Literature Review

The Impact of Maternal Death Reviews on Quality of Care

Compiled by the Evidence for Action team.

Introduction

Maternal death reviews (MDRs) have been operating in many developed countries for decades, and are in different stages of planning or implementation in developing countries. MDR is a key element in a strategy to reduce maternal mortality by identifying causes of death and avoidable factors contributing to deaths. MDR means taking action based on findings to improve quality of care, ultimately reducing avoidable maternal mortality. There is little evidence demonstrating the effectiveness of MDRs in improving quality of care and there are no randomized controlled trials demonstrating the efficacy of MDRs. Most studies focus on the process of implementing MDRs but do not report actions taken to improve quality of care and reduce maternal mortality. This literature review synthesizes available evidence on actions taken as a result of MDRs, identifying quality improvement initiatives and barriers to implementing recommendations.

Methodology

A review of existing literature was conducted using Google Scholar, Science Direct and PubMed databases. Combinations of the following terms were entered: “maternal death review”, “verbal autopsy”, “community maternal death review”, “maternal death surveillance and response”, “impact”, “quality”, “quality improvement”. The searches yielded more than 200 results. Additional articles were identified through references of selected articles. Articles were excluded if no full text was available, English was not the language of publication or if the impact of MDRs on quality of care was not addressed. Fourteen articles met the inclusion criteria and are included in the review.

Research question: How can maternal death reviews lead to improvements in care/health outcomes? If there was no improvement, what are the barriers preventing MDRs from having an impact?

Results

Setting	Summary	How did MDR lead to quality improvements?	Barriers to improvement	Change/ Outcome
9 hospitals in 3 districts in Malawi (2)	This study reviewed 43 facility-based maternal deaths in 9 hospitals in 3 districts over a 1 year period in Malawi. Three contributing factors to maternal death were identified (1) Lack of health worker capacity and life saving skills, inadequate monitoring of patients, initial assessment incomplete, delay in starting treatment (2) Administrative factor – lack of blood transfusion (3) Family factors such as delay in getting to hospital, use of traditional medicine. Level of analysis: facility	Recommendations were implemented when senior staff and decision makers were involved in the MDR process and committed to changes and recommendations made	Barriers to improvement include: • Barriers to conducting MDR include shortage of senior staff • Complete anonymity in MDR is difficult especially in small health facilities • Poor quality of data collected – errors of omission, errors of transcription, errors of interpretation, disorganization • Difficult to implement recommendations due to lack of resources or lack of commitment from senior staff and decision makers	Specific initiatives to improve quality of care were not discussed.
Malawi (3) +	This paper assesses the challenges associated with conducting facility-based MDR in Malawi. 4	Facilitating factors for implementation of MDR recommendations include: • Support from the District Health	Barriers to implementation of MDR recommendations: • Challenges to conducting MDR include fear of blame,	Specific initiatives to improve quality of care were not discussed.

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	categories of challenges emerged: (1) provider-related; (2) client/family related; (3) community related; (4) administrative Level of analysis: facility	Management Team (DHMT) to hospitals is vital for implementation of MDR recommendations as DHMT support is a motivator and can influence management • External support from Ministry of Health boosts morale and provides health facilities with technical expertise • Workshops bringing together staff from different health facilities to share experiences in MDR promotes and stimulates interest in MDR	lack of knowledge and skills to conduct a review, inadequate resources and missing documentation • Recommendations not implemented due to lack of financial resources, lack of transport to follow up at community level, shortages of drugs, supplies, blood and human resources	
Maternal death review in Africa (4)	Results from a survey sent to 46 SSA countries in 2007 to determine MDR activities in each country. Examples of MDR leading to quality improvements are included. Level of analysis: international with national examples	Stories illustrating how MDR led to improvements in quality of care: • In Garissa provincial hospital in Kenya, the blood bank, laboratories, pharmacies and other supporting services now operate 24/7. Emergency medicines are available in the labor room. Efforts to improve privacy, infection control and communication with clients have increased client satisfaction. MDR revealed fatality among eclampsia cases	The survey identified the following as challenges to MDR implementation: • Frequent turnover of programme managers and staff • Competing priorities • Incomplete and inconsistent reporting • Non-participating private sector • Lack of obstetricians to review causes of death and recommendations for	• Improved access to emergency obstetric services, drugs and supplies in a provincial hospital in Kenya. • Improved accountability, decision making and availability of supplies and equipment in Mozambique

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		was high so the hospital organised orientation for eclampsia management and put in place clinical protocols for all major obstetric complications. • In Mozambique, conducting maternal death review improved the accountability and timely decision making, availability of supplies and equipment, and led to additional staff training.	action	
3 districts in Malawi (Lilongwe, Kasungu and Salima) (5)	Observational study comparing emergency obstetric care offered to women who gave birth in 73 health facilities (13 hospitals and 60 health centres) in 3 districts in 2005 (baseline) was compared to 2006 and 2007. Level of analysis: district	Establishing the maternal death audit and criterion-based clinical audit involved: • Training through an interactive quality improvement (QI) workshop teaching staff how to conduct a maternal death review and clinical audit • Each hospital set up a QI team made up of health professionals working in the maternity unit (midwives, clinical officers, doctors, lab technicians, anaesthetic technicians and administrators) • QI team met whenever there was a maternal death and reviewed	Barriers to quality improvement include: • Shortage of qualified health workers who can provide emergency obstetric care	• Institutional delivery rate increased from 31.8% in 2005 to 34.7% in 2007 • # of maternal deaths decreased continuously over 3 yrs • Facility-based maternal mortality decreased over the years from 250 per 100,000 in 2005; 222 in 2006, 182 in 2007 • Overall case fatality rate decreased from 3.7% in 2005, 3% in

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		the case to determine cause of death and factors contributing to death and made recommendations for change • QI team reviewed whether recommendations from previous reviews had been implemented • Recommendations for change included training in life-saving skills for staff; documentation of initial assessment for all newly admitted pregnant women; workshops to improve technical skills of staff; repaired supplies; ensure availability of staff in case of emergencies; established local standards for post-operative care, monitoring and management; sufficient blood supplies available; outreach community education to promote facility-based delivery and better supervision of staff.		2006 and 1.5% in 2007 • The availability of comprehensive and basic emergency obstetric care facilities did not change over the 3 year period
5 reference hospitals in Senegal (6)	This study was carried out in 5 reference hospitals in Senegal, including primary-level referral hospitals and more specialised (regional and/or teaching)	Factors influencing the use of findings from MDR: • Findings are fed back to managers and all staff of the maternity unit • Involvement of hospital officials • Involvement of community representatives	Barriers to implementation of MDR: • Poor quality of data collected in medical files • Lack of involvement from heads of departments and senior staff	Specific initiatives to improve quality of care were not discussed.

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	hospitals. Key informant interviews, focus group discussions and observations from attending audit meetings were conducted to determine professionals' perceptions of maternal death reviews. Level of analysis: facility		• Lack of feedback to staff who did not attend the audit meetings • Lack of staff motivation in conducting MDR	
UK confidential enquiry and reports results from the 2006 – 2008 Saving Mother's Lives report based on results from the confidential enquiry (7)	This article reviews the process of the UK Confidential Enquiry into Maternal Deaths. The Enquiry considers all deaths of pregnant and delivered women up to 1 year after the end of their pregnancy. The process of enquiry involves deciding which deaths to review, collecting and assessing information, using it to develop recommendations, implementing these, and evaluating their impact.	• Following the publication of results for the confidential enquiries, national clinical guidelines are developed to address the leading causes of death. For example, in 2004, the Royal College of Obstetricians and Gyneacologists introduced the national guidelines "Thromboprophylaxis during pregnancy, labour and after normal vaginal delivery." After the introduction of these guidelines deaths from cesarean deliveries decreased • National guidelines are developed based on recommendations from the confidential enquiries report	N/A	Steady decrease in maternal mortality rates over time

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	The results are published triennially and disseminated to all interested parties. Level of analysis: national	and have in part contributed to the decline in deaths from pulmonary embolism and other causes • The 2000 – 2002 report found that socially marginalised women faced a higher than 20-fold risk of dying than the more privileged. This contributed to a new government strategy for maternity care, which made care more accessible for all women, including those most at risk. As a result, the most recent report saw a significant downward trend in maternal mortality among Black African women and women from White ethnic backgrounds over the past 9 years		
Moldova (8)	WHO, in partnership with the Moldova Ministry of Health and other key stakeholders, piloted facility-based near-miss case reviews and national-level confidential enquiries into maternal deaths in Moldova. Level of analysis: national	After two meetings of the Confidential Enquiry National Committee to review maternal deaths, it was acknowledged that there was an urgent need for a guideline on how to manage post-partum haemorrhage. The guideline was developed shortly after the meeting.	The major challenge to conducting reviews was fear of punitive action for health care providers involved. To overcome this barrier, much time and effort were taken to develop a confidential and anonymous process of enquiry.	Development of clinical guidelines to improve management of post-partum haemorrhage.

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South Africa (9)	This article describes the process and outcomes of national facility-based mortality audits for maternal, perinatal and child deaths in South Africa. Maternal mortality is audited through the National Committee on Confidential Enquiries into Maternal Deaths. The aim of the enquiries is to obtain data for all maternal deaths to capture causes, avoidable factors and substandard care related to all deaths to identify areas for quality improvement. Level of analysis: national	A frequently identified avoidable cause of death is incorrect management of labour, especially absence of use or incorrect use of the partograph. In the Saving Mothers 1999 – 2001 report, a recommendation that "correct use of the partograph should become the norm in each institution conducting births" and the need for a quality assurance (QA) programme to be implemented. A target was set for 30% of all institutions to have a QA programme in place by 2004. This was assessed in the 2002 – 2004 report and found that in 8 of 9 provinces, coverage of QA programmes at facilities ranged from 18 – 100%.	While QA programmes were implemented in most provinces, not all health facilities were using the programme and the programme did not always lead to correct use of the partograph. The provinces cited lack of and poor use of the partograph with shortage of staff, high turn over and inexperienced personnel.	Implementation of a quality assurance programme in 18 – 100% of health facilities in 8 provinces.
A district hospital in Dakar, Senegal, 1997 – 2000 (10)	This study assesses the effect of facility-based maternal death reviews on mortality rates and quality improvements in care at a district hospital in Senegal that provides	13 specific interventions were recommended by the review committee and implemented during 3 year period: • Renovation of laboratory building • Assigned 3 midwives from primary health centres to the hospital	A number of recommendations were made but not implemented: • Expand the maternity ward • Recruit 2 full time pediatricians • Recruit 2 full time	The maternal mortality rate over the 3 year intervention period decreased from 0.83% in the baseline period to 0.41% in year 3 of the intervention. Most of

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	primary and referral maternity services. Level of analysis: facility	• Recruited 4 anaesthetist-nurses • Recruited 1 biologist and 2 laboratory assistants • Bought blood-bank refrigerator • Equipped the post-surgery unit • Upgraded surgical equipment • Ensured 24 hour availability of drugs and supplies • Made intravenous magnesium sulfate available • Trained staff for blood bank management • Ensured 24 hour availability for hemoglobin and coagulation tests • Supervised staff in maternity ward • Supervised staff in primary health care facilities	gynaecologist-obstetricians • Train staff in primary health care facilities for emergency obstetric care • Equip a second operating room • Elaborate standardized kits for normal delivery • Improve standardized kits for Caesarean section • Elaborate and disseminate clinical practice guidelines for emergency obstetric care • Encourage blood donation at the district level	the decrease in overall maternal mortality rate was due to decreased deaths related to haemorrhage and hypertensive disorders. Maternal mortality rate decreased from baseline by 12% in year 1, by 36% in year 2, and 55% in year 3.
3 provinces of South Kalimantan, Indonesia, 1995 – 1999 (11).	A district-level review of maternal deaths aims to identify substandard levels of care contributing to maternal deaths; strengthen links between district health office, district hospital and health centres; make recommendations to	• In Hulu Sangai Selatan district the review revealed that the unavailability of appropriate medication at the community level might have contributed to a number of deaths caused by eclampsia. In response, magnesium sulfate was supplied to village midwives • In a different community	N/A	• Supplies of magnesium sulfate available to midwives for treating eclampsia • Standard protocols developed to improve consistencies in case management by

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	improve quality of care; and assess the main causes of maternal and perinatal deaths. Level of analysis: district	inconsistencies in case management between midwives in community health centres and villages led to the development and dissemination of a standard protocol for handling obstetric emergencies		midwives
Botswana (12)	This paper describes the maternity monitoring system in Botswana, which consists of maternal death and morbidity reviews at the facility-level, and analysis by the National Maternal Mortality Audit Committee. The National Committee then feeds back recommendations to health care staff. Level of analysis: national	The monitoring system has contributed to the following improvements in maternal care: • Maternal death was made a notifiable event in 2006 and plans are underway to criminalise the failure to report maternal deaths • Training for skills birth attendants is ongoing • Recruitment of midwives and doctors from other countries such as Cuba and China	Challenges to improvement: • Facility-based committees are not fully functioning and do not meet regularly • Lack of ownership of facility-based committee members • Unreliable reporting on process indicators such as caesarean rates	• Policy level changes for maternal deaths • Training for skilled birth attendants • Increase in human resources
UK Confidential Enquiries into Maternal Deaths report 2006 – 2008 (13) +	The Confidential Enquiries into Maternal Deaths in the UK report describes the leading causes of maternal death in the UK for a 3 year period and makes recommendations for	The impact of confidential enquiries includes: • Decline in deaths from direct causes, particularly thromboembolism and haemorrhage, due to improved prevention and management of these conditions after publication	N/A	• Maternal mortality rate of women dying from obstetric haemorrhage or eclampsia decreased from 6.24 to 4.67 per

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	improvements. Successes due to implementation of recommendations from previous reports are also highlighted. Level of analysis: national	of national clinical guidelines based in part on previous recommendations made by the Enquiry • Case fatality rate from ectopic pregnancy has halved from 2003 – 2005, suggesting that previous messages regarding diagnosis have been taken into account		100,000 maternities for 2003 – 2005 • The case fatality rate from ectopic pregnancy decreased from 31.2 to 16.9 per 100,000 pregnancies 2003 – 2005.
Sri Lanka (14)	The process for Sri Lanka's district and national-level maternal death review is described Level of analysis: district and national	The MDR identified overcrowding of wards with specialist services and heavy workloads for obstetricians in specialist hospitals as a contributing factor to maternal mortality. In response, clinical management protocols were developed and circulated to all hospitals offering maternity services.	N/A	Development of clinical protocols to more easily manage heavy workloads of obstetricians working in specialist hospitals.
Tamil Nadu, India (15) +	This report includes a description of Tamil Nadu's maternal death surveillance system, which involves verbal autopsy, facility-based maternal death reviews, near-miss case audits,	Based on in part results from the maternal death surveillance system, the following interventions were piloted and/or implemented to improve quality of care and reduce maternal mortality: • The 24x7 model was piloted at primary health care centres to	N/A	• 24/7 availability of skilled birth attendants at primary health care (PHCs) centres. PHCs with staff nurses conducted an average of 15.5

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	and clinical audits. Interventions implemented based on maternal mortality surveillance findings are described. Level of analysis: district	ensure availability of skilled birth attendants 24 hours a day, 7 days a week • To reduce delays in reaching first-level referral health facilities, one district piloted an initiative in partnership with a NGO to provide emergency transportation in case of complications. The NGO manages and operates the emergency service with a vehicle provided by government. The service is free for poor pregnant women and offered at a nominal fee to other pregnant women. The initiative will be replicated across the state. • Revitalisation of strategically located first referral units to Comprehensive Emergency Obstetric and Newborn Care (CEmOC) centres with 24/7 access to emergency care. Each CEmOC staffs 4 obstetricians and gynaecologists, 2 general surgeons, 4 paediatricians and 2 anaesthetists. Every CEmOC has 24 hour access to a blood bank, lab services, operating theatre,		deliveries per month in 2003 – 04 compared with 4.2 for all PHCs in the state. • Emergency transportation for pregnant women in case of complications. On average, 30 – 45 emergency cases were transported per month, 30% of which were obstetric emergencies • Provision of timely and comprehensive emergency obstetric and newborn care through a network of 62 Comprehensive Emergency Obstetric and Newborn Care Centres (CEmOC)

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		drug supply and linkage with ambulance services		

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Discussion

This literature review focused on how maternal death reviews has led to improvements in quality of care. Where no improvements were made, barriers and challenges to improvement were considered. While there is a large body of knowledge focusing on implementation and set up of MDR systems, few studies report how the systems have contributed to quality improvements. Of the 14 studies and reports considered in this review, 11 studies discussed specific actions undertaken to improve quality of care as a result of MDRs (4, 5, 7 – 15); three studies discussed facilitating factors to taking action for improvement (2, 3, 5); and three studies linked the impact of quality improvements to health outcomes (5, 10, 13). Seven of the studies and reports reviewed identified and discussed barriers to implementing recommendations based on MDR findings (2 – 6, 8, 9).

Specific improvements made to improve quality of care based on MDR findings include development of clinical guidelines to better manage conditions that are the leading causes of death. In Moldova, the first action taken by the newly established Confidential Enquiry National Committee was the development of clinical guideline for management of post-partum haemorrhage (8). As a result of findings from the UK National Confidential Enquiry, national guidelines to better manage thromboembolism were developed and disseminated (13). Changes made at the facility-level include 13 recommendations implemented at a hospital in Senegal, including recruitment of human resources, equipment upgrades, and 24/7 availability of essential drugs and supplies (6). A district-level maternal death audit in South Kalimantan, Indonesia, led to increased supply of magnesium sulfate to midwives to reduce maternal mortality from eclampsia, as well as development of guidelines to standardize case management among midwives (11).

A number of studies discussed factors that facilitated implementation of recommendations from MDR findings (2, 3, 5, 6). Strong political commitment and participation of a multidisciplinary team in the review process, with involvement from senior staff members including obstetricians and heads of departments, was associated with greater success in implementation of recommendations for quality improvement (2, 3, 5). In Malawi, teams were more likely to act on recommendations when the Ministry of Health was available to support and provide expertise, and workshops were organised to bring together different health teams to share lessons learned and experiences (3). A different study in Malawi found that assigning a multidisciplinary team to quality improvement activities ensured accountability in implementing results and recommendations from MDR (5). In Indonesia and Senegal, where verbal autopsy in the community was a key component of identifying maternal deaths, willingness of community members and participation of community representatives was key to identify causes of death and form and act on recommendations (6, 11). Feedback of MDR recommendations to key stakeholders and health care providers is essential for action to be taken; without feedback and an understanding of improvement needs, changes will not be made to improve quality of care (6).

Of the 14 studies reviewed, 3 reported changes in health outcomes due to quality improvement initiatives implemented based on MDR recommendations (5, 10, 13). In Malawi, facility-based maternal mortality decreased from 250 per 100,000 in 2005 to 182 in 2007 (5). In a hospital in Senegal, the maternal mortality rate decreased from 0.83% in the baseline period to 0.41% over three years (10). The decrease in maternal mortality was in part attributed to implementation of the 13 recommendations made after reviewing maternal deaths. Following the introduction of guidelines for management of thromboembolism, maternal mortality in the UK decreased from 6.24 to 4.67 per 100,000 maternities for 2003 – 2005 (13). These studies show that when recommendations based on MDR findings are implemented, quality of care can improve and avoidable mortality can be reduced; however, few studies go to this depth of analysis when discussing implementation of MDRs.

Of the studies and reports reviewed discussing barriers to acting on recommendations from MDR (2 – 6, 8, 9, 12), the most common were lack of involvement from senior staff and heads of department (2, 4, 6) and poor quality of data recorded during the MDR process (2, 3, 4, 6, 12). Other common barriers to improvement include a shortage of human resources, high turnover of staff, inexperienced staff, lack of standardized guidelines for reviewing maternal deaths, and lack of feedback of recommendations to staff responsible for quality of care.

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