Review Article

Quality improvement in maternal, neonatal and child health services in sub-Saharan Africa: A look at five resource-poor countries

Tekleab Mekbib[1*], Sheila Leatherman[2]

Abstract

Background: Quality improvement (QI) practices can advance maternal, neonatal and child (MNC) health outcomes. Hence, accelerating QI activities to achieve better results should be encouraged.

Objectives: This study aims to review QI interventions by conducting a synthesis of available data.

Methods: A rapid review methodology and the 'Google Scholar' search engine were used. We focused on Ethiopia, Ghana, Nigeria, Tanzania and Uganda because their populations are large, they all have a significant burden of MNC deaths, they are all signatories to the Every Newborn Action Plan (ENAP) and members of the Quality of Care (QoC) Network, and all have adopted maternal death surveillance and response (MDSR) systems. We also examined documents on the websites of ENAP, QoC Network, World Health Organization, and the ministries of health of all five countries.

Results: There was a paucity of information on clinical practice guidelines (CPGs), audit and feedback. There was weak integration between national quality policies and strategies and UN initiatives. Only 12 articles and two reports met our inclusion criteria. We found a total of just 20 CPGs on the websites of the various ministries of health. All five countries shared a scarcity of CPGs and poor performance in using MDSR systems.

Conclusions: For successful implementation of QI interventions, it is necessary to establish a mechanism for producing evidence-based CPGs and to revitalize the MDSR system. UN initiatives need to be integrated with national programs for impact and sustainability. While our findings do not allow us to make a causal link between the scarcity of CPGs and inadequate QoC in MNC healthcare services, evaluation of national programs, including UN initiatives, is required. [Ethiop. J. Health Dev. 2020; 34(1):59-80]

Key-words: Quality improvement; maternal, neonatal and child health; quality of care; Every Newborn Action Plan; Quality of Care Network; clinical practice guidelines; audit and feedback

Background

In sub-Saharan Africa (SSA), quality improvement (QI) practices can advance both the processes and outcomes of maternal, neonatal and child (MNC) healthcare and at the same time accelerate achievements of the Sustainable Development Goals (SDGs). However, a high burden of MNC deaths and weak health systems pose serious challenges in SSA countries. SSA accounts for around 66 percent of all maternal deaths across the globe, with under-five and neonatal mortality rates at 79 and 28 per 1,000 live births, respectively (1,2). It is critical, therefore, for QI interventions to be deployed across healthcare systems to achieve better health outcomes (3-5).

The SDG dedicated to achieving universal health coverage (UHC) triggered the quality of care (QoC) global movement. UHC serves as a vehicle to improve MNC healthcare and ensure access to high QoC. It affirmed that countries would strive to "Achieve UHC, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all." (6) To facilitate this transition, UN agencies, the World Bank and others adopted several global initiatives (7-10). Countries also developed national healthcare policies and strategies to advance QoC, while reforming health systems with partner support (11-13).

The World Health Assembly endorsed the Every Newborn Action Plan (ENAP) with the aim of achieving equitable and high-quality coverage of care (14). Its strategic objective was to improve the quality of MNC healthcare with two goals achievable by 2030: all countries will reach the target of 12 or fewer newborn deaths per 1,000 live births and 12 or fewer stillbirths per 1,000 total births. Subsequently, the QoC Network was launched to improve QoC in MNC health (15). The QoC Network aspires to reduce MNC mortality rates by 50% by 2022 (16,17). Network member countries produced a national monitoring framework for QI in MNC healthcare (18) and agreed to pursue four strategic objectives, summarized as leadership, action, learning, and accountability (19).

One of the critical components of QI interventions is clinical practice guidelines (CPGs), which are used to guide clinical practices and to ensure that patient care is evidence-based and standardized (20). CPGs can improve quality and patient safety, as well as optimize the use of resources (21). Adherence to CPGs is

[1*]Postdoctoral Research Associate and Senior Medical Advisor, WHO Collaborating Center for Research Evidence for Sexual and Reproductive Health, Department of Maternal and Child Health, Gillings Global School of Public Health, University of North Carolina at Chapel Hill E-mail: mekbib@live.unc.edu, mekbibt24@gmail.com

[2,] Professor, Department of Health Policy and Management, Gillings Global School of Public Health, University of North Carolina at Chapel Hill. Email: sleathe@ad.unc.edu, sheilaleatherman@gmail.com

monitored through audit and feedback (A&F) to ensure uniformity of clinical care and to maintain quality service provision (22). In North America, it is often termed 'peer review' and is one of the quality intervention strategies used to assess clinical practice (23).

According to the World Health Organization (WHO), a maternal death surveillance and response (MDSR) system is a tool that provides timely information on where, when, and why maternal deaths occur; builds on maternal death reviews, and includes the 'response' component for preventing maternal deaths and improving QoC (24). Institutionalization of the system strengthens surveillance with notification, systematic data collection, analysis of every event and taking remedial actions (25). It identifies maternal and perinatal deaths, makes them notifiable events (surveillance), and takes appropriate action (response) to prevent deaths in the future and improve QoC (26-28). The purpose of this paper is to review QI country policies and strategies, ENAP and QoC Network initiatives, including the availability, use, adherence to CPGs, A&F, and MDSR.

Methods

Rapid reviews (a form of evidence synthesis) are efficient solutions for decision-making to support health systems strengthening by providing high-quality evidence in a timely and cost-effective manner (29-31). We employed this method and focused on the scoping of the selected literature. Methodological quality appraisal was not conducted, as our intention was not to evaluate specific effects. We selected Ethiopia, Ghana, Nigeria, Tanzania, and Uganda, as these countries have large populations, high burdens of MNC deaths, are engaged in ENAP and the QoC Network initiatives, and have adopted the MDSR system to improve quality. The review was conducted from February to July 2019. We used Google Scholar because several peer-reviewed and published articles from major databases are uploaded onto this search engine regularly. For grey literature, we used Google Search.

Inclusion criteria: Articles on availability and use of CPGs, A&F, and MDSR, as well as articles on adherence to the recognized standards of MNC healthcare; Documents on the websites of WHO, ENAP and the QoC Network; Guidelines and protocols posted on the websites of the countries' ministries of health; Documents on QI, as well as national policies and strategies that influence the quality of MNC healthcare, and Articles published in the English language from 2014 to 2019.

Exclusion criteria: Articles outside the selected countries, and papers that do not address MNC healthcare; editorials, review papers, conference abstracts, and opinion pieces.

The following search terms were used in various combinations with Boolean operators (and, or, not): availability; use; adherence; clinical practice guidelines; maternal, neonatal and child health; maternal and perinatal death reviews; near-miss reviews; maternal death surveillance response; quality of care; Ethiopia; Ghana; Nigeria; Tanzania; Uganda. Pertinent information from included articles and reference lists were summarized using a simple form.

We conducted a secondary analysis based on data from ENAP, QoC Network, and MDSR systems. It included tracking progress in ENAP countries on the inclusion of indicators in their health management information systems (HMISs) (32). When a country had completed activities and taken measures to include an indicator in the HMIS, it was marked as 'Yes,' and if not, as 'No.' This approach was adopted to demonstrate the status of ENAP QI initiatives by country. 'Effort scores' and 'completion rates' were calculated from data reported by QoC Network members (Appendix 1).

Actions and activities include national QI approach (11 activities); selection of learning sites (6 activities); QI management and response system (6 activities); QI coaching system and structures (5 activities); measurement (8 activities); orientation in QI initiative to districts and facilities (3 activities); and national learning hub (5 activities). For every completed activity, we gave a score of '1,' and calculated completion rates by taking the sum of scores reported by country and divided by the total number of scores times 100.

We analyzed peer-reviewed studies and information from the websites of WHO, ENAP, QoC Network and the respective ministries of health, based on data from 2014 and 2019.

Operational definitions

Quality of care: We used the WHO definition to describe QoC as "the extent to which healthcare services provided to individuals and patient populations improved desired outcomes. To achieve this, healthcare must be safe, effective, timely, efficient, equitable, and people-centered" (33).

Quality measure: To assess quality, it must include not only components such as inputs, processes, and outcomes but also the perceptions of QoC by beneficiaries (34). Processes are indicators consisting of organizational and clinical interactions with patients. This review addresses process indicators to examine CPGs, A&F, and MDSR.

Quality improvement: QI in public health "refers to a continuous and ongoing effort to achieve measurable improvements in the efficiency, effectiveness, performance, accountability, outcomes, and other indicators of quality in services or processes to achieve equity and improve the health of the community" (35).

To structure the review, we adapted the framework by Leatherman *et al.* (36), which describes four levels of the health system for which quality interventions are selected and implemented. It guides the translation of available evidence into policy and managerial decisions to improve QoC. We focused on the policy level to examine MoH activities in formulating policies, strategies, regulation and guidelines on QoC,

as well as the status of ENAP and QoC Network initiatives. At the facility level, we assessed specific interventions – CPGs, A&F and quality reviews such as MDSR.

Results

National-level efforts: An online search of the websites of each country's MoH revealed that the countries developed just 20 CPGs in MNC healthcare and related topics that are available in the public domain (Table 1). The MoH websites of Ghana, Tanzania, and Uganda have a low number of CPGs compared to the MoH websites of Ethiopia and Nigeria. Studied countries have national treatment guidelines, and the management of MNC healthcare is incorporated into these documents. There is no information on how CPGs are developed, distributed and monitored.

Table 1: Examples of clinical practice guidelines and manuals for MNC healthcare by country (2014-2019)

No.	Name of CPGs	Date	Link to publication	Developer	Type of condition
Ethiopia					
1	National technical guidance for maternal and perinatal death surveillance and response	2017	www.ephi.gov.et/images/pictures/National-Maternal-and-Perinatal--Death-Surveillance-and-Response-guidance-2017.pdf	Ethiopian Public Health Institute	Maternal and perinatal death
2	Guideline for cervical cancer prevention and control in Ethiopia	2015	www.iccp-portal.org/system/files/plans/Guideline%20Eth%20Final.pdf	FMoH[1]	Cervical cancer
3	Maternal death surveillance and response (MDSR) technical guideline	2014	http://mdsr-action.net/wp-content/uploads/2016/11/Ethiopia-MDSR-revised-guidelines.pdf	FMoH	Maternal death
4	Standard treatment guideline for health centers	2014	https://apps.who.int/medicinedocs/documents/s17821en/s17821en.pdf	FMHACA[2]	MNC healthcare
5	Standard treatment guidelines for primary hospital	2014	http://apps.who.int/medicinedocs/documents/s21693en/s21693en.pdf	FMHACA	MNC healthcare
6	Standard treatment guidelines for general hospital	2014	http://apps.who.int/medicinedocs/documents/s21694en/s21694en.pdf	FMHACA	MNC healthcare
Ghana					
1	Guidelines for housemanship in Ghana	2015	www.moh.gov.gh/wp-content/uploads/2016/02/GUIDELINES-ON-HOUSEMANSHIP-TRAINING-2015.pdf	MoH, Medical and Dental Council	Health policy and accreditation
2	National guidelines for the prevention of mother to child transmission of HIV	2014	https://aidsfree.usaid.gov/sites/default/files/tx_ghana_pmtct_2014.pdf	MoH	MNC health
Nigeria					
1	Nigeria standard treatment guidelines	2016	http://apps.who.int/medicinedocs/documents/s23530en/s23530en.pdf	FMoH	General health
2	National guidelines for maternal and perinatal deaths and surveillance and response in Nigeria	2015	www.health.gov.ng/doc/National%20Guidelines%20PDF.pdf	FMoH and partners	Maternal and perinatal health
3	National tools for maternal and perinatal deaths and surveillance response in Nigeria	2015	www.health.gov.ng/doc/National%20Tools%20PDF.pdf	FMoH and partners	Maternal and perinatal health
4	Manual for training doctors and nurse/midwives on long-acting reversible contraceptive (LARC) methods (IUDs and contraceptive implants). Participants' reference book	2015	www.health.gov.ng/doc/DNM%20Participant%20Reference%20Book%20Corrected(1).pdf	FMoH and partners	Family planning

5	Manual for training doctors and nurse/midwives on long-acting reversible contraceptive (LARC) methods (IUDs and contraceptive implants). Trainer's manual	2015	www.health.gov.ng/doc/DNM%20Trainers%20Manual%20Corrected.pdf	FMoH and partners	Family planning
6	Manual for the training of community health extension workers (CHEWs) on long-acting reversible contraceptive (LARC) methods (IUDs and contraceptive implants).Trainer's manual	2015	www.health.gov.ng/doc/CHEWs%20Trainers%20Manual%20Corrected%20(1)%20-%20Copy%20-%20Copy.pdf	FMoH and partners	Family planning
7	Manual for the training of community health extension workers (CHEWs) on long-acting reversible contraceptive (LARC) methods (IUDs and contraceptive implants). Participants' reference book	2015	www.health.gov.ng/doc/CHEWs%20Participants%20Reference%20Book%20Corrected.pdf	FMoH and partners	Family planning
Tanzania					
1	Standard treatment guidelines and national essential medicines list	2017	https://apps.who.int/medicinedocs/documents/s23541en/s23541en.pdf	MoHSW[3]	General health
2	National guidelines for safe-care standards for dispensaries, health centers and district hospitals	2014	www.tzdpg.or.tz/fileadmin/documents/dpg_internal/dpg_working_groups_clusters/cluster_2/health/Sub_Sector_Group/Quality_Assurance/13_SafeCare-Guideline-Signed-PDF.pdf	MoHSW	General health
Uganda					
1	Material and Perinanatal death surveillance and response guidelines	2017	https://health.go.ug/sites/default/files/MATERNAL%20AND%20PERINATAL%20DEATH%20SURVIELLANCE%20AND%20RESPONSE%20GUIDELINES%20AUGUEST%202017.pdf	MoH	Maternal and perinatal health
2	Uganda clinical guidelines: National guidelines for the management of common conditions	2016	https://health.go.ug/sites/default/files/Uganda%20Clinical%20Guidelines%202016_FINAL.pdf	MoH	General health
3	The quality improvement methods: A manual for health workers in Uganda	2015	www.health.go.ug/sites/default/files/QI%20Manual%20_April%2015%20_0.pdf	MoH	QI in healthcare

[1]Federal Ministry of Health; [2]Food control Authority; [3]Ministry of Health and Social Welfare

As the studied countries have adopted the MDSR system, we examined a WHO resource to find out the status of their MDSRs (37). Table 2 shows a summary of MDSR policy and implementation. Although all five countries have launched national policies for maternal death notifications, they do not have a uniform implementation and reporting mechanism. Ethiopia and Uganda use their national surveillance system, which is known as 'Integrated disease surveillance and response' for reporting maternal deaths, giving maternal death the status of a health emergency. In contrast, Ghana, Nigeria, and Tanzania use routine HMISs. Ethiopia and Ghana do not have a national death review committee, while the other three countries have established and conducted annual meetings. Ethiopia, Ghana, and Uganda do not issue annual reports.

Table 2: Maternal death surveillance and response (MDSR) national policy by country (2015)

Status	Ethiopia	Ghana	Nigeria	Tanzania	Uganda
National policy for maternal death notification					
National policy to notify all maternal deaths	Yes	Yes	Yes	Yes	Yes
Year of adoption	2014	2011	2013	2010	2009
Zero reporting	Yes	No	No	Yes	Yes
Mechanism for reporting maternal deaths	Other surveillance system (Integrated disease surveillance and response)	HMIS*	HMIS*	HMIS*	Other surveillance system (Integrated disease surveillance and response)
Maternal death review					
National policy to review all maternal deaths	Yes	Yes	Yes	Yes	Yes
Year of adoption	2013	2004	2014	2007	2011
Level of implementation (national/sub-national)	Sub-national	National	National	National	National
Involvement of civil society	Yes	No	Yes	Yes	Yes
Implementation					
Existence of a national death review committee	No	No	Yes	Yes	Yes
How often does the national committee meet? [Whether the national committee meet]	N/A	N/A	Yes	No	Yes
Production of an annual report with recommendation (national)	No	No	Yes	Yes	No
Existence of a sub-national committee	Pilot stage only	Yes	Yes	Yes	No data
Production of an annual report with recommendations (sub-national)	No	No	Yes	Yes	No
Community representation in the sub-national review committee	Yes	Yes	Yes	No	Yes
Existence of a national MDSR plan	Yes	No	No	Yes	No

* HMIS=Health management information system

Sources:

1. United Nations, Department of Economic and Social Affairs, Population Division. World population prospects: The 2015 revision; 2015. DVD Edition.
2. Maternal mortality rates and numbers: WHO, UNICEF, UNFPA, The World Bank, United Nations Population Division. Trends in maternal mortality: 1990 to 2015. Geneva: WHO; 2015.
3. WHO Global MDSR implementation survey 2015.

A WHO and UNICEF publication on tracking progress on maternal and neonatal healthcare for ENAP countries served as a basis for secondary analysis (32). Table 3 summarizes recorded data on major core and additional indicators. ENAP countries report their life-saving actions by producing indicators for monitoring MNC healthcare in their national HMISs. These activities include a newborn action plan; free maternal and newborn care; kangaroo mother care; communication strategy; support for health workers in terms of their competencies, and retention. None of the countries reported an indicator for antenatal corticosteroid use. Ethiopia and Tanzania lead the group by having 14 and 15 indicators, respectively, out of 16. Ghana and Nigeria have 10 indicators each, while Uganda has only 50% of the indicators in place. In the studied countries, the lack of financial and human resources is reported as barriers to fully implement the ENAP initiative.

Table 3: Tracking progress on measures taken to improve maternal and neonatal health by country (2017)

Core and additional indicators	Ethiopia	Ghana	Nigeria	Tanzania	Uganda
1. National newborn action plan	Yes	Yes	Yes	Yes	No
2. Newborn mortality reduction target	Yes	Yes	Yes	Yes	Yes
3. Stillbirth reduction target	Yes	No	Yes	Yes	No
4. National health insurance scheme/free policy covering MNC care and sick newborn care	Yes	Yes	In process	Yes	Yes
5. Maternal death notification policy	Yes	Yes	Yes	Yes	Yes
6. National HMIS with an indicator for the use of antenatal corticosteroids	In process	In process	In process	No	No
7. National HMIS with an indicator for the performance of resuscitation	Yes	In process	In process	Yes	In process
8. National HMIS with an indicator for kangaroo mother care	Yes	Yes	Yes	Yes	No
9. National HMIS with treatment and management of severe neonatal infections	Yes	In process	In process	Yes	No
10. Human resource strategy for skilled birth attendants	Yes	Yes	In process	Yes	Not reported
11. Retention strategy for skilled birth attendants	Yes	No	In process	Yes	Yes
12. Competency and skill-based service/training/education for MNC health	Yes	Yes	Yes	Yes	Not reported
13. Community MNC health engagement/mobilization strategy	Yes	Yes	Yes	Yes	Yes
14. National communication strategy for newborn care	No	Yes	Yes	Yes	Yes
15. Perinatal death review system	Yes	Yes	Yes	Yes	Yes
16. Maternal death and surveillance and response (MDSR) mechanism	Yes	Yes	Yes	Yes	Yes

Information based on data collected using Every Newborn Tracking Tool developed in 2018.

QoC Network countries have also incorporated MNC healthcare indicators in their national HMISs. They use a common set of core indicators to monitor performance and track progress. Table 4 depicts implementation readiness, effort score and completion rate by country based on the four strategic objectives. There are small differences in total effort score and completion rates between countries. For all countries, completion rates for performing actions 4, 5, 6 and 7 are less than 50% because of the lack of resources, and attention paid to harmonizing national program-related activities. Ethiopia has a national learning-hub completion rate of 50% to 80%; in the other studied countries, the rate is less than 50%. Partners provide technical support on QI coaching and clinical mentorship. Effort score and completion rates for this particular action are 0 and below 50%, respectively, because of a poor commitment by decision-makers, lack of buy-in and resource allocation to the initiative.

Table 4: Effort scores and completion rates by QoC Network member countries (March to December 2017)

Strategic objectives (Actions)	Quality of Care Network member country									
	Ethiopia		Ghana		Nigeria		Tanzania		Uganda	
	Score	Completion rate	Score	Completion rate	Score	Completion rate	Score	Completion rate	Score	Completion rate
1. National QI approach	10/10	>80%	2/11	<50%	10/11	>80%	5/11	<50%	8/11	50%-80%
2. Selection of learning sites	2/6	<50%	2/6	<50%	3/6	50%-80%	1/6	<50%	3/6	50%-80%
3. QI management and response system	5/6	>80%	1/6	<50%	4/6	<50%	5/6	>80%	2/6	<50%
4. QI coaching system and structures	1/5	<50%	0/5	<50%	1/5	<50%	0/5	<50%	1/5	<50%
5. Measurement	7/8	>80%	7/8	>80%	6/8	50%-80%	1/8	<50%	0/8	<50%
6. Orientation in QI initiative to districts and facilities	2/3	50%-80%	0/3	<50%	1/3	<50%	0/3	<50%	1/3	<50%
7. National learning hub	3/5	50%-80%	0/5	<50%	0/5	<50%	0/5	<50%	0/5	<50%
Total score and completion rate	30/43	69.76%	12/44	27.27%	25/44	56.82%	12/44	27.27%	15/44	34.09%

Data source available at www.qualityofcarenetwork.org

Table 5 shows the QoC Network country reports on clinical QI interventions in MNC healthcare. Member countries have launched national quality and strategy documents to address clinical QI interventions. Tanzania and Ethiopia have adopted the Kaizen model in addition to the PDSA cycle to improve QoC. Ghana, Nigeria, and Uganda use the PDSA cycle with technical support from partners. Permanent and *ad hoc* committees at the national level of each country manage QI efforts. Ghana, Nigeria, and Uganda have adopted CPGs in MNC healthcare based on WHO standards. Ethiopia has developed its CPGs, and Tanzania is in the process of doing so. Clinical A&F, particularly maternal and perinatal death reviews, are reported by all countries except Nigeria. Member countries still have paper-based reporting systems, although steps have been taken to establish electronic data systems for their HMISs.

Table 5: Clinical quality improvement interventions in maternal and neonatal health reported by QoC Network member countries (March to December 2017)

Network member	QI model	Responsible body	Clinical practice guidelines	Clinical decision support tools	Clinical audit and feedback	QI coaching and clinical mentorship	HMIS (electronic data system)
Ethiopia	Kaizen and PDSA cycle	Health Service Quality Directorate	Available	Paper-based HMIS in MNC healthcare at facility level & electronically at MoH level	Key performance indicators reported in review meetings (maternal and perinatal death reviews)	Only in partner-supported facilities	Available in learning facilities and reported to districts, regions and federal offices
Ghana	PDSA cycle	Quality Management Unit	Developed by integrating the WHO QoC standards on MNC health	As above	Perinatal audit reports in review meetings in some facilities	In some public and partner-supported facilities	System-level gaps being addressed
Nigeria	PDSA cycle	National QoC Council	Developed by adopting the WHO QoC standards on MN health	As above	Status not reported	In some partner-supported facilities	In the process of integrating partner-supported reports into the national and district HMIS
Tanzania	Kaizen approach	Technical Working Group	Not yet developed	As above	Available for maternal and perinatal deaths	In the process of developing capacity	Integrated into national and district HMIS
Uganda	PDSA cycle	National QoC Steering Committee	Developed by adopting the WHO QoC standards on MNC health	As above	In some partner-supported facilities	In some partner-supported facilities	Standard reporting format to be developed

Note: No external validation has been undertaken so far.

Efforts at the facility level: Only 12 articles and two reports fulfilled our inclusion criteria. The characteristics of the included articles are summarized in Table 6. Availability, use, and adherence to CPGs, including MDSR experiences, are described based on the available evidence. The studied countries experience similar levels of scarcity, and lack of uniformed usage of CPGs.

Table 6: Characteristics of included studies by country (2014-2019)

Country	Author/ Year	Title	Data collection method	Participants	Findings/Results	Setting
Ethiopia	Ethiopian Public Health Institute, FMoH, Averting Maternal Death and Disability, 2017 (38)(38)	Ethiopian emergency obstetric and newborn care (EmONC) assessment 2016	National cross-sectional census of public and private health facilities providing maternal and newborn health services from 3,804 facilities	Health facilities	The most commonly available guidelines in the maternity area were for family planning (78% of health facilities), for obstetric topics and infection prevention (52%), and for preterm/low birth weight/KMC (48%).	National
	Ethiopia Public Health Institute, FMoH, WHO, 2017 (39)	Ethiopia service availability and readiness assessment 2016	Cross-sectional facility-based survey	Health facilities	A representative sample of 698 health facilities showed that the availability & use of guidelines for MNC healthcare services are as follows: ANC (29%); Essential childbirth care (26%); Essential newborn care (30%); and CEmOC (18%).	National
	Mirkuzie *et al.* 2016 (40)(40)	High proportions of obstetric referrals in Addis Ababa: The case of term premature rupture of membranes	Mixed-methods design	Laboring mothers and service providers	The study reported a large proportion of obstetric referrals in general, and premature rupture of membrane (PROM) referrals in particular, including variations in diagnosing and managing term PROM. A large number of referrals are attributed to lack of clinical guidelines for common obstetric complications at the health centers and competency gaps among providers.	Urban
	Gebrehiwot *et al.* 2014 (41)	Improving maternity care in Ethiopia through facility-based review of maternal deaths and near misses	Facility-based review	Women visiting health facilities	2,774 cases (206 deaths and 2,568 near misses) were reviewed. The ratio of maternal deaths to near misses was 1:12; overall, the maternal death rate was 728 per 100,000 live births In all, 1,946 (70.2%) women arrived at the hospital after they had developed serious complications. Only 1,223 (44.1%) women received prenatal follow-up and 157 (76.2%) deaths were attributed to direct obstetric causes. Facilities adopted several QI measures, such as providing 24-hour services and making ambulances available.	Urban
	Abebe *et al.* 2017 (42)(42)	'We identify, discuss, act and promise to prevent similar deaths': A qualitative study of Ethiopia's MDSR system	A qualitative case study in four zones in the largest regions, interviewing 69 key informants from regional, zonal, district and facility levels.	Service providers and health managers	Facilitators of the system's introduction were strong political support, alignment with broader health strategies and strong links across health system departments. Barriers included confusion around new responsibilities, high staff turnover and fear of legal repercussions. MDSR systems take time to establish, encountering challenges in early implementation.	Urban

Ghana	Amoakoh-Coleman *et al.* 2016 (43)	Public health facility resource availability and provider adherence to first antenatal guidelines in a low resource setting in Accra, Ghana	Cross-sectional analysis of the baseline data of a prospective cohort study	Service providers	Complete provider adherence to guidelines for pregnant women's first ANC visit for all participants was 48.1% (95% CI: 41.8–54.2), varying significantly across individual facilities and types of facilities. Complete provider adherence to guidelines was more common (51.9%) in the polyclinics compared to the hospitals (47.8%) and the only health center (33.8%).	Urban
	Adusi-Poku *et al.* 2015 (44)	Quality of care: A review of maternal deaths in a regional hospital in Ghana	A mixed-methods study (document reviews and interviews)	Service providers	18 (55%) cases were deemed to have received adequate documentation; senior clinicians were involved in 26 (85%) cases. Poor documentation, non-involvement of senior clinicians in the management of cases, lab-related issues concerning blood and blood products, including promptness of care and adequacy of intensive care facilities and specialists in the hospital, were contributory factors to maternal deaths. These are common themes contributing to maternal deaths, which need to be addressed. Maternal death review with emphasis on QoC with facility assessment is a useful tool to address EmOC services.	Urban
Nigeria	Oguntunde *et al.* 2015 (45)	Factors influencing the use of magnesium sulphate in pre-eclampsia/eclampsia management in health facilities in northern Nigeria: A mixed-methods study	A qualitative and quantitative study	Service providers	80% of all the health facilities visited did not have observable, written clinical protocols and guidelines for the management of PE/E, as required by the State Ministries of Health. Only 14% of health facilities were able to present written clinical protocol and guidelines that were also observed to be in use by data collectors, while the remaining 6% retrieved such guidelines and protocols, which were kept unused. Hospitals were far more likely to have verifiable written protocols than all other types of facilities combined ($p<0.0001$).	Urban
	Hofman *et al.* 2014 (46)(46)	Experiences with facility-based maternal death reviews in northern Nigeria	A qualitative and quantitative study	Service providers	Facility-based MDRs initiated in 75 EmONC facilities in northern Nigeria and initially conducted in 33 hospitals. However, the process stopped after some time and restarted later on. The main reasons were the transfer of key members of MDR committees, shortage of staff and lack of supportive supervision. Ninety-three (12.1%) of 768 identified maternal deaths were recorded on maternal death response (MDR) forms and 52 (6.7%) had been reviewed. MDRs resulted in improved QoC, including mobilization of additional resources. Challenges were fear of blame, shortage of staff, transfer of	Urban

					MDR team members, inadequate supportive supervision, and poor record-keeping. MDR needs to be institutionalized in the MoH, which provides oversight, policy guidance, and support, including supportive supervision.	
Tanzania	Armstrong *et al.* 2014 (47)	Strengths and weaknesses in the implementation of maternal and perinatal death reviews in Tanzania: Perceptions, processes, and practice	Qualitative and document review	Service providers	The MPDR system does not function adequately to either perform good-quality reviews or fulfill the aspiration to capture every facility-based maternal and perinatal death. Hospital reviews fail to identify appropriate challenges and solutions at the facility level. Staff is committed to the process of maternal death review, with routine documentation and reporting, yet action and response are insufficient.	Urban
Uganda	Munabi-Babigumira *et al.* 2019 (48)*et al* 2019	Ugandan health workers' and mothers' views and experiences of the quality of maternity care and the use of informal solutions: A qualitative study	Qualitative study	Mothers and service providers	Interviewed providers reported that they did not have guidelines on MNC healthcare and relied on knowledge acquired during training and through experience.	Peri-urban
	Braddick *et al.* 2016 (49)(49)	A mixed-methods study of barriers and facilitators to the implementation of postpartum hemorrhage guidelines in Uganda	Mixed-methods study (direct observation and interviews)	Service providers conducting Active management of the 3rd stage of labor (AMTSL)	Adherence to guidelines was low. There is a need to address barriers such as lack of guideline awareness, poor access to guidelines, prioritizing experience over evidence, and incorrect clinical practice.	Urban and peri-urban
	Opoka *et al.* 2019 (50)(50)	Adherence to clinical guidelines is associated with reduced inpatient mortality among children with severe anemia in Ugandan hospitals	Record review	Children	Children managed according to clinical guidelines have lower mortality than those not managed according to the guidelines. Efforts to reduce inpatient mortality should focus on training and supporting health workers to adhere to clinical guidelines.	Urban

	Agaro *et al.* 2016 (51)(51)	The conduct of maternal and perinatal death reviews in Oyam District, Uganda: A descriptive cross-sectional study	Aqualitative and quantitative study	Health managers and service providers	Only 34.8% of the health workers had ever participated in MPDR. Factors that influenced the conduct of MPDR were the existence of MPDR committees ($p<0.001$), attendance at review meetings ($p<0.001$) and knowledge of objectives of MPDR ($p<0.001$), implementation of MPDR recommendations ($p<0.001$), the observed improvement in maternal and newborn care ($p<0.001$), and provision of feedback ($p<0.001$). The proportion of MPDR conducted in Oyam was low due to poor initiation of the review process and a lack of supportive supervision.	Peri-urban

Ethiopia
A national survey (38) on emergency obstetric and newborn care (EmONC), involving 3,804 health facilities, revealed a lack of national CPGs. Only 52% of health facilities had CPGs that focus on the management of pregnancy and childbirth complications, and just 48% had CPGs for preterm/low birth weight. In the same survey, adherence to CPGs by service providers with respect to recording client history, physical examination, and investigation for postpartum hemorrhage, were 48%, 44%, and 51%, respectively.

An assessment of service availability and readiness based on a nationally representative sample revealed that CPGs for the management of maternal and newborn care were still in short supply. The availability of antenatal care (ANC) was 29%, essential newborn care was 26%, and comprehensive emergency obstetric care (CEmOC) was 18% (39). A mixed-methods study showed that a large proportion of obstetric referrals to tertiary facilities are largely due to a lack of CPGs and problems associated with competency among service providers (40). An in-depth review of patients from 10 hospitals conducted for 18 months suggests that integrating reviews of maternal deaths and near misses into regular practice helps to identify their causes and, in turn, can lead to remedial actions (41). However, a qualitative study on the impact of the MDSR over the two years since its introduction reported serious challenges, such as high staff turnover, poor distribution of data collection tools, and fear of repercussions for reporting maternal deaths (42).

Ghana
A cross-sectional study on public health facility resources and provider adherence to guidelines for pregnant women's first ANC visit reveals that complete adherence to the guidelines was 48.1% among the study participants. Complete provider adherence to guidelines was more common (51.9%) in polyclinics compared to hospitals (47.8%) (43). Another study raised issues of poor documentation, and the lack of involvement by senior clinicians in the management of cases, in contributing to maternal deaths. The study concluded by calling for maternal death reviews, strengthening the capacity of health facilities, and QoC to provide EmOC services (44).

Nigeria
A mixed-methods study on the availability of CPGs for the management of preeclampsia/eclampsia reported that 80% of health facilities did not have CPGs. Only 14% of health facilities were able to present written CPGs that were observed to be in use, while the remaining 6% were retrieved from safekeeping and were unused (45). A study of the introduction of facility-based maternal and perinatal death reviews (MPDRs) reported that the system was not functioning properly and was not successful because of the high turnover of providers and lack of supportive supervision. There were also challenges such as the fear of blame, poor record-keeping, and the absence of skilled staff to conduct the reviews (46).

Tanzania
A qualitative study showing the process and practice of MPDRs and near misses indicated that MPDRs do not function adequately, as there is a lack of commitment among staff to conduct audits, and limited organizational support (47).

Uganda
A qualitative study reported that interviewed service providers did not have CPGs on MNC healthcare, and as a result, they relied on knowledge acquired during training and through experience (48). A mixed-methods study on barriers and facilitators in the management of postpartum hemorrhage indicated that adherence to CPGs was low, and concluded that there is a need to address barriers, such as the lack of adequate resources, guideline awareness, and poor access, as well as the importance of prioritizing experience over evidence and incorrect clinical practice (49). Another study highlighted that adhering to CPGs when managing children with severe anemia can result in significant reductions in inpatient mortality (50). A qualitative study on the experience of MPDRs showed that only 34.8% of service providers had ever participated in MPDRs activities. This was due to poor initiation of the review process, reviews being undertaken on an *ad hoc* basis, and a lack of supportive supervision (51).

Discussion
The objective of this study was to review country policies and strategies on QI, ENAP and QoC Network initiatives, including the availability and use of, as well as adherence to, CPGs, A&F, and MDSR. Joining the global movement for QI provides these countries with a motivation to accomplishing more than mere access to and utilization of healthcare services. In the process, these countries not only launched national quality and strategy documents but also adopted diverse quality methods, such as Kaizen and PDSA cycle, for institutionalizing QI in MNC healthcare.

The MoH websites revealed very few CPGs, indicating serious deficiencies and gaps in clinical care. Singh *et al.* (52) raised concerns about the lack of CPGs, processes, and skills for obstetric care in peripheral health centers in India, which mirrors the situation in SSA. Ethiopia and Nigeria lead Ghana, Tanzania and Uganda in terms of the number of CPGs available in the public domain. CPGs are critical components of QI interventions, and we believe that these countries need to develop, disseminate and support the widespread distribution and use of evidence-based CPGs, in collaboration with local professionals.

Although adopting the MDSR system is one of the QI strategies to reduce maternal and perinatal mortality, the five countries in the current study have done so very slowly. Studies by Armstrong *et al.* (47) and Agaro *et al.* (51) point out that MDSR in SSA is

generally undertaken in an *ad hoc* manner, occurs in facilities that are widely dispersed, and includes little or no outside supervision. Richard *et al.*'s (53) study of death reviews in Burkina Faso reported a lack of staff commitment and resistance to being evaluated by their peers or service users, which is also a problem in the countries in the current study. Hence, countries in the current study need to accelerate the movement from routine reviews to taking action by creating an enabling environment.

ENAP and QoC network initiatives' strategic objectives and overall goals are underpinned by QoC to improve MNC healthcare services. As they complement each other, they need not be seen as parallel programs to be aligned and harmonized for maximum impact. To track coverage and quality, the countries in the current study incorporated life-saving core indicators for regular reporting into their national HIMSs.

A recent meeting of QoC Network member countries in Addis Ababa, Ethiopia, highlighted the difficulties in handling too many indicators from different partners and recommended a mechanism for common core indicators to be derived from and fed into country-owned and country-led strategic efforts (54).

Nevertheless, ENAP and QoC Network member countries have been reporting positively about the successful measures and actions they have taken. The Addis Ababa meeting, however, demonstrated that the mere inclusion of indicators in national HMISs does not mean that these actions have been fully implemented as intended. This shows that countries need to work more to institutionalize data management and validation processes. The meeting also identified other challenges, such as inadequate financial and human resources, lack of national ownership of the initiatives, and the need for partner alignment with government plans and guidelines.

Although QoC Network member countries pursued four strategic objectives, the Addis Ababa meeting highlighted that they are at different stages in their implementation efforts. QI coaching and clinical mentorship systems are poorly developed because of a lack of resources; and member countries have constraints in organizing support for implementation, in changing leadership for quality, in overcoming implementation barriers, and in strengthening community involvement. Despite these shortcomings, Ethiopia and Tanzania seem to perform better in implementing ENAP and QoC Network initiatives compared to Ghana, Nigeria, and Uganda. Moreover, completion rates for national learning hubs for all countries except Ethiopia are less than 50%.

When examining clinical QI interventions in these five countries, very few articles and reports qualified for review. We saw once again scarcities in peer-reviewed articles on CPGs. In support of our findings, Lewis (55) reports that, in resource-poor settings, there are few facilities with written standards and protocols of care to apply; as a result, many service providers use their professional judgment to determine avoidable factors to identify solutions.

The lack of CPGs and poor skills of service providers for obstetric care in peripheral health centers in India, as reported by Singh and colleagues, parallels the prevailing situation in SSA.

As indicated above, countries that have adopted the WHO system for MDSR have shown a lack of knowledge and understanding of the importance of audits among hospital staff, and all have experienced inadequate supervision and support. In terms of the implementation of MDSRs, the five countries in the current study, as well as Rwanda (56) and Botswana (57), share similar experiences and challenges.

Limitations of the study

We could have missed information from the grey literature, as a systematic search was not conducted of the entire evidence base, including MoH documents not posted on their websites. This could be considered as a limitation of this study.

Conclusions

In conclusion, despite the limited number of CPGs and A&F reviewed, our study provides evidence that QI intervention efforts to improve QoC and reduce mortality in MNC healthcare services are unsatisfactory. Nevertheless, our findings do not allow us to make a causal link between the scarcity of CPGs and adequate quality in patient care, and an evaluation of national programs, including UN initiatives, is required. It is essential to develop, disseminate and support the distribution and use of evidence-based CPGs, including designing a mechanism for common indicators in MNC healthcare services, and institutionalize data management. Building capacity and strengthening supportive supervision by taking action and creating an enabling environment to revitalize MDSR is critical. ENAP and QoC Network initiatives need to be aligned and harmonized for significant outcomes. Finally, countries have to allocate adequate financial and human resources for self-sufficiency and capacity building. They also need to conduct external validation studies for ENAP and QoC Network initiatives.

Acknowledgments

The authors are thankful to Linda Tawfik for editing and formatting the paper.

Competing interests: None declared.

References

1. World Health Organization. Trends in maternal mortality: 1990 to 2015: Estimates by WHO, UNICEF, UNFPA, World Bank Group, and the United Nations Population

Division. Geneva: WHO; 2015. http://apps.who.int/iris/bitstream/10665/194254/1/9789241565141_eng.pdf?ua=1

2. United Nations Inter-agency Group for Child Mortality Estimation (UN IGME). Levels & trends in child mortality: Report 2017, Estimates developed by the UN Inter-agency Group for Child Mortality Estimation. New York: United Nations Children's Fund, 2017. www.unicef.org/publications/files/Child_Mortality_Report_2017.pdf
3. Kruk ME, Gage AD, Arsenault C, Jordan K, Leslie HH, Roder-DeWan S. High-quality health systems in the Sustainable Development Goals era: Time for a revolution. Lancet Global Health 2018;6(11): e1196-e1252.
4. Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, *et al.* Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): A cross-sectional study. Lancet. 2013;381(9879):1747-55.
5. Liu L, Oza S, Hogan D, Chu Y, Perin J, Zhu J, *et al.* Global, regional, and national causes of under-5 mortality in 2000-15: An updated systematic analysis with implications for the sustainable development goals. Lancet. 2016;388(10063):3027-35.
6. Transforming our world: the 2030 Agenda for Sustainable Development. New York: United Nations; 2015. Available at: https://sustainabledevelopment.un.org/post2015/transformingourworld.
7. World Health Organization. Strategies towards ending preventable maternal mortality (EPMM). Geneva: WHO; 2015. https://apps.who.int/iris/bitstream/handle/10665/153544/9789241508483_eng.pdf?sequence=1
8. Every Woman Every Child. Global strategy for women's, children's and adolescents' health 2016–2030. www.everywomaneverychild.org/global-strategy/
9. World Health Organization. Every Newborn: an action plan to end preventable deaths. Geneva: WHO; 2014. https://apps.who.int/iris/bitstream/handle/10665/127938/9789241507448_eng.pdf?sequence=1
10. Global Financing Facility in support of Every Woman Every Child (GFF) Washington, DC: World Bank Group; 2016. http://globalfinancingfacility.org/.
11. World Health Organization. Handbook for national quality policy and strategy: A practical approach for developing policy and strategy to improve quality of care. Geneva: WHO; 2018. https://apps.who.int/iris/bitstream/handle/10665/272357/9789241565561-eng.pdf?ua=1
12. OECD, World Health Organization, World Bank Group. Delivering quality health services: A global imperative for universal health coverage. Geneva: WHO; 2018. https://apps.who.int/iris/bitstream/handle/10665/272465/9789241513906-eng.pdf?sequence=1&isAllowed=y
13. National Academies of Sciences, Engineering, and Medicine. Crossing the global quality chasm: Improving health care worldwide. Washington, DC: The National Academies Press; 2018.
14. Kinney MV, Cocoman O, Dickson KE, Daelmans B, Zaka N, Rhoda NR, *et al.* Implementation of the Every Newborn Action Plan: Progress and lessons learned. Seminars in Perinatology. 2015;39(5):326-37.
15. World Health Organization. Quality, equity, dignity: A network for improving quality of care for maternal, newborn and child health. www.qualityofcarenetwork.org/
16. World Health Organization. Quality, equity, dignity: the network to improve quality of care for maternal, newborn and child health – strategic objectives. Geneva: WHO; 2018. https://apps.who.int/iris/bitstream/handle/10665/272612/9789241513951-eng.pdf?ua=1
17. Quality, equity, dignity: A network for improving quality of care for maternal, newborn and child health: Department of Maternal, Newborn, Child and Adolescent Health (MCA). Geneva: 2017. Available at: www.who.int/maternal_child_adolescent/topics/quality-of-care/quality-of-care-brief-qed.pdf
18. World Health Organization. Standards for improving the quality of maternal and newborn care in health facilities. Geneva: WHO; 2016. http://apps.who.int/iris/bitstream/10665/249155/1/9789241511216-eng.pdf
19. Adeniran A, Likaka A, Knutsson A, Costello A, Daelmans B, Maliqi B, *et al.* Leadership, action, learning and accountability to deliver quality care for women, newborns and children. Bull World Health Organ. 2018;96:222-4.
20. Cabana MD, Rand CS, Powe NR, Wu AW, Wilson MH, Abboud PA, *et al.* Why don't physicians follow clinical practice guidelines? A framework for improvement. JAMA. 1999;282:1458-65.
21. Olayemi E, Asare EV, Benneh-Akwasi Kuma AA. Guidelines in lower-middle-income countries. British Journal of Haematology. 2017;177:846-54.
22. Amoakoh-Coleman M, Agyepong IA, Zuithoff NPA, Kayode GA, Grobbee DE, Klipstein-Grobusch K, *et al.* Client factors affect provider adherence to clinical guidelines during first antenatal care. PloS ONE. 2016;11(6):e0157542.
23. Al-Lamki L. Peer review of physicians' performance. Is it a necessary quality assurance activity? SQU Medical Journal. 2009;9(2):109-12.
24. World Health Organization. Maternal death surveillance and response: Technical

guidance. Information for action to prevent maternal death. Geneva: WHO; 2013. https://apps.who.int/iris/bitstream/handle/10665/87340/9789241506083_eng.pdf?sequence=1&isAllowed=y
25. Mathai M, Dilip TR, Jawad I, Yoshida S. Strengthening accountability to end preventable maternal deaths. International Journal of Gynecology and Obstetrics. 2105;131:S3-S5.
26. World Health Organization. Accountability for women's and children's health: 2015 progress report. WHO. www.who.int/life-course/news/regional-news/accountability-report-2015-with-isbn.pdf
27. World Health Organization. Time to respond: A report on the global implementation of maternal death surveillance and response. Geneva: WHO; 2016. https://apps.who.int/iris/bitstream/handle/10665/249524/9789241511230-eng.pdf?sequence=1
28. Scott H, Dairo A. Maternal death surveillance and response in east and southern Africa. Journal of Obstetrics and Gynaecology of Canada. 2015;37(10):915-21.
29. Tricco AC, Zarin W, Antony J, Hutton B, Moher D, Sherifali D, *et al.* An international survey and modified Delphi approach revealed numerous rapid review methods. J Clinical Epidemiology. 2016;70: 61-7.
30. Langlois EV, Straus ES, Antony J, King VJ, Tricco AC. Using rapid reviews to strengthen health policy and systems and progress towards universal health coverage. BMJ Glob Health. 2019;4(1):e001178.
31. Featherstone RM, Dryden DM, Foisy M, Guise J-M, Mitchell MD, Paynter RA, *et al.* Advancing knowledge of rapid reviews: An analysis of results, conclusions, and recommendations from published review articles examining rapid reviews. Systematic Reviews. 2015;4:50.
32. World Health Organization, UNICEF. Progress report: Reaching every newborn national 2020 milestones: Country progress, plans and moving forward. Geneva: WHO; 2018. https://apps.who.int/iris/bitstream/handle/10665/255719/9789241512619-eng.pdf?sequence=1
33. World Health Organization. Standards for improving the quality of maternal and newborn care in health facilities. Geneva: WHO; 2016. https://apps.who.int/iris/bitstream/handle/10665/249155/9789241511216-eng.pdf?sequence=1
34. Donabedian A. The quality of care. How can it be assessed? JAMA. 1988;260(12):1743-8.
35. Riley WJ, Moran JW, Corso LC, Beitsch LM, Bialek R, Cofsky A. Defining quality improvement in public health. J Public Health Management Practice. 2010;16(1):5-7.
36. Leatherman S, Sutherland K. Designing national quality reforms: A framework for action. International Journal for Quality in Health Care. 2007;19(6):334-40.
37. World Health Organization. Maternal death surveillance and response (MDSR): Country profile for MDSR implementation. www.who.int/maternal_child_adolescent/epidemiology/maternal-death-surveillance/country-profiles/mdsr-country-profiles.pdf?ua=1
38. Federal Ministry of Health, Ethiopian Public Health Institute, Averting Maternal Death and Disability. Ethiopian emergency obstetric and newborn care (EmONC) assessment 2016. www.ephi.gov.et/images/pictures/download2010/FINAL-EmONC-Final-Report-Oct25-2017.pdf
39. Federal Ministry of Health, Ethiopian Public Health Institute, WHO. Ethiopia service availability and readiness assessment 2016. www.ephi.gov.et/images/pictures/download2009/v6%20Final%20SARA%20Report%20Jan%202017.pdf
40. Mirkuzie AH, Sisay MM, Bedane MM. High proportions of obstetric referrals in Addis Ababa: The case of term premature rupture of membranes. BMC Research Notes. 2016;9:40.
41. Gebrehiwot Y, Tewolde B. Improving maternity care in Ethiopia through facility-based review of maternal deaths and near misses. International Journal of Gynaecology and Obstetrics. 2014;127 (Suppl. 1):S29-34.
42. 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.
43. Amoakoh-Coleman M, Agyepong IA, Kayode GA, Grobbee DE, Klipstein-Grobusch K, Ansah EK. Public health facility resource availability and provider adherence to first antenatal guidelines in a low resource setting in Accra, Ghana. BMC Health Services Research. 2016;16:505.
44. Adusi-Poku Y, Antwi E, Osei-Kwakye K, Tetteh C, Detoh EK, Antwi P. Quality of care: A review of maternal deaths in a regional hospital in Ghana. African Journal of Reproductive Health. 2015;19(3):68-76.
45. Oguntunde O, Charyeva Z, Cannon M, Sambisa W, Orobaton N, Kabo IA, *et al.* Factors influencing the use of magnesium sulphate in pre-eclampsia/eclampsia management in health facilities in northern Nigeria: A mixed-methods study. BMC Pregnancy and Childbirth. 2015;15:130.
46. Hofman JJ, Mohammed H. Experiences with facility-based maternal death reviews in northern Nigeria. International Journal of Gynaecology and Obstetrics. 2014;126(2):111-4.
47. 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. Tropical Medicine and International Health. 2014;19(9):1087-95.

48. Munabi-Babigumira S, Glenton C, Willcox M, Nabudere H. Ugandan health workers' and mothers' views and experiences of the quality of maternity care and the use of informal solutions: A qualitative study. 2019. PLoS ONE. 2019;14(3):e0213511.
49. Braddick L, Tuckey V, Abbas Z, Lissauer D, Ismail K, Manaseki-Holland S, *et al.* A mixed-methods study of barriers and facilitators to the implementation of postpartum hemorrhage guidelines in Uganda. International Journal of Gynaecology and Obstetrics. 2016;132:89-93.
50. Opoka RO, Ssemata AS, Oyang W, Nambuya H, John CC, Karamagi C, *et al.* Adherence to clinical guidelines is associated with reduced inpatient mortality among children with severe anemia in Ugandan hospitals. PLoS ONE. 2019;14(1):e0210982.
51. 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 Women's Health. 2016;16:38.
52. Singh S, Doyle P, Campbell OM, Mathew M, Murthy GV. Referrals between public sector health institutions for women with obstetric high risk, complications, or emergencies in India – a systematic review. PLoS One. 2016;11(8):e0159793.
53. Richard F, Ouédraogo C, Zongo V, Ouattara F, Zongo S, Gruénais M, *et al.* The difficulty of questioning clinical practice: An experience of facility-based case reviews in Ouagadougou, Burkina Faso. British Journal of Obstetrics and Gynaecology. 2009;116:38-44.
54. World Health Organization, UNICEF, UNFPA. Quality, equity, and dignity: Report of the second meeting of the Network for Improving Quality of Care for Maternal, Newborn and Child Health. Demonstrating accountability learning from implementation. 12-14 March 2019, Addis Ababa, Ethiopia. Available at: http://www.qualityofcarenetwork.org/knowledge-library/report-second-global-meeting-network-improving-quality-care-maternal-newborn-and
55. Lewis G: Emerging lessons from the FIGO LOGIC initiative on maternal death and near-miss reviews. International Journal of Gynaecology and Obstetrics. 2014;127(Suppl 1):S17-20.
56. Musafili A, Persson LÅ, Baribwira C, Påfs J, Mulindwa PA, Essén B. Case review of perinatal deaths at hospitals in Kigali, Rwanda: perinatal audit with the application of a three-delay analysis. BMC Pregnancy and Childbirth. 2017;17:85.
57. Madzimbamuto FD, Ray SC, Mogobe KD, Ramogola-Masire D, Phillips R, Haverkamp M, *et al.* A root-cause analysis of maternal deaths in Botswana: Towards developing a culture of patient safety and quality improvement. BMC Pregnancy and Childbirth. 2014;14:231.

Appendix 1: Progress of QoC Network member countries in efforts to institutionalize quality improvement activities (March to December 2017)

QI actions	Ethiopia	Ghana	Nigeria	Tanzania	Uganda
National quality improvement approach	• National standards on MN health QoC developed • National package on QoC strategies adopted • Leadership and governance structure endorsed • Audit and feedback tools developed • Hospital MIS and key performance indicators in place • Learning Collaborative between hospitals exist • Quarterly cluster meetings between lead and member facilities, including mentorship and supportive supervision • Financial awards provided to the best-performing hospitals • National health care quality strategy developed • Health Services Quality Directorate established at the FMoH	• National standards on MN health QoC to be developed • National package on QI interventions agreed • Key interventions in national QI package developed • Leadership and organization management formed • QI coach trainings conducted • Clinical mentoring started in government- and partner-supported districts • Audit and feedback planned • Improved data systems to be developed • Learning networks and learning collaboratives to be formed • Performance-based financing planned • National Quality Healthcare Strategy developed • Quality Management Unit established at the MoH	• National standards on MN health QoC developed • National package on QI interventions agreed • Key interventions in national QI package developed • RMNCH National Steering and Technical QoC committee formed • QI coaching and clinical mentorship functional in only eight states • Audit and feedback – no activity reported • Improving data systems – no activity reported • Learning networks/systems, including learning collaboratives, reported in two states only • Performance-based financing – no activity reported • National Strategy developed on QoC for MN health • National Council for QoC established as a strategy for reduction of MN deaths	• National standards on MN health QoC to be developed • National package on QI interventions agreed • Key interventions in national QI package to be developed and harmonized • Leadership and organization management formed • QI coaching and clinical mentorship for some programs • Audit and feedback for maternal and perinatal death reviews only • Improving data systems under HMIS/DHIS2 and RMNCH • Learning networks/systems, including learning collaboratives, in partner-supported districts • Performance-based financing in selected regions • National QI strategy and RMNCAH Strategy available • National Ministerial Steering Committee on QI proposed	• National standards on MN health QoC developed • National package on QI interventions agreed • Key interventions in national QI package in place • Leadership and organization management to be formed • QI coaching in some partner-supported districts • Clinical mentorship to be strengthened • Audit and feedback (guidelines adapted from WHO) • Improving data systems to include QoC indicators in the HMIS • Learning networks/systems, including learning collaboratives, to be developed • Performance-based financing to be developed • National QoC Strategy developed • Steering committee at the national level in place

Selection of learning sites	• Criteria for selection of learning districts, facilities developed • Baseline situational analysis at learning sites conducted • Initial resource provision to learning sites allocated in partner-supported areas	• Criteria for selection of learning districts and sites/facilities developed • Learning districts and sites/facilities to be selected • Baseline situational analysis to be conducted at learning sites • Initial resource provision not yet allocated to learning sites	• Selection criteria developed for learning districts and facilities • Learning districts selected and most are partner supported • Learning sites selected are not specified • Baseline situational analysis at learning sites not conducted • Initial resource provision to learning sites conducted	• Criteria for selection of learning districts under discussion • Criteria for selection of learning sites/facilities in the process of finalizing • Learning districts, sites/facilities to be selected • Baseline situational analysis at learning sites not conducted • Initial resource provision pending	• Criteria for selection of learning districts and sites/facilities developed • Learning districts selected but learning sites/ facilities not yet selected • Baseline situational analysis at learning sites to be finalized • Initial resource provision to learning sites to be allocated by partners
QI management and response system	• National, district and stakeholder communication and feedback mechanisms and loops agreed • Existing structures reviewed and identified for QI activities • Roles and responsibilities within existing structures for QI activities agreed • The Health Service Quality Directorate established and functional • Quality structure at regional level to be established	• National, district and stakeholder communication and feedback mechanisms and loops to be agreed • Existing structures to be reviewed and identified for QI activities • Roles and responsibilities within existing structures for QI activities to be agreed • Focal person with specified ToR for QoC at national, district and facility levels	• National, district and stakeholder communication and feedback mechanisms and loops agreed • Utilization of regular review meetings • Use of the learning platform to share the program with facilities and state-level bodies • Roles and responsibilities within existing structures for QI activities to be agreed • Focal person with specified ToR for QoC for all levels not agreed at national level	• National, district and stakeholder communication and feedback mechanisms and loops agreed • Existing structures to be utilized for QI activities reviewed and identified • Roles and responsibilities within existing structures for QI activities in process • Focal person with specified ToR for QoC at national and district levels to be reviewed • Focal person or team with specified ToR at facilities available	• National, district and stakeholder communication and feedback mechanisms and loops agreed • Existing structures to be utilized for QI activities reviewed and identified • Roles and responsibilities within existing structures for QI activities agreed • Focal person with specified ToR for QoC at national level, but ToR is not clear • Focal person with specified ToR for QoC at district level for MCH only • Focal person or team with specified ToR at facilities
QI coaching system and structure	• A pool of QI coaches/experts available • Clinical mentorship	• A pool of QI coaches to be developed • Clinical mentorship program/approach	• A pool of QI coaches/experts to be developed • Clinical mentorship	• A pool of QI coaches/experts available in some programs, but no national QI coaches or	• A pool of QI coaches/experts available and more needed • Clinical mentorship

	program/approach developed • Nationally agreed ToR for QI coaches and clinical mentors developed • Support system for QI coaches and clinical mentors agreed	developed • Clinical mentorship program developed • Nationally agreed ToR for QI coaches and clinical mentors not developed • Support system for QI coaches and clinical mentors to be agreed	program/approach agreed in partner-supported areas only • Nationally agreed ToR for QI coaches and clinical mentors developed in partner-supported sites only • Support system for QI coaches and clinical mentors agreed only in partner-supported sites	mentors • Clinical mentorship program/approach developed • Nationally agreed ToR for QI coaches and clinical mentors not developed • Support system for QI coaches and clinical mentors not established	program to be agreed and developed • Nationally agreed ToR for QI coaches and clinical mentors not developed • Support system for QI coaches and clinical mentors not established
Measurement	• National monitoring framework for MNCH QoC developed • Core set of QoC indicators agreed for national level reporting • Common set of QI aims agreed across districts • System of reporting agreed and necessary tools developed (information flow; standardized reporting formats; roles and responsibilities; and review mechanisms in HPMI)	• National monitoring framework for MNCH QoC not developed • Core set of QoC indicators agreed for national-level reporting to be developed • Common set of QI aims agreed across districts • System of reporting agreed and necessary tools developed but not yet functional • Information flow not reported • Standardized reporting formats not reported • Roles and responsibilities not reported • No review mechanisms reported	• National monitoring framework for MNCH QoC not developed • Core set of QoC indicators agreed for national-level reporting • Common set of QI aims agreed across districts in partner-supported sites • System of reporting agreed and necessary tools developed in partner-supported sites • Information flow not reported • Standard reporting format using NHMIS/DHIS2 • Roles and responsibilities not clearly reported • Review mechanisms not yet reported	• National monitoring framework for MNCH QoC not developed • Core set of QoC indicators to be agreed for national-level reporting • System of reporting to be agreed and necessary tools to be developed • Information flow not reported • Standardized reporting formats not yet agreed • Roles and responsibilities not yet agreed • Review mechanisms proposed (quarterly review meetings at district level; bi-annual and annual review meetings at national level)	• National monitoring framework for MNCH QoC not developed • Core set of QoC indicators to be agreed for national-level reporting • Common set of QI aims to be agreed across districts • System of reporting will use the current national HMIS • Information flow will use the current HMIS with modification • Standardized reporting formats to be developed • Roles and responsibilities to be developed • Review mechanisms to be developed
Orientation for districts and facilities	• Orientation package for learning districts developed	• Orientation package for learning districts developed in some sites	• Orientation package for learning districts developed in partner-	• Orientation package for learning districts to be developed	• Orientation package for learning districts developed and piloted

	• Orientation to learning districts completed • Orientation to learning sites completed	• Orientation to learning districts completed in districts only • Orientation completed in some learning sites	supported sites only • Orientation to learning districts completed • Orientation to learning sites/facilities not reported	• Orientation to learning districts to be completed • Orientation to learning sites/facilities to be completed	• Orientation to learning districts completed • Orientation to learning sites to be completed
National learning hub	• ToR developed for a learning hub to support the national learning network • The Health Service Quality Directorate serves as a learning hub/center for QoC • Standardized documentation developed for capturing and sharing learning from QoC implementation • Processes agreed for synthesizing and sharing key lessons • Venues and mechanisms identified for sharing QoC lessons and evidence synthesis	• ToR not developed for a learning hub to support the national learning network • The learning hub/center for QoC to be established • Standardized documentation to be agreed for capturing and sharing learning from QoC implementation • Processes to be agreed for synthesizing and sharing key lessons • Venues and mechanisms not identified for sharing QoC lessons and evidence synthesis	• ToR not developed for a learning hub/center to support the national learning network • The learning hub/center for QoC to be established • Standardized documentation to be developed for capturing and sharing learning from QoC implementation • Processes to be agreed for synthesizing and sharing key lessons • Venues and mechanisms for sharing QoC lessons and evidence synthesis not identified	• ToR not developed for a learning hub/center to support the national learning network • The learning hub/center for QoC to be established • Standardized documentation to be developed for capturing and sharing learning from QoC implementation • Processes to be agreed for synthesizing and sharing key lessons • Venues and mechanisms for sharing QoC lessons and evidence synthesis not identified	• ToR not developed for a learning hub/center to support the national learning network • The learning hub/center for QoC to be established • Standardized documentation to be developed for capturing and sharing learning from QoC implementation • Processes to be agreed for synthesizing and sharing key lessons • Venues and mechanisms for sharing QoC lessons and evidence synthesis not identified