 1 December 2017, Total retrieved: 5927

1. ("near miss" or audit).ab. (34259)
2. (obstetric* or matern* or pregnan* or woman or women).ab. (1057153)
3. 1 and 2 (4764)
4. ("near miss" or audit).ti. (13725)
5. (obstetric* or matern* or pregnan* or woman or women).ti. (325314)
6. 4 and 5 (724)
7. 3 or 6 (4962)

is reported in [box 1](#). Manual searches of reference lists were also performed.

Studies were eligible for inclusion if they explored facilitators and/or barriers of implementing the NMCR, either by collecting personal views of hospital staff or of patients, in an LMIC (defined as for the World Bank definition¹⁰ at the time when the study was conducted). Both studies using the most recent WHO definition of a maternal near-miss case¹¹ developed in year 2011, or locally adapted definitions (such as locally developed disease-specific definitions) were considered for inclusion. Studies reporting facilitators and barriers to effective NMCR implementation merely as the author's opinion (eg, in the section Discussion) and not as a result of a dedicated analysis were excluded. Abstracts and unpublished technical reports were also not eligible for inclusion. Studies on newborn near-miss cases were not included.

Data collection and analysis

Studies were selected for inclusion by two independent researchers. The full text of all eligible citations was examined in detail. Two researchers extracted data from included studies, using a prepiloted data extraction form. Any disagreement was solved via discussion between the two researchers and consensus sought through a third researcher.

Two authors independently extracted information regarding the study setting, the study sample, methods and tools used for data collection and data analysis. Two authors independently created a spreadsheet with all facilitators and barriers reported in included studies and used thematic analysis methods to conduct initial open coding on each relevant text unit. In the initial round of coding, main emerging themes were synthesised and these were intentionally very broad in order to capture the overarching core themes. As a second step, each theme was further analysed to develop the axial coding scheme. Axial coding is widely accepted in qualitative literature as a sufficient method to disaggregate core themes during qualitative analysis.^{12–14} Two researchers independently applied the axial codes systematically to the data by hand-sorting the text units into themes and subthemes. Any disagreement on thematic analysis was solved by discussion between the two authors and consensus sought through a third author. Final results are reported in a table, providing the first-order, second-order and third-order themes. Excel and Word were used as software of data extraction.

The quality of studies was evaluated by two authors independently using the Critical Appraisal Skills Programme (CASP) assessment tool for qualitative studies.¹⁵

Three authors inferred barriers and facilitators reported in the included studies and captured by the descriptive themes, and developed key recommendations

for effective NMCR implementation, in line with methods used by previous reviews.¹⁴ This process was performed first independently by each author and then as a group until consensus was reached.

Patient and public involvement

Patients were not directly involved in this study. However, the development of the research question and outcome measures was informed by patient experience, as previously reported in literature.^{2–5} For example, in revising studies, we evaluated whether patient views were considered, and the general attitude of service providers towards patients.

RESULTS

Characteristics of the studies

The systematic search yielded a total of 25 361 records (figure 1). Overall, nine studies^{16–24} met the inclusion criteria (table 1). Of these, seven studies were held in countries in the African Region: Benin,^{21 24} Burkina Faso,²⁴ Cote D'Ivoire,²⁴ Ghana,²⁴ Malawi,²⁰ Morocco,^{22 24} Tanzania¹⁹ and Uganda.¹⁶ Two reports contributed on one study from Brazil.^{17 18}

Most studies were conducted in low-income countries, with the exception of the studies in Morocco and Brazil (middle-income countries). Three studies were conducted in an urban setting,^{16 23 24} one in a rural

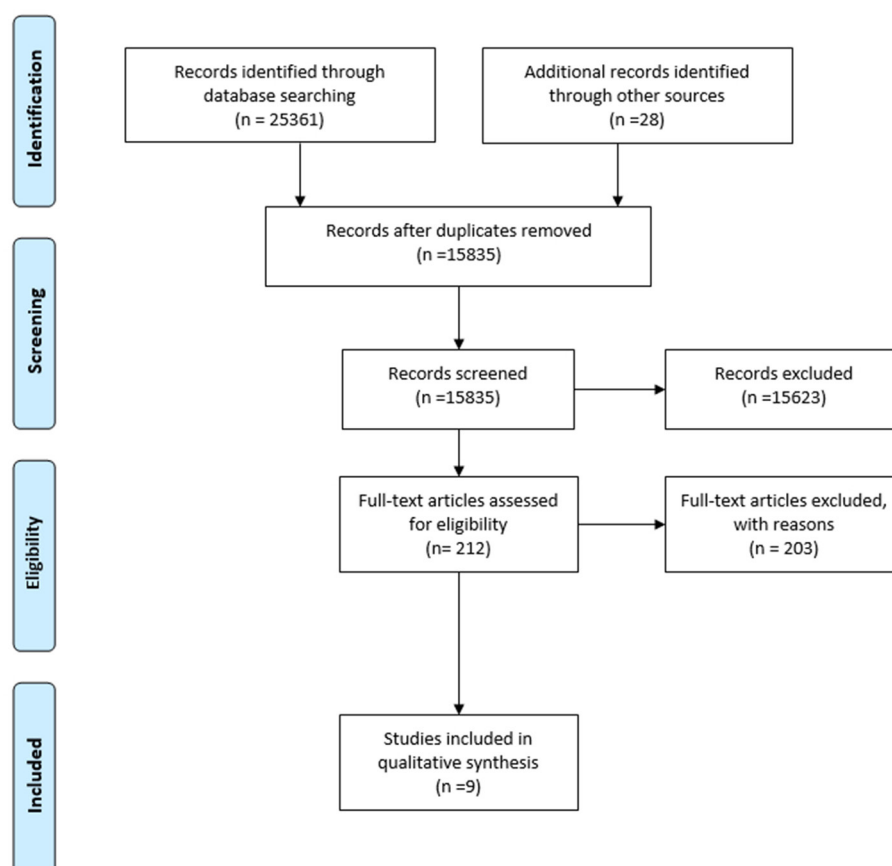


Figure 1 Study flow diagram.

Table 1 Study context and population

Study	Country	World Bank classification*	Setting	Hospital (n)	Hospital type*	Sample staff (n)	Staff type*
Kayiga <i>et al</i> , 2016 ¹⁶	Uganda	L	Urban	1	Tertiary hospital	40	D, I, R
Gomez Luz <i>et al</i> , 2014 ¹⁷ Gomez Luz <i>et al</i> , 2014 ¹⁸	Brazil	UM	Mixed	27	Mixed (all teaching hospitals but 5 secondary level, 22 tertiary level)	122	C, PI, MA
Hamersveld <i>et al</i> , 2012 ¹⁹	Tanzania	L	Rural	1	District hospital	23	D, C, M, N, MA
Bakker <i>et al</i> , 2011 ²⁰	Malawi	L	Mixed	2	Mixed (one district, one rural hospital)	33	D, N, M
Hutchinson <i>et al</i> , 2010 ²¹	Benin	L	Mixed	5	Mixed (two national university hospitals, one regional, one district, one missionary)	10	MA, HW
Muffler <i>et al</i> , 2007 ²²	Morocco	LM	Mixed	13	Mixed	56	MA, M, N, D, I, C, R
Richard <i>et al</i> , 2008 ²³	Burkina Faso	L	Urban	1	District hospital	35	D, M, N
Filippi, 2004 ²⁴	Benin, Cote D'Ivoire, Ghana, Morocco	L, L, L, LM	Urban	12	Mixed (first level in Morocco, more specialised in other countries)	162	D, M, I, N

*L, low income; LM, lower middle income; UM, upper middle income (countries are classified based on the years when the study was performed).

C, coordinator; D, doctors; I, in charge; HW, health workers; I, investigators; M, midwives; MA, manager; n, nurses; PI, principal investigator; R, resident.

area,¹⁹ four in a mixed setting^{17 20–22} and one not clarified this information. Overall, there were four large-to-middle-sized studies including a conspicuous number of hospitals: 27 maternities in the Brazilian study^{17 18}; 13 facilities in a study in Morocco²²; 12 hospitals in a multi-country study²⁴ and 5 in a study from Benin.²¹ One study in Malawi included two hospitals,²⁰ while the remaining three studies included one single facility.^{16 19 23} Number of staff interviewed (and/or included in the focus group) varied from a maximum of 162 people²⁴ to a minimum of 10.²¹ All studies collected the views of hospital staff, while none reported the views of patients.

In terms of methodology (table 2), most studies were conducted 1–2 years after the start of the NMCR implementation, with only two studies^{21 22} being performed several years after. All studies used interviews as the main tool for data collection. In addition, two evaluations used focus group discussion,^{16 20} three used direct observation of the NMCR session^{19 20 24} and two evaluated notes from the NMCR sessions and other related documents.^{23 24} Five studies explicitly stated that the investigation was conducted by a researcher who was external from the study context,^{17 20 21 23 24} while the others did not fully clarify the relationship between the interviewer and the participants. Other methods related to data collection and analyses are reported in table 2.

Quality of the studies according to the CASP criteria is reported in table 3. Three studies matched all criteria for quality and were rated as 'high quality',^{17 21 23} while the remaining studies were rated as of moderate quality.^{16 19 20 22 24}

Barriers and facilitators

Table 4 synthesises the first-order, second-order and third-order themes identified. Factors were divided into national-level factors, facility-level factors and external partners factors.

National level factors

National standards

Absence of national case management protocols¹⁶ was reported as a barrier to the effective implementation of NMCR.

Leadership and coordination mechanisms

Facilitators of effective NMCR implementation described by health workers included general commitment of health authorities²⁰ and the establishment of effective coordination mechanisms, such as effective task allocation,¹⁷ networking support among facilities,²⁴ availability of a standard form for reporting,²¹ effective monitoring and quality assessment.^{17 21} Commitment to training²⁰ and integration of audits into medical and midwifery school curricula²¹ were also reported as facilitators.

Barriers to effective NMCR implementation included absence of directives from health authority²² and pressure from competing programme activities or interests.^{21 22}

Facility level factors

National guidelines and standards

Absence of case management protocols¹⁶ at facility level was reported as key barrier in implementing the NMCR.¹⁶

Table 2 Study methods

Author	Timing in respect of NMCR start	Methods and tools	Who performed the evaluation?	Other methods related to data collection	Other methods related to data analysis
Kayiga <i>et al.</i> , 2016 ¹⁶	During NMCR implementation	Interviews+three focus groups	NR	Open-ended questions. Midwives, doctors and residents involved in focus group separately.	All data were transcribed coded and analysed by thematic analysis.
Gomez Luz <i>et al.</i> , 2014 ¹⁷ Gomez Luz <i>et al.</i> , 2014 ¹⁸	6 and 12 months after start of implementation	Semistructured telephone interviews	Interviewers skilled in how to conduct telephone surveys were specifically trained for the study	Pretested tool for guiding the interviews. At least six attempts made to contact each potential subject. When telephone contact was unsuccessful, messages were sent by email. The interviews were conducted by phone, after informed consent, and simultaneously recorded.	The NVivo software program was used to codify the interviews, organise and analyse the qualitative data. Thematic content analysis was conducted by two authors and reviewed by two other authors. Quotations from the transcripts were used to illustrate the results presented.
Hamersveld <i>et al.</i> , 2012 ¹⁹	2 years after implementation	In-depth interviews+observation +	Two study authors	A semistructured interview guide based on earlier studies. Participants conveniently selected. Interviews conducted in Swahili for those who could not express themselves in English. During the study period, points of key interest were analysed and used to refine questions and elaborate on certain areas while maintaining the structure of the interview guide.	The recording was transcribed manually and then analysed by using inductive coding. All interviews in Swahili were recorded, transcribed and translated into English. Further analysis grouped the codes into categories and cross-links within the data as well as between data, and literature were identified. Two authors independently analysed the data, after which results were compared.
Bakker <i>et al.</i> , 2011 ²⁰	After national institutionalisation of NMCR and during an impact study	Semistructured interviews, focus groups, observation and key informant interviews	Independent primary investigator not part of the hospital staff	Interviews: semistructured questionnaire previously used for another study and probed for critical views; convenience and snowball sampling; the inclusion criterion for participants was regular involvement with obstetric healthcare in the district. Focus groups: conducted towards the end of the study period to complement interviews.	All data were literally transcribed, using Express Scribe transcription software. Relevant data were entered into Microsoft Excel. Analysis and statement coding were performed using MAXQDA 2010 software.
Hutchinson <i>et al.</i> , 2012 ²¹	7 years after start of NMCR implementation	Semistructured interviews	First author, a local researcher not involved in the NMCR implementation and not known by participants	A literature review informed the development of a semistructured interview guide. Open-ended questions allowed participants to address issues important to them. The guide was translated into French and modified following advice by local scientists. Participants were selected randomly ensuring inclusion of a range of professional backgrounds. All interviews were conducted in French, transcribed and translated in English.	Transcripts were read numerous times in order to become familiar with emerging themes. Framework analysis was used to provide a systematic approach for coding themes.

Continued

Table 2 Continued					
Author	Timing in respect of NMCR start	Methods and tools	Who performed the evaluation?	Other methods related to data collection	Other methods related to data analysis
Muffler <i>et al</i> , 2007 ²²	About 10–12 years after start of implementation	Self-administered questionnaire+semistructured interviews	NR	A self-administered questionnaire was sent to 84 public maternities to identify those implementing the audits. All but one maternity units were visited. Semistructured interviews were conducted individually. In addition, locally available data on audit activity was gathered from audit reports and overviews were systematically reviewed and compared with data gathered in the interviews.	Interview data were analysed using systematic content analysis.
Richard <i>et al</i> , 2008 ²³	About 1 year after start of the implementation	Questionnaire+reviews of notes from audit sessions	Research midwife, not part of the hospital staff	A pretested questionnaire was used. It contained closed and open-ended questions, and it was administered face to face by a single interviewer.	Data were analysed using a qualitative and quantitative approach. Answers from open-ended questions were coded. Answers were then grouped according to themes to build tables. Two authors conducted the analysis.
Filippi <i>et al</i> , 2004 ²⁴	Few years after start of implementation	Interviews+observation of sessions+ documents review	Local researchers, externally supported by international team	NR	NR
NMCR, near-miss case review; NR, not further reported.					

Table 3 Quality assessment of studies

Study	Clear statement of the aims of the research	Qualitative methodology appropriate	Research design appropriate to address the aims of the research	Recruitment strategy appropriate	Data collected to address the research issue	Relationship between researcher and participants adequately considered	Have ethical issues been taken into consideration?	Data analysis sufficiently rigorous	Clear statement of findings	Is the research valuable?
Kayiga <i>et al.</i> , 2016 ¹⁶	Y	Y	Y	Can't tell *	Y	Can't tell *	Y	Y	Y	Y
Gomez Luz <i>et al.</i> , 2014 ^{17,18}	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Hamersveld <i>et al.</i> , 2012 ¹⁹	Y	Y	Y	Can't tell *	Y	Can't tell *	Partly †	Y	Y	Y
Bakker <i>et al.</i> , 2011 ²⁰	Y	Y	Y	Partly ‡	Y	Y	Y	Y	Y	Y
Hutchinson <i>et al.</i> , 2010 ²¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Muffler <i>et al.</i> , 2007 ²²	Y	Y	Y	Y	Y	Y	Partly §	Y	Y	Y
Richard 2008 <i>et al.</i> , ²³	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Filippi <i>et al.</i> , 2004 ^{24,25}	Y	Y	Y	Y	Y	Can't tell *	Can't tell *	Y	Y	Y

*Not enough information provided in the paper.

†Participants' informed verbal consent was obtained for each interview and for the use of a tape recording. Participants' anonymity was protected by keeping the tape records and written information confidential.

‡Participants were conveniently selected.

§The National Health Sciences Research Committee of the Government of Malawi qualified the study as 'operational research' and did not require formal ethical approval, because it involved the evaluation of routine clinical practice only. Participants were informed about the study background and objectives and permission was asked to tape-record. It was made clear that information would be anonymously transcribed and reported by the primary investigator and that his reports could not be traced to individuals.

Table 4 Results of the thematic analysis

Third order	Second order	First order	Facilitators	Barriers
National level factors	Leadership and coordination mechanisms	Guidelines and standards NMCR implementation	Commitment of health authorities ²⁰ Effective task allocation ¹⁷ Effective coordination ²⁴ Standard form for reporting ^{17 21} Effective monitoring and quality assessment ^{17 21} Commitment to training ²⁰ Integrating audits into the curricula of medical and midwifery schools ²¹	Absence of national case management protocols ¹⁶ Absence of directives from the health authority ²² Pressures of competing programme activities ²¹ Clashing interests of health authorities compared with those of health providers ²²
Facility level factors	Policies and coordination mechanisms	Standards Training Leadership and coordination of audit sessions	Training of all key staff ^{17 19 21} Obstetricians' and midwives' involvement in safe motherhood initiatives ²¹ Good leadership ^{17 21} Managerial support ^{19 21} Written management policy ^{17 21} Convincing explanations on the importance of audits ¹⁷ Introduction of new clinical guidelines together with audits ^{17 23} Dedicated and permanent chairperson ²⁰ Involvement of a variety of staff and managers ^{19 20} Presence at the session of the health workers involved in the case ²⁰ Case discussion conducted openly, fairly and with decent manners ^{19 20} Focusing also on positive aspects of care ²⁰ Cases discussed in an anonymous way ²³ Balance between the expectations and engagement from both providers and administrators ²²	Absence of management protocols ¹⁶ Training of single people ²² Poor understanding, management and participations from leaders ^{17 19 21 22} Managers failing to show that the aim of audit is not finding the guilty party ^{21 22} Lack of task allocation ¹⁶ Lack of inclusion of all staff ^{19 21} Case selection bias ²³ The audit highlighted only the negative aspects of case management ²³ Blaming and/or use of harsh language, threatening, repressive attitude ¹⁹⁻²³ Loss of confidentiality and/or pointing out explicitly who made a mistake ^{20 23} Underestimation of resources needed ²¹ Delay of release of funds ¹⁶ Managers' reluctance in attending meetings ²⁴ Centralised decision-making ²³ Lack of follow-up on recommendations ^{16 19 20 23} Lack of transparent results diffusions and provision of feedback ^{16 19 20}
	Incentives		Political and/or institutional commitment and active coordination ^{17 22} Standardised forms for reporting ¹⁷ Structured action plans with transparent information to all staff ^{19 20 24} Constant monitoring and periodic quality assessment ¹⁷ Role and recognition ^{22 24} Economic incentives ^{21 24} Purchase of necessary essential equipment ²¹	No reward nor economic incentive, in settings with low salaries ²¹⁻²³ Low resources available to implement recommendations ²⁴

Continued

Table 4 Continued

Third order	Second order	First order	Facilitators	Barriers
External factors	Resource availability	Human resources, essentials equipment and supplies	Adequate human and material resources ^{19 22} Proper documentation ¹⁹	High patient workload, shortage of staff ^{16 17 19-22 24} Staff absenteeism ^{19 20} and/or high staff turnover ²¹ Shortage of equipment and supplies, including stationary ^{16 19 23} Insufficient record-keeping ^{17 19} Underestimation of resources needed ²¹ Low morale among staff desiring to leave work ¹⁶
	Sociocultural environment	Culture and practice of quality improvement	Blame-free environment ¹⁹ Attitude towards self-criticism ²² Positive attitude towards audit and feedback ²⁰ Being a teaching hospital associated with research ¹⁷ Health staff willingness to improve quality of care ²³ Good case notes perceived as helpful in protecting staff in a legal context ²²	Culture of blaming, fear and individual punishment ^{16 19-22} Lack of knowledge on principles and methods of audits ^{17 22} Audit not perceived as part of duties ^{17 21} Audits perceived as a way of controlling staff ²³ Lack of knowledge and/or interest in quality improvement ¹⁷ Inadequate knowledge of evidenced-based medicine ^{17 19 22} Difficulty from staff to feel questioned about own work ^{17 19 23} Attitude in finding excuses and not revealing the truth ^{19 21}
		Hierarchy, cultural norms among health staff and interpersonal relationship	Good practices of communication and cooperation between staff ^{19 22} Possibility to challenge staff of higher grade ¹⁹	Hierarchical differences ¹⁶ Nurses, midwives and doctors working separately ¹⁶ Doctors behaving as superior ^{16 22} Lack of assertiveness among mid-level staff ^{17 19 20} Personnel not being used to speak in public, fear of people higher in rank ^{17 19}
	Attitude towards patients		Empowered patients ¹⁶ Health staff passion and an attitude of caring for patients ^{16 17}	Disrespectable manners towards lower level staff ²⁰ Previously existing conflicts at interpersonal level ²² Lack of external support to facilitate dynamics ²²
				Difficulty of accepting professional responsibility ²² Poor attention low priority given to some conditions (eg, obstructed labour) ¹⁶ Low commitment to serve/work ¹⁶
External factors	Outputs and outcomes	Audit impacts	Positive impact of audits on quality of care ²¹ Positive impact of audits on health staff ^{20-22 24}	Lack of evidence or clarity about what the audit is and on its effectiveness ^{19 22}
	Sustained support	Availability	External body providing technical support and/or required resources ^{21 22 24}	

NMCR, near-miss case review.

Training

Training of all key staff and managers on the principles, importance and methodology of the NMCR^{17 19 21} was reported as key factor facilitating their implementation. In addition, programmes to strengthen involvement of obstetricians and midwives in safe motherhood initiatives²¹ were reported as useful.

On the other side, however, training a limited number of people (most often, only the local coordinator/facilitator) meant there was a risk of the process to be entirely dependent on the availability of that single person²² and this was noted as a barrier.

Leadership and coordination of audit sessions

A list of factors related to leadership and coordination was reported as facilitators to case reviews: good leadership^{17 21}; managerial support^{19 21}; existence of a written management policy^{17 21}; clear and convincing explanation on the importance of audits¹⁷; leadership for the introduction of new clinical guidelines as opposed to audits only^{17 23}; availability of a dedicated and permanent chairperson²⁰; involvement of a variety of staff and managers in all stages of audit, with unrestricted admission to sessions^{19 20}; attendance to the session of the health workers who had been involved in the case management²⁰; case discussion conducted openly and fairly with participants maintaining respect and good manners towards each other^{19 20}; focus also on positive aspects of care²⁰; case discussion conducted in an anonymous way²³ and finally a balance between the expectations and engagement from both providers and administrators.²²

Similarly, a list of barriers related to leadership and coordination was reported, such as poor understanding from leaders of the NMCR process; poor leadership and lack of involvement of directors^{17 19 21 22}; failure from managers in recognising that the NMCR aim is not finding who is guilty, but rather improving services^{21 22}; lack of task allocation¹⁶; lack of inclusion of all types of staff (eg, midwives, laboratory services) and poor participation of certain type of staff (eg, doctors or low-level staff not attending or attending irregularly)^{19 21}; case selection bias (eg, selecting only cases where mid-level staff, but not doctors, committed mistakes)²³; highlighting only the negative aspects of case management²³; blaming and/or using harsh language or bossing attitude^{19–23}; loss of confidentiality during the sessions²³; managers reluctance to attend meetings for fear of requests they cannot fulfil.²⁴ Other barriers included delay in releasing funds¹⁶ and centralised human resources management and decision-making inhibiting initiatives by the clinicians.²³

Monitoring and supervision

Political and/or institutional commitment in monitoring and supervision, active coordination of accountability mechanisms,^{17 22} together with the availability of standardised forms for reporting,¹⁷ structured action plans to implement the NMCR recommendations with

transparent information to all staff members,^{19 20 24} effective monitoring, periodic quality assessment and networking of local teams to a central coordinating centre¹⁷ were reported by staff as facilitators of the NMCR implementation.

On the other side, lack of follow-up on recommendations^{16 19 20 23} and lack of transparent results dissemination and provision of feedback^{16 19 20} were cited as barriers.

Incentives

Incentives such as appointing a role^{22 24} or providing some form of recognition such as economic incentives for participating in the audit sessions,^{21 24} and purchasing necessary essential equipment as recommended from the case reviews²¹ were observed as important factors to allow NMCR sustainability over time.

On the contrary, the absence of a reward or of an economic incentive, even if minimal, in setting with low salaries and high inflation,^{21–23} together with the low resources available to implement recommendations²⁴ were perceived as key barriers.

Resource availability

Adequate human and material resources^{19 22} and proper documentation¹⁹ were reported as essentials to carry forward the NMCR.

On the other side, high patients workload, shortage of staff,^{16 17 19–22 24} staff absenteeism^{19 20} and/or high staff turnover,²¹ together with shortage of equipment and supplies, including stationery,^{16 19 23} insufficient record-keeping^{17 19} and underestimation of resources needed²¹ were all perceived as barriers, associated with low morale among staff and desire to leave work.¹⁶

Culture and practice of quality improvement

A long list of sociocultural factors was reported as being either a facilitator or a barrier to effective implementation of NMCR. Factors perceived as facilitators were the following: a blame-free environment¹⁹; a culture of self-reflection among health workers and a general positive attitude towards audit and feedback^{20 22}; being a teaching hospital associated with research,¹⁷ motivational factors such as a desire to improve quality among health-care personnel.²³ Finally, staff's understanding that good quality in case management and appropriate documentation can help protect them in the case of a legal litigation²² was also reported as a facilitator.

The list of sociocultural barriers included: a culture of blaming, fear and individual punishment^{16 19–22}; lack of knowledge on the principles and methods of audits^{17 22}; the fact that NMCRs were not perceived as being part of regular duties^{17 21} or that they were perceived as a way of controlling staff²³; lack of knowledge and/or interest in quality improvement¹⁷; and inadequate knowledge on principles, methods and contents of evidence-based medicine.^{17 19 22} These factors were reported as being associated with difficulties from staff when questioned about their own work,^{17 19 23} and an attitude of making up

excuses and not withholding the truth about what actually happened during the care of near-miss cases.^{19 21}

Hierarchy, cultural norms among health staff and interpersonal relationships

Good practices of communication and cooperation between different cadres of health workers^{19 22} and the possibility of challenging a higher-level staff¹⁹ were reported as facilitators of the NMCR implementation.

On the other side, barriers were perceived as following: the existence of hierarchical differences¹⁶; nurses, midwives and doctors working separately as opposed to acting as part of a team¹⁶; doctors' feeling/behaving as superior compared with other levels of staffing^{16 22}; disrespectful manners towards lower-level staff²⁰; lack of assertiveness among mid-level staff^{17 19 20}; staff not being used to speak in public, fear of talking in presence of staff in a higher rank^{17 19}; previously existing conflicts at interpersonal level²² as well as lack of external support to facilitate these dynamics.²²

Attitude towards patients and medical conditions

The existence of a sufficient degree of empowerment among patients, patients having a recognised status and being respected,¹⁶ together with a caring attitude from the staff^{16 17} were reported as facilitators of the NMCR implementation.

On the other side, difficulty of accepting professional responsibility,²² poor attention and low priority given to some clinical conditions possibly leading to complications (eg, obstructed labour),¹⁶ together with a low commitment to serve/work¹⁶ were reported as barriers.

Outputs and outcomes

Several studies reported that sustainability of audits also depended on their perceived effects. Where healthcare staff perceived that audits had a positive impact on quality of care—such as maternal or perinatal outcomes, respect for women's rights during childbirth, availability of equipment and organisation of care—²¹ and/or a positive impact on healthcare staff dynamics—such as improved communication and coordination, improved acceptance of responsibilities, increased awareness of problems, improved knowledge and skills^{20–22 24}—these factors facilitated the NMCR implementation over time.

On the other side, a lack of evidence or clarity about what the NMCR was, and on its effectiveness^{19 22} was perceived as a barrier to sustain the case reviews.

External partners factors

Sustained support

The existence of an external body or organisation able to provide technical support, and if needed additional required resources^{21 22 24} were reported as a key factor to ensure effective NMCR implementation in different settings.

Key recommendations

Table 5 synthesises key recommendations for effective NMCR implementation. Actions are divided in those that

may be implemented in the short term and those needing a longer time for the implementation but that may result in a longer-term impact.

DISCUSSION

This review fills a gap in evidence synthesis on facilitators and barriers to effective implementation of NMCR. Findings of the review suggest that the effective implementation of NMCR in maternity hospitals is a complex intervention that can be challenged by a number of barriers at different levels (national, facility, external partner level), including technical aspects (such as leadership and coordination mechanisms), resource availability (adequate human resources to manage workload and essential supplies), sociocultural factors (such as existing cultural norms, hierarchy among healthcare staff and patients' empowerment) and the lack of external support. On the other side, a number of facilitating factors were identified. Findings from this systematic review suggest a list of practical recommendations (table 5), which can be used by policy-makers and managers to prevent and mitigate common challenges to successful NMCR implementation.

This review was conducted according to the PRISMA⁸ and the ENTREQ⁹ standards. A broad search strategy in a large number of electronic databases was used. The key limitation of the review is the paucity of existing relevant scientific reports: although the NMCR approach has been used in many countries, there has been relatively few formal studies exploring facilitators and barriers to effective NMCR implementation. Despite the above-described limitation, this review retrieved an appreciable number of good-quality studies from the African Region. Findings of the review are therefore mostly generalisable to this setting.

Outside the African Region, we retrieved several informal evaluations reporting on enablers and barriers to effective NMCR implementation in Europe, Central Asia, South East Asia, Latin America and the Caribbean.^{25–37} It will be inappropriate to pull together results of peer-reviewed formal studies with those of unpublished technical reports and informal evaluations. However, it may be interesting to acknowledge that grey literature^{25–37} suggests that key factors enabling effective NMCR implementation in countries other than the African Region are similar to those observed in this review, with some peculiarities specific to each context. First, the importance of good leadership is a recurrent theme highlighted virtually in all grey literature.^{25–37} Second, the crucial role of a positive cultural environment has been reported as a key determinant of successful NMCR implementation on a global scale.^{25–36} For example, a review of experiences of NMCR implementation supported by the International Federation for Gynecology and Obstetrics in Europe, Asia and Africa identified three independent cultural factors as key determinants for the successful NMCR implementation: (1) individual responsibility and ownership; (2) a proactive institutional ethos, promoting learning as a

Table 5 Key recommendations for effective NMCR implementation

Short term	Long term
External partners <ul style="list-style-type: none"> ▶ Ensure technical support. 	External partners <ul style="list-style-type: none"> ▶ Ensure sustained technical support, in particular on the quality of the NMCR.
National level <ul style="list-style-type: none"> ▶ Ensure general commitment and understanding of national and local health authorities. ▶ Ensure financial resources. ▶ Make available updated evidenced-based national guidelines and standards. ▶ Develop a good action plan and budget, covering all WHO recommendations.* ▶ Create the legal framework. ▶ Ensure effective leadership and coordination. ▶ Ensure timely monitoring and evaluation. ▶ Support timely transparent results dissemination to health staff and the community. ▶ Promote local responsibility and ownership. ▶ Collaborate with an external body for quality assessment. 	National level <ul style="list-style-type: none"> ▶ Integrate NMCR in a comprehensive quality improvement plan for maternal and newborn health. ▶ Support continuous medical education. ▶ Integrate key concepts of quality improvement methods, including audits, in medical and midwifery schools' curricula. ▶ Support and disseminate a culture that promotes health system changes, professionalism and team work. ▶ Training in communication skills and team management. ▶ Policies to ensure adequate resources (human resources, equipment and supplies) to health facilities. ▶ Policies to improve quality of documentation. ▶ Community empowerment and policies for including service users views in health planning.
Local level <ul style="list-style-type: none"> ▶ Ensure commitment, understanding and active participation of hospital directors. ▶ Dissemination of updated evidenced-based national guidelines and standards. ▶ Develop a good action plan and budget, covering all WHO recommendations,⁵ considering feasibility based on local resources. ▶ Inform and create awareness among all staff. ▶ Train and adequate number and type of staff. ▶ Consider ways to provide some form of professional recognition for health staff involved in NMCR. ▶ Ensure effective leadership and coordination. ▶ Ensure that NMCR sessions are carried forward according the WHO recommendations.⁵ ▶ Ensure that recommendations from the NMCR are put in place. ▶ Ensure timely transparent results dissemination to all staff. 	Local level <ul style="list-style-type: none"> ▶ Same activities as for national level, when appropriate to local level.

*See the WHO manual: WHO. Regional Office for Europe. Conducting a maternal near-miss case review cycle at the hospital level' manual with practical tools. Available at <http://www.euro.who.int/en/health-topics/Life-stages/maternal-and-newborn-health/publications/2016/conducting-a-maternal-near-miss-case-review-cycle-at-hospital-level-2016> NMCR, near-miss case review.

crucial part of improving services and (3) a supportive political and policy environment at both national and local levels.²⁵ On the other side, identified cultural barriers for performing NMCR included a culture of blaming, fear and individual punishment, together with a lack of professionalism.²⁵ Similarly, reports on NMCR implementation in ex-Soviet countries identified a culture of blaming, fear and individual punishment, and hierarchy among staff as key barriers for successful NMCR implementation.^{28–32} In ex-Soviet countries, the key element in promoting a safe, friendly, confidential environment was the emanation from Ministry of Health of *prikazes* (national laws) and the commitment of hospital directors to a non-punitive system.^{35 36}

In line with what has been observed in this review, grey literature reporting experiences of NMCR implementation in LMIC in Europe and Asia deemed as crucial to provide some professional recognition for health staff involved in the case reviews.^{25 27 33} In settings with very low resources, a small financial incentive was reported as essential, since in these contexts any non-paid activity outside working hours means a serious loss of income.²¹

Again, similarly to what has been reported in studies included in this review,¹⁹ the importance for staff to perceive clearly the potential and/or actual benefits of the audits (eg, improvements in quality of care, organisation of care, staff knowledge and recognition) was recognised as a key determinant of successful NMCR implementation in a number of reports from different regions,³⁷ while disillusion from lack of actions following the reviews was highlighted as a important barrier for NMCR sustainability.^{25–28}

Lack of knowledge of the evidence-based maternal and perinatal practices was reported as a barrier to NMCR implementation in the WHO European region,²⁹ as well in studies in this review. As far as different types of hospitals were concerned, reports from both Europe, Latin America and Africa observed that the implementation of NMCR was easier in lower level facilities^{16 24 33} or research hospitals¹⁷ where staff was used to work together, rather than in large maternity units dominated by 'academic tradition' difficult to challenge³³ or where there was high staff turnover.¹⁶ Poor patient empowerment and insufficient inclusion of service user views were reported as

barriers to successful NMCR implementation in Europe, Asia and Africa.^{25 27 33} Finally, the availability of an external partner/organisation capable of providing sustained technical support (and, if needed, the resources to put in place the quality improvement recommendations) was a key factor mentioned in many reports from different countries.^{25 27–30 32 35 36}

This review contributes to the current debate on quality improvement interventions and on the knowledge of potential challenges to their implementation. When compared with other systematic reviews of facilitators and barriers of effective implementation of other quality improvement interventions,^{38 39} it appears that, not surprising, many barriers, such as the lack of coordination and leadership or lack of knowledge of evidence-based practices, are common to different quality improvement interventions. More research should be conducted to test strategies aiming at facilitating successful implementation for NMCR as well as for other quality improvement interventions.

CONCLUSIONS

Studies suggest that the effective implementation of NMCR at facility level is a complex intervention that can be challenged by a number of barriers at different levels (national, facility level, external partner level). Policy-makers, in planning the NMCR implementation, should consider the lessons learnt from previous studies as synthesised in this paper and should carefully plan actions to prevent and mitigate common challenges to successful NMCR implementation. Future studies should aim at documenting better facilitators and barriers to successful implementation of the facility-based individual NMCR, especially outside the African region, as well as exploring facilitators and barriers for other quality improvement interventions, and in testing strategies aiming at facilitating successful implementation.

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